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NOTICE

VOL. XIX, PART I NO. 39

PROCEEDINGS

NOVEMBER 18, 1932

THE EFFECT OF CHANGES IN VALUES ON CASUALTY INSURANCE

PRESIDENTIAL ADDRESS, THOMAS F. TARBELL

In the presidential address at the May meeting the speaker touched upon certain general problems relative to business cycles, and the informal discussions at that meeting on the effect of current economic conditions on the principal casualty lines proved a most interesting and valuable feature. The reason for again bringing to the fore matters pertaining to the current economic situation is that the casualty insurance business is and undoubtedly for some time to come will continue to be influenced and affected by major economic changes resulting therefrom. Developments and events since the last meeting have brought out prominently the influence of changes in values on the business of casualty insurance and it is intended to consider and comment upon the present and probable future effects of such changes as respects the various lines of casualty insurance. The term "changes in values" as used contemplates a broad definition—changes in commodity prices, rents, wages, salaries, wealth, income and capital. While changes in values may be inflationary or deflationary, it is the latter type that are of the greatest moment at the present time and the term "changes in values" will be considered as contemplating changes of the deflationary type unless otherwise specified. While much speculation and conjecture could be entered into concerning the effects of changes in values on the investment phases of the business, it is intended

to confine consideration to the underwriting and rate making phases.

The effect of changes in values upon premium volume during a deflationary period requires little comment. The consequential decrease in volume of business is reflected in increased expense ratios and obviously adversely affects underwriting results. The annual statements for 1932 will unquestionably show a substantial decrease in volume of business compared to 1931, probably running to twenty-five per centum or more. In spite of the most strenuous efforts that companies may make to reduce expenses, it is too much to hope that they can be immediately brought down to the level of reduced premium volume. Many items of expense are only semi-controllable. Expenses in general vary either according to premium or according to the number of items handled. Most of the former, such as commissions, taxes, and, to some extent, assessments based upon premium, vary directly with premium but experience shows that for the more important casualty lines the number of items handled during a period of falling volume such as the present remains more or less constant or tends to increase. For example, while there has been some falling off in number of compensation policies issued, the decrease has been much smaller than the decrease in amount of premiums. Further, and acting as an offset to this, is the relatively greater number of "Not Taken" and "Canceled" policies. Payroll audit expense cannot be materially reduced other than in the salary element and claim and inspection "plants" must be kept at maximum efficiency not only to maintain the expected contractual standard of these services, but companies must for their own protection maintain better than normal claim and inspection services because of the peculiar factors operating to adversely affect loss ratios.

Rents in many cases are only semi-controllable since space other than that in property actually owned is generally held under leases of varying durations and expirations, and as a rule a satisfactory modification of rent cannot be obtained during the currency of a lease.

Expenses imposed by or resulting from state bureaus or commissions such as the expenses of the New York Department of Labor for administering the compensation law, the major por-

tion of which is paid by the insurance companies, are not subject to control by them. To date there is no evidence of any appreciably effective effort to cut the costs of government.

Although inability to immediately deflate expenses to the level of a rapidly deflated premium volume is appreciated by experienced casualty insurance men, it is not, apparently, appreciated by all who have an influence upon the destinies of casualty companies and for this reason the foregoing points have been advanced.

Before considering the effect of changes in values upon the loss experience of the various casualty lines, it is perhaps well to analyze pure insurance cost. The pure cost of insurance (the pure premium) is dependent upon two factors—claim frequency and cost per claim. It must also be borne in mind that in most lines of casualty insurance claim frequency is dependent upon accident frequency. Variations in these factors as actually experienced during any period from those contained in the rates result in differences between actual and expected losses. These differences represent profit or loss as respects the pure loss cost element of the business.

Lines of insurance such as life insurance or the principal sum part of accident insurance contain only one variable—claim frequency. In disability insurance and all the usual casualty lines both claim frequency and claim cost are variables. Although there is usually a maximum value of claim cost either in fact because of policy limits in liability and property damage insurance, amount of insurance in burglary insurance, penalty of bond in fidelity and surety contracts and statutory benefits in compensation, or in effect because of the value of the subject matter of insurance as in plate glass and automobile collision insurance, the frequency of total losses is generally small and the operation of the limiting value has no material weight in a study of the effect of changes in values upon the claim cost variable.

To exhaustively examine the effect of changes in values in the broad sense previously discussed would require excursions into the realm of psychology and the speaker confesses his lack of qualification to do this. Accordingly, such examination for each casualty line will be limited to such conclusions as appear obvious

or reasonable from a consideration of economic conditions and ordinary human reactions and behavior.

Accident and Health

The experience under the principal sum part of accident insurance can only be affected by a change in accidental death frequency. Theoretically values do not affect the accidental death frequency, since moral hazard is supposed to be absent because suicide is a hazard not covered under the contract. However, as a practical matter there is probably an increase in accidental death frequency through cleverly staged suicides traceable to financial difficulties where a company, although morally certain that a case is suicide, cannot prove it at law.

In the case of dismemberment benefits, decreased values and loss or decrease of income present a moral hazard as it is easier to successfully stage accidents not involving death. Consequently, the claim frequency as respects these benefits will probably show an increase.

In the case of the indemnity and miscellaneous features it requires but slight evidence to establish the fact that both claim frequencies and claim costs will be increased during periods of falling values. In accident and health indemnity there is a strong motive for presenting trivial claims and for prolonging claims by malingering, especially where over-insurance exists or the assured is unemployed. There is unquestionably an added hazard in health insurance during falling values because of physical deterioration and illness resulting directly or indirectly from worry. Experience has shown that non-cancelable accident and health insurance has developed a substantial number of "pensioners" owing to over-insurance, even during periods of rising prices, and the prospect under falling prices is even more discouraging. This line, however, is relatively unimportant at the present time.

The effect of decreased values upon accident and health experience, therefore, appears to be entirely adverse.

Automobile Lines

Personal Injury—The effect of changes in values upon accident frequency is probably favorable. Lack of or a reduction in

income tends to decrease actual car exposure as measured by car miles, both in respect to insured and uninsured cars, and this should operate to reduce the accident frequency from collision accidents and perhaps to some extent from pedestrian accidents. The effect upon claim frequency, however, is probably in the opposite direction; that is, the ratio of claims to accidents is increased. The reason for this probability is the added incentive to those injured who are either unemployed, partially employed or otherwise experiencing a reduced income to endeavor to profit financially from trivial accidents which in more prosperous times would not be considered as possessing sufficient prospect of financial return to be worth pursuing. This incentive also tends to exaggeration of the seriousness of injuries. Another factor in the situation tending to increase both accident and claim frequencies is the physical condition of motor vehicles. Reduced income operates to discourage the keeping of motor vehicles in proper condition and repair.

The effect upon loss costs is problematical. Economic pressure tends to further the desire to obtain as large settlements as possible on both meritorious and non-meritorious claims. On the other hand, the increased purchasing power of the dollar furnishes a strong argument for obtaining settlements more equitable from the company standpoint. In cases litigated to conclusion in the courts it is probable that juries composed partly of unemployed individuals will tend to be liberal in verdicts. However, propaganda designed to impress upon the public its responsibility for rates may act somewhat as a deterrent. There is also the possibility that judges appreciating the relative value of the dollar today as compared with several years ago will temper awards where modification is within their discretion. To date there is little tangible evidence of deflation of verdicts but it appears logical to expect some in the near future.

It is difficult to draw any definite conclusions as to the net effect of changes in values upon the personal injury feature of automobile insurance. The speaker, however, ventures the opinion that the net effect of this particular feature will operate to offset to some degree the consistent upward trend in loss costs for this line that has been particularly evident during the past few years.

Property Damage—Factors favorably or unfavorably affecting the personal injury accident frequency should similarly affect property damage accident frequency. Most property damage accidents result from collisions of varying severity, and reduced actual car miles exposures should produce fewer accidents. Substandard mechanical conditions tend to produce more accidents. Unlike personal injury, however, the proportion of property damage accidents resulting in claims should decrease for the reason that a constantly increasing percentage of the cars in operation are old cars, the owners of which do not take the same pride in their appearance as they took a few years ago when the cars were new. In the matter of claim costs minor damage does not assume as important a role as it did several years ago when a dented fender meant a new fender and everything else that the owner of the damaged property could in any way, however remote, attribute to the accident. Nowadays the chances are that the old car has so depreciated in the eyes of its owner that he will not even bother to have the damage repaired unless it is serious. Another factor is the attitude of service garages and repairmen. A few years ago when a car came into a garage for repairs resulting from collision about the first question asked was "Is the damage covered by insurance?" If the answer was in the affirmative you may readily appreciate the effect upon the repair bill. Shrinkage in volume of repair business and the resultant competition for what business remains has considerably changed the situation and it is now possible for insurance companies to make arrangements for repair work, both labor and material, on an equitable basis.

The net result of favorable and unfavorable factors seems to point to an improvement in the automobile property damage experience.

Automobile Collision—Most automobile collision claims occur as a result of collisions with stationary objects, uninsured cars or with insured cars where the collision claimant is adjudged or admitted to be responsible for the collision. Decreased actual car miles exposure is a favorable factor. Mechanical condition, as in personal injury and property damage, is an unfavorable factor. Ratio of claims to accidents will probably show no substantial change since all but a small proportion of collision insur-

ance is written on some form of deductible basis. There should be some reduction, however, since due to lowered repair costs, some claims which a few years ago would exceed the deduction will now be less than the deduction. Obviously, the most favorable factor is reduced repair costs. The favorable factors appear to predominate and the net effect should be improved experience.

Liability

The several liability lines are variously affected by price or value factors according to the peculiar characteristics and objects or hazards which form the subjects of insurance. Where the unit of exposure is objects, area and frontage, units of product, etc., changing prices do not affect the effective premium. This applies to such lines as elevator, owners', landlords' and tenants' and theatre. Where, however, the unit of exposure is payroll, amount of sales or any other unit of monetary value, the effect of changes in values reduces the effective premium. This applies to manufacturers' and contractors', employers' and certain general liability lines where the unit of exposure involves the monetary element.

It is probable that the accident frequency on certain lines will be decreased because of a decrease in what might be termed density of exposure. This applies to such lines as elevator, owners', landlords' and tenants' and theatre. Owners', landlords' and tenants' with elevator coverage furnishes an example. A building only partially tenanted is subject to less actual area and elevator exposure than a similar structure fully tenanted.

For certain other lines an increase in accident frequency is the logical expectation, since during a period of deflated prices there is a greater number of unemployed persons spending their time walking the streets, viewing construction work or hanging around construction work hoping for a job. While this is a regrettable situation, it, no doubt, increases exposure and accident frequency. This increased exposure applies particularly to manufacturers' and contractors' and to the frontage hazard under owners', landlords' and tenants'.

The factors affecting the relationship of claims to accidents and claim costs applicable to automobile liability would appear to apply generally to the various other liability lines. Employers'

liability presents certain peculiar features as respects claim cost rather similar to those met with in compensation.

While it is obviously difficult to give proper weights to all price factors affecting the liability lines, the adverse factors appear to predominate.

Compensation

The effects of changes in values upon compensation insurance have been prominently brought to the fore in recent months. This line in particular is adversely affected by price factors on both the exposure and loss sides. Reduced rates of wages depress premiums without a corresponding reduction in benefits because of the operation of maximum and minimum rates of indemnity. On the loss side the accident frequency is adversely affected by such factors as lower standards of safety, sub-standard machine equipment and frequently lower plant morale. In some situations a distinct moral hazard is present; for example, in cases where employment is only temporary such as on certain contracting jobs and "made-work" projects or where the minimum rate of compensation benefit for temporary total disability is in excess of the prevailing wage rate. While fear of losing his job may furnish an incentive for the quick recovery of the injured workman in some instances, there are probably more instances where partial employment or the prospect of unemployment furnishes an incentive to malingering and converting compensation insurance into unemployment insurance. Sub-standard physical condition of an injured employee resulting from the adversities of depression may also be a factor in prolonging the period of disability.

Medical and hospital charges have not decreased in proportion to wages and it will probably be some time before these are brought in line.

The effects of changes in values on compensation insurance are decidedly adverse and this coupled with other adverse factors presents a very drab picture. While the critical condition of compensation insurance has been recognized and efforts made to improve the situation by the recent emergency rating program which incorporates a factor to offset reduced wage rates, it is quite probable that such program even if generally approved will

be inadequate to successfully cope with the continually increasing adverse factors.

Fidelity

Changes in values appear to have little effect on exposure under fidelity bonds. Experience indicates that fidelity losses are generally on a higher level as a result of falling values than under rising values. Defalcations and other breaches of trust probably occur most frequently during inflationary periods and at the beginning of deflationary periods if, as is usually the case, such beginning is marked by an abrupt drop in values, particularly stock values. Misappropriations of funds are usually for the purpose of stock or other speculation. During rising values defaulters, if in danger of discovery, can frequently avoid detection by making temporary restitution of funds, but a sharp drop in stock values or other values which may be the subject of speculation generally leads to the loss of a substantial part or the whole of the defaulters' illegitimately gained capital and to his ultimate, if not immediate, detection. Rising values induce dormant losses which eventuate into actual losses under falling values. While the ultimate effect of falling prices after the initial drop is favorable to the loss experience, the net effect because of the consequences of the sharp initial drop is unfavorable.

Surety

Changes in values have some effect upon surety bond exposure, since falling values create an increased demand for certain types of bonds, such as depository bonds, which normally have a low loss frequency.

The effects of changes in values on the loss experience of the several kinds of surety bonds vary. In case of contract bonds, falling prices are a favorable factor to the completion of the work within the contract price. However, competition for business tends to bring contract prices down to a point where the price may be less than the actual cost. Another factor of material consequence is the effect of credit stringency, which has accompanied falling prices during the past year, on the ability of contractors to finance their operations.

The depository bond line has suffered severe and abnormal

losses as a result of falling prices, deflation of values and public fear engendered by falling prices.

Financial guarantee bonds of certain types, such as mortgage guarantees, have met with a most unfortunate experience as a result of falling prices and deflation of values. These guarantees have contributed a very substantial part of the aggregate underwriting loss in the surety line in the past few years.

It is obvious that falling prices and deflation of values have contributed substantially to adversely affect the surety line.

Plate Glass

The position of this line under the conditions being considered is rather unique. As it is a contract for replacement, there is substantially no moral hazard. Falling prices have no material effect upon exposure. Loss costs vary directly with the prices of labor and material entering into the cost of replacement. Theoretically, premiums also vary nearly directly with replacement costs but there is generally some lag between changes with the result that during a period of falling prices the loss ratio is favorably affected.

Burglary

Falling prices tend to reduce the actual values exposed under burglary contracts. On the other hand, there is a tendency to reduce amounts of insurance carried to conform to reduced values. The net result, however, is probably favorable to the experience. The unfavorable factor in this line is claim frequency. Unemployment and other social ills which usually accompany falling prices encourage burglaries, thefts and robberies, particularly under contracts covering cash and negotiable securities. The same conditions also serve to increase moral hazard. As respects property losses, while theoretically the right of replacement clause operates to discourage irregular property losses, it is not as a practical matter very effective owing to the general practice of indemnification, a practice which it would probably not be desirable or good policy to change, and, further, because of the impracticability of replacement in many kinds of property losses. It is of practically no value in mercantile open stock losses.

While the decreased property values have favorably affected the burglary experience, higher claim frequencies and unusual and large cash burglary and hold-up losses result in the unfavorable factors predominating.

Boiler and Machinery

These lines being somewhat similar are considered together. Exposure factors are not materially affected by changes in values. Accident frequency is possibly affected to a slight degree since forced economy tends to discourage the maintaining of plant and equipment in the best of condition. This tendency is considerably, if not entirely, offset by efficient inspection service. Reduced costs of repairs and replacements operate to reduce average claim costs. On the whole, reduced values should favorably affect the boiler and machinery lines.

Miscellaneous Property Damage and Collision

The effect of changes in values on these lines will be similar to the effects upon the concurrent liability lines with which they are associated. As these lines are relatively unimportant the net result is not of material consequence.

Analyses of the more important factors affecting casualty insurance as the result of changes in values show that in a period of deflated values and falling prices the expense ratio rises because of inability to contract expenses proportionately to the reduction in premium volume and that for the business as a whole the effect upon loss ratios is adverse. This latter conclusion is substantiated by the recent and current actual loss ratios for the more important casualty lines, particularly compensation. While changes in values are by no means the only unfavorable factors affecting loss ratios, they have unquestionably been a substantial contributing cause. On the other side of the picture, in periods of inflated values and rising prices the general effect upon underwriting results should be in the opposite direction—lower expense ratios and lower loss ratios.

If the foregoing analysis of the effects of changes in values is

correct, it lends weight to the theory that rate levels as respects both pure premiums and expense loadings should be determined from the long term point of view and that reserves should be set up in times of increasing values to act as a shock absorber in times of decreasing values.

The problems incidental to deriving rate making formulae to produce proper rates over a considerable period of time are many and formidable and can only be solved by patient and exhaustive study. Past experience records are available for most lines but the record of past experience, while of material value for purposes of determining relativity between classes, types, etc., is not in itself a reliable index of the rate level for a future period. The important factor that has been neglected, either because of optimism or inability to assign to it a definite value, is the trend factor. Practically all casualty lines are affected by a law which might be termed the law of increasing loss costs. The operation of this law has been particularly evident in compensation insurance and the reasons therefor are generally recognized by casualty insurance men. It has also been noted in automobile public liability insurance—also the reasons therefor. There is no evidence that this law has ceased to operate or has diminished in the slightest in compensation insurance and it is reasonable to conclude it will continue to be an important factor in automobile insurance. The law has been recognized to some degree in compensation insurance rate making by the selection of the latest available policy year's experience for the indemnity rate level and the projection of medical cost to the period for which rates are to become effective. It was also recognized by the introduction of a flat countrywide factor in the determination of the 1932 automobile public liability rates. There is still much more work to be done along the lines of developing scientific formulae for determining modification factors to reflect this peculiar law. This problem is essentially one for the casualty actuary and he will be looked to and held responsible for its solution.

WISCONSIN UNEMPLOYMENT COMPENSATION ACT

BY

W. H. BURHOP

Unemployment is generally admitted to be one of the greatest problems of labor as well as of industrial management. Labor fears unemployment more than industrial accidents or sickness because it affects, during certain times, so large a proportion of the labor class and the worker has no power to defend himself nor curtail the period of unemployment by any precaution he may exercise or anything that he may do. Industrial management wants to avoid periods of unemployment because no business can be conducted profitably unless its machinery and equipment can be in constant use and operation. It is very natural, therefore, that the problem of unemployment has been given much attention and consideration by labor organizations, by industrial management, and by law-making bodies.

Various forms of statutory unemployment relief have existed for many years in European countries. No real demand for unemployment insurance legislation in the United States existed prior to the beginning of the twentieth century. The vast natural resources of our country, the development of new areas, the great diversification of our industries and the almost unlimited agricultural opportunities have all operated to promote reasonably steady employment. But the several periods of business depression and resulting general unemployment during the past thirty years have created an organized demand by labor for protection and relief.

Wisconsin Legislative Proposals

The most discussed proposal for state unemployment insurance legislation prior to 1931 was the Huber bill (Senate Bill No. 122) brought before the Wisconsin Senate in 1921. This proposal was formulated by Professor John R. Commons of the University of Wisconsin who, for many years, had devoted much time and study to this problem in industrial relations.

The Huber bill was designed by Dr. Commons more as an

unemployment prevention measure rather than a relief plan. Mechanization of industry produces unemployment, but this is gradual in character and is partly controlled by industry finding additional markets for the increased quantity of goods produced, by increased consumption through reduced prices and by shortening the hours of work. The type of unemployment at which the Huber bill was directed is that resulting from the business cycle, periods of great expansion followed by periods of depression.

Labor has no control over business expansion. Industrial management properly organized does have control. In periods of prosperity industry has enlarged its productive facilities, more machinery is added and new factories are constructed. Soon the abnormal demand has been supplied and manufacturing operations must be reduced. From a period of overtime work we suddenly change to part time work. If manufacturing had not been accelerated the demand would have been supplied more slowly and steady employment would have resulted. In this program of undue expansion industry has been aided by our credit system. Dr. Commons writes, *"The banking system, which is the center of the credit system, more than the business man who is the actual employer, can stabilize industry, and in stabilizing industry, stabilize employment. The difficulty is that no one individual can do it alone; no bank can do it by itself; no one business man can do it by himself; it is a collective responsibility and collective action is necessary."

The principal intent in the Huber bill was to penalize business management for over-expansion. If expansion is followed by unemployment, industry would be required to pay the penalty in unemployment benefit. This penalty, constituting relief for those who suffered innocently, was expected to prevent expansion, thereby removing the extremes of the business cycle and maintaining employment on a more constant basis. Just as workmen's compensation has been the greatest force in the prevention of industrial accidents, so would unemployment insurance be the best preventative of unemployment. Of lesser consideration in this plan of prevention are the creation of a better system of employment offices and agencies maintained by industry, and

* *Unemployment Insurance, the Road to Prevention.* Published by Wisconsin Association for the Prevention of Unemployment, Madison, Wisconsin.

greater effort by manufacturers to diversify their lines, thereby avoiding sharp seasonal fluctuations in business.

Since the Huber bill did not become a law, the provisions of the bill merit only passing comment. The proposal included all employers of six or more persons. After a waiting period of three days the benefit was one dollar per day of unemployment. All employers were required to insure in a compulsory mutual organization managed by employers under regular state insurance supervision. This company was expected to study causes of unemployment, encourage moderation in expansion, study unemployment problems in individual plants, suggest remedies and operate employment agencies. Exemption from insurance was possible upon satisfactory evidence of financial condition. Benefits were restricted to one week for every four weeks of employment in the state and not to exceed thirteen weeks in any year. Contested cases were to be decided by the Industrial Commission, subject to court appeal. An advisory board representing equally employers and labor was created.

The Huber bill failed to pass in 1921, was reintroduced in the 1923 Legislature and after extended hearings again was defeated. Similar bills were presented in 1925 and 1927, but largely on account of favorable employment conditions in these two years the proposal did not receive much attention.

Legislation in 1931

General unemployment in 1931 again made unemployment insurance one of the outstanding issues in the Wisconsin 1931 Legislature. Various bills were introduced embodying more nearly the principles advocated by the *American Association for Labor Legislation rather than the theories in the Huber bill. Finally it was decided that more public hearings should be conducted and additional investigation should be carried on. All definite legislation was deferred and a legislative committee was appointed to study the subject and prepare a bill to be considered by a special legislative session. This special session convened late in 1931, and on January 28, 1932, the Wisconsin Unemployment Compensation Act became a law (Chapter 20, Laws of Special Session 1931).

* *American Labor Legislation Review,* December, 1930.

This act is in a large measure a compromise of the views of representatives of industry and labor. Industrialists had maintained throughout the entire discussions that industry is doing voluntarily everything possible for the prevention of unemployment. Hundreds of the larger companies had created unemployment prevention and relief plans; others were diversifying their lines to escape seasonal dullness. State compulsion appeared unnecessary. Further, an expensive plan confined to employers of one state would merely add to competitive difficulties and would not be a cure for conditions that are national. In short, employers desired to solve their problems without state interference and without the detail and restrictions that would accompany a compulsory state controlled plan. Labor contended that industry had had sufficient opportunity to stabilize employment and had failed and that, therefore, compulsion by state was the only alternative. This conflict of views and resulting compromise must be borne in mind when the provisions of the law are considered.

Provisions of the Unemployment Act

Section 1 of the act declares the legislative intent, and the first part of Section 2 is a declaration of public policy. Quoting from these sections, "The legislature intends through this act to make it certain that by July 1, 1933, at least a majority of the employes of this state will enjoy the protection of fair and adequate systems of unemployment compensation. The largest organizations of employers in the state having declared it to be the intention of its members voluntarily to establish unemployment fund systems, it is the intent of the legislature to give employers a fair opportunity to bring about the purpose of this act without legal compulsion." If by July 1, 1933, employers of not less than 175,000 employes have voluntarily established plans which comply with the standards of the law, then the compulsory system will not become effective. These plans must be continued so that the number of employes covered is never less than 175,000. If employers do not voluntarily provide protection for this number of employes, then the compulsory feature becomes operative but the voluntary approved plans will then automatically constitute "exempted plans" under the act. In the declaration of public

policy it is stated that, "The burden of irregular employment now falls directly and with crushing force on the unemployed worker and his family, and results also in an excessive drain on agencies for private charity and for public relief. * * * Industrial and business units in Wisconsin should pay at least a part of this social cost, caused by their own irregular operations. To assure somewhat steadier work and wages to its own employes, a company can reasonably be required to build up a limited reserve for unemployment, and out of this to pay unemployment benefits to its workers, based on their wages and lengths of service".

Who Is Covered

The act applies to all employers who have employed ten employes or more for four months or more during the preceding calendar year. The four month provision is intended to eliminate strictly seasonal occupations, principally the canning industry. Other specific employments excluded are farm laborers, domestic servants, employes of a governmental unemployment relief project approved as such by the Industrial Commission, elected or appointed public officers, employment by a governmental unit on an annual salary basis, teachers, and employes of interstate and logging railroads. Two years' residence in Wisconsin is required for employes to become subject to the law.

When Benefit Is Payable

An employe is deemed totally unemployed if he performs no services for his current employer for one week. Notice of unemployment must be given to the Industrial Commission. The waiting period is two weeks, payments are never retroactive, but in case of more than one period of unemployment in one year, only one waiting period applies. No payments are due if the employe lost his employment through misconduct, if he has left his job voluntarily, if he left work due to a trade dispute, if he is out of employment because of an act of God affecting his place of employment or if he has received in wages fifteen hundred dollars or more during the twelve months preceding unemployment. Refusal to accept suitable employment disqualifies claimants from further payments.

Amount of Benefits

Eligible employes will receive ten dollars per week or fifty per cent. of wages, whichever is lower, with a minimum of five dollars a week. Benefits for partial employment are limited to the difference between actual earnings and total unemployment benefits. No employe shall receive in any one calendar year more than ten weeks of benefit. This amount may be further reduced by the benefit liability limit of his employer's account.

Liability Limit of Employers

Employers have no liability if the employe has worked less than two weeks for the individual employer during the preceding year. Payment is limited to one week's benefit for every four weeks of employment during the year, and no liability exists if unemployment occurs more than six months after the date on which such employe last performed services for the employer. When an employe is employed by more than one employer within any twelve-month period the payment of benefits due such employe for total unemployment shall be made from the successive employers' *accounts in inverse order to such successive employments.

No employer's account shall at any time be liable to pay benefits beyond the current resources his account has or would have if all contributions due had been paid. If the employer's reserve account at the beginning of the month amounts to fifty dollars or more per employe, full benefits must be paid during the month. For every five dollars reduction per employe in the fund, benefits are decreased one dollar per week.

Settlement of Claims

Unemployed must report their claims to the superintendent of the public employment office for the district in which the claimant was last employed, or to a deputy of the Industrial Commission designated for that purpose. The superintendent or deputy allow or reject claims. Appeal from their decision is to an appeal board appointed by the Industrial Commission for each district. These boards must consist of one representative of employers,

* Reserve accounts referred to later.

one representative of employes, and one person who is not an employer, employe or representative of either. Decisions of the appeal board are subject to review by the Industrial Commission and the Commission's decisions are subject to judicial review just as decisions under the workmen's accident compensation law.

Unemployment Reserve Fund

The reserve fund is administered by the state without liability on the part of the state beyond the amount in the fund. Every employer subject to the law must contribute to the fund a sum equal to two per cent. of the annual payroll and an additional two-tenths of one per cent. of the payroll for administrative costs. This latter contribution must also be paid by employers exempt from the regular provisions of the law. If an employer has been continuously subject to the law for two years his contributions may be reduced. If in such case the employer's account amounts to fifty-five dollars per employe but less than seventy-five dollars, the contribution is reduced to one per cent. of the payroll, and if the reserve exceeds seventy-five dollars per employe no more contributions are required. Payments are again resumed on the regular basis as the reserve funds are reduced by the payment of benefits.

A separate account must be kept for each employer and these separate accounts shall not be merged except it is possible for groups of employers to organize a joint account with the approval of the Industrial Commission. This plan of individual reserve accounts is one of the principal differences of the new law and the original proposals. The plan is in no way an insurance system, but an individual employer's reserve fund plan.

Exemptions

The Commission may exempt from the law employers who guarantee, under a plan approved by the Industrial Commission, to all their eligible employes, in advance for one year periods, at least forty-two weeks of work or wages for at least thirty-six hours each week. Exemptions may also be granted to employers who have established plans which the Commission finds: (a) Make eligible for benefits at least the employes who would be eligible for benefits under the compulsory features of the act;

(b) Provide that the proportion of the benefits to be financed by employers will be equal to or greater than the benefits which would be provided under the compulsory features of this act; and (c) are on the whole as beneficial in all other respects to the employes as the compulsory plan.

Voluntary Systems of Unemployment Compensation

In accordance with the legislative intent expressed in Section 1, the compulsory features of this law shall not take effect until July 1, 1933, nor shall it become effective on that date if the Commission finds that on or before June 1, 1933, employers then employing at least 175,000 employes have established plans previously approved by the Commission as plans which would entitle the employer to an exemption. If this requirement is not met, the law will become effective, but those employers who have established and maintain approved plans will be exempt.

Advisory Committee

The Industrial Commission has appointed an advisory committee consisting of three representatives of labor, three representatives of employers, and the secretary of the Commission as Chairman. This group is assisting the Commission in considering various plans proposed by employers, also in formulating plans to fit the needs of various employers. A large number of plans have already been submitted but it is doubtful if a single plan can be developed that will answer the needs of every employer. This, of course, is not mandatory, but the administrative work would be greatly reduced if one or even a few standard plans could be developed to serve all employers.

Conclusion

The employers of Wisconsin do not want the compulsory law; the vast majority of employers do not want any unemployment insurance or reserve law unless it is on a national basis and the competitive disadvantage of additional cost is thereby removed. If they must have a law, they prefer the voluntary plan as being the least objectionable. Employers fear that if a compulsory system is adopted its history will follow the example of work accident indemnity legislation in the constant increase of benefits

and the heavy additional costs of doing business. Every proper effort will be exerted toward the adoption of voluntary plans so that at least 175,000 employes will be covered by July 1, 1933. The present general unemployment makes this goal more difficult because so many more employers must adopt plans to meet the legal requirement. Out of all this effort will spring some highly practical unemployment relief plans. In this respect at least the new law is likely to produce some beneficial results. A summary and outline of the various plans that will ultimately be approved offers an excellent subject for future discussion.

TEN YEARS OF RATES AND RATING BUREAUS IN ONTARIO, APPLIED TO AUTOMOBILE INSURANCE

BY

JOHN EDWARDS

Insurance in Ontario

The Abstract Report of the Superintendent of Insurance on the insurance business in Ontario for 1931 furnishes the following information with regard to premium income in the province:

Business of 1931 Within Ontario

Net premium income..Life insurance.....	$89,075,076.00
Net premium income..Fraternal societies.....	4,023,377.00
Net premiums written.Fire insurance.....	22,067,713.00
Net premiums written.Automobile insurance.....	8,830,502.00
Net premiums written.Casualty and misc. (other than automobile).	7,450,280.00
Totals	$131,446,948.00

Note: These figures are net as to reinsurance ceded. Workmen's compensation is not included in the figures as such insurance in Ontario is entirely monopolistic state fund.

The population of Ontario according to the 1931 census is 3,426,488. While the total automobile insurance premiums mentioned in the above table appears to be small considering that all automobile insurance coverages are included, namely, public liability, property damage, collision, fire and theft, it must be remembered that the cost of automobile insurance in Ontario is low when compared with the cost of such insurance in other jurisdictions.

For example, in the city of Toronto the 1932 bureau premium for insurance upon a 1932 Chevrolet, closed model, covering public liability and property damage (standard limits), $100 deductible collision, fire and theft (actual cash value at time of loss or damage) is $47.05 complete, and greater Toronto has a population of some 750,000.

During 1931, automobile license plates were issued to private passenger car owners to the extent of 489,713 and private passenger operators' permits were issued to 508,121 motorists, not including chauffeurs.

Government Regulation

The regulation of insurance in Canada follows largely the same principles concerning government regulation in the United States. All insurers are required to be licensed in each of the provinces where business is transacted. There is, however, a Federal Insurance Department at Ottawa which inspects annually all insurers registered by it. Insurers which are registered by the Federal authorities are not required to file deposits with the provincial Departments. The Federal Department confines itself to the registration of insurers from the standpoint of solvency and requires a detailed annual return from all insurers registered by it (subject to annual audit).

All insurers transacting business within Ontario are required to pay an annual license fee and to make an annual return of financial condition showing an exhibit of the assets, liabilities, receipts and expenditures for the calendar year and shall also exhibit particulars of the business done in Ontario.

The Ontario Insurance Act also contains provisions relating to various kinds of insurance contracts, including statutory conditions which various types of contracts must contain. There is also a separate part of the Act which deals with agents, brokers and adjusters including license provisions relating thereto, and another part deals with rates and rating bureaus which is dealt with more fully in this article.

All insurers transacting business in the province are subject to inspection, but for practical reasons and to avoid duplication, the provincial Departments do not make an annual statement audit of insurers which are inspected by the Federal Department. In the case of the Citizens Insurance Company *vs.* Parsons (1881) a definite principle was made clear, that it is within the power of the Dominion Legislature to create the person of a company and endow it with powers to carry on a certain class of business, to wit, insurance; and nothing that the provinces can do by legislation can interfere with the status so created; but none the less, the provinces can by legislation prescribe the way in which insurance business or any other business shall be carried on in the provinces. The great point of the case referred to was the clear distinction drawn between the question of the status of a com-

pany and the way in which the business of the company shall be carried on.

Masten Insurance Commission

On August 7th, 1916, the Honourable Mr. Justice Masten, Judge of the Ontario Supreme Court, was appointed a Commissioner (pursuant to the Public Inquiries Act, chap. 18, R.S.O. 1914) to inquire into and report to the Lieutenant-Governor of Ontario upon:

"(a) The methods by which insurance companies registered or licensed by the province of Ontario, their representatives or agents, transact all classes of business except the business of life and marine insurance, but more particularly as to fire insurance, automobile insurance, plate glass insurance, boiler insurance and accident insurance.

(b) The methods, rules, regulations and practices of all associations of such insurance companies and associations of representatives or agents of such insurance companies with regard to making, promulgating, enforcing or controlling rates, commissions, forms, clauses, contracts or the placing of insurance.

(c) The advisability of adopting statutory conditions for automobile, plate glass, boiler and accident insurance policies.

(d) The existing laws in Ontario in relation to the foregoing and their practical operation.

(e) The existing laws in Ontario in relation to unlicensed insurance and their practical operation.

(f) Any matter arising out of the foregoing which it is necessary to investigate with a view to the above inquiries, and to make such recommendations in regard to the above as he may think advisable."

The report of the Commissioner was released on January 18th, 1919, and recommendations contained therein are quoted in part as follows:

1. Supervision and control by the province, of the Canadian Fire Underwriters' Association, in the manner and to the extent set forth in the report.
2. Similar supervision and control of all other rate making organizations in the province of Ontario, including associations of insurers writing automobile, casualty and boiler insurance.
3. Prohibition of any rate which discriminates unfairly be-

tween risks of essentially the same hazard, with power to the Superintendent to cancel a discriminatory rate.

4. Power to the Superintendent to inquire, mediate and report in respect of any difference respecting any insurance matter.
5. That all companies be required to keep their records in such a way as to classify the business done by them and to show in their annual returns to the Department not only the amount of business done in the province, and their underwriting profit made, but also the profits made in each of the several classes of risks assumed by them.
9. Consideration by the Legislature of the desirability of limiting commissions by statute.
15. A general revision of the Insurance Act.

Automobile Insurance

Insurance business as conducted throughout Canada and the United States represents, with certain exceptions, a private, competitive enterprise conducted for profit. The exceptions take the form of co-operative organizations having no capital stock (e.g. mutuals and reciprocal interinsurers) and provincial or state funds furnishing exclusively workmen's compensation insurance. Insurance of motor cars, commonly referred to as automobile insurance, as conducted in Canada, is furnished almost entirely by stock insurers, although in comparatively recent years a beginning has been made in this field by mutual insurers. Automobile insurance in Ontario constitutes a separate and distinct class of business from the other general classes, such as fire, casualty and life insurance. It is written by insurers which are essentially fire offices, as well as by those which are essentially casualty offices.

The insurers which are licensed for automobile insurance in Ontario may also be classified as follows:

1. Tariff insurers, i.e. those holding membership in the Canadian Automobile Underwriters' Association (also known as "the bureau").
2. Non-tariff insurers (including all mutuals).

The Canadian Automobile Underwriters' Association is a voluntary association of insurers which transact automobile insurance. Its chief functions are to gather statistics relating to the business of automobile underwriting, to establish and maintain

uniform premium rates for automobile insurance and to regulate acquisition cost through standardization of agents' commissions. During the period of membership insurers are bound by agreement to observe the premium rates and rules therewith appertaining for automobile insurance determined by the bureau. An insurer may retire from membership at any time by giving thirty days' notice.

The membership of the bureau is constantly changing.

Development of Rating Laws in Ontario and Their Application to Automobile Insurance

In 1922, Ontario enacted legislation dealing with "Rates and Rating Bureaus". The Insurance Act of 1922 defined "Rating Bureaus" and by inference it permitted insurers to combine in rating associations for the purpose of determining and fixing rates.

By way of a summary this legislation of 1922 provided:

1. Rating bureaus were required to file copies of their constitutions, by-laws, lists of members, etc., with the Department of Insurance.

2. The unfair discrimination between risks within Ontario of essentially the same hazard, etc., was prohibited. The Superintendent of Insurance upon receipt of a written complaint from a policyholder alleging unfair discrimination was empowered to make an investigation and to require any insurer or rating bureau to file particulars with him relative to any rate or schedule of rates in respect of which such complaint had been received, and to order any rating bureau or insurer to remove any unfair discrimination so determined. Unfair discrimination could not be removed by increasing the rates affected by the order, except with the approval of the Superintendent. An appeal from the decision of the Superintendent could be lodged through the Appellate Division of the Supreme Court of Ontario.

3. The Superintendent, or any person authorized by him, was empowered to have access to the books and records of insurers and rating bureaus concerning the matter of rates.

4. Authority was given to the Superintendent to inquire into any question which any insurer, insured or rating bureau might

bring before him with regard to insurance rates fixed by any rating bureau or charged by any insurer and also with regard to any other question arising out of the relationship of the parties with reference to the insurance in question. The result of any inquiry under this section was to be reported upon by the Superintendent in his Annual Report.

5. On and after January 1st, 1923, all insurers transacting the business of fire insurance within Ontario were required to keep records and make a sworn annual return thereof to the Department of Insurance showing their premiums and losses in the province according to the classification of occupancy hazards of the National Board of Fire Underwriters with such modifications as the Superintendent might prescribe.

On April 16th, 1924, a memorandum was issued by the Minister in charge of the Ontario Department of Insurance addressed to all insurers licensed to transact automobile insurance in the Province, which read:

> "Your attention is directed to section 264 of The Ontario Insurance Act as enacted in 1922, which provides
>
> No rating bureau and no insurer authorized to transact the business of insurance within Ontario shall fix or make any rate or schedule of rates, or charge a rate which discriminates unfairly between risks within Ontario of essentially the same hazard, or, if such rate be a fire insurance rate which discriminates unfairly between risks in the application of like charges or credits, or which discriminates unfairly between risks of essentially the same hazard and having substantially the same degree of protection against fire.
>
> Complaint has been made to the Department that companies are violating this provision through a failure to appreciate its application to automobile insurance. The undersigned, therefore, desires to notify the companies that in the opinion of the Department the following practices in particular are contrary to the requirements of this section.
>
> 1. The insurance of automobiles of individual employees at the rates granted to the employer who insures his fleet of motor cars with the company, unless the same rates are available and granted to all persons insured, whether or not so employed.
>
> 2. The insurance of groups of persons at rates different or lower than the rates offered to the general public. This includes the insurance of members of motor clubs or associa-

tions of employees or of persons engaged in particular occupations."

In 1925 the following changes concerning "Rates and Rating Bureaus" were made to the Ontario Insurance Act:

The Superintendent of Insurance was authorized to require:

1. Every rating bureau and every licensed insurer to make a return under oath to the Superintendent in such form and at such times as he deemed necessary, showing every or any schedule of rates fixed, made or charged by them, together with such further or other information concerning such rates as was necessary or desirable.

2. The Act of 1922 had prohibited unfair discrimination between risks within Ontario of essentially the same hazard. In 1925 the wording was changed to read "the same physical hazard, etc.".

3. The Act of 1925 provided that an insurer, as well as an insured, could file a written complaint with the Superintendent regarding unfair premium rate discrimination.

In dealing with the matter of premium rates, a basic point to be borne in mind is that the law of Ontario prior to its amendment in 1925, neither established nor recognized any standard by which the premium rates of an individual insurer might be judged. It merely laid down the principle that in the application of rates to specific risks there should be no unfair discrimination. The 1925 amendment empowered the Superintendent to require the insurers to place their premium rates on file with the Insurance Department as evidence of the prices which they undertook to charge. Here, therefore, was a standard of judgment whereby the Department could reach a decision on the merits of any individual case of *prima facie* unfair discrimination. The same standard of judgment applied alike to bureau and non-bureau insurers. That is to say the law dealt with the question of unfair discrimination as an individual insurer matter. No insurer was required to adopt any particular system of rates. The statute contemplates, however, that all insurers would apply equitably whatever rate system they had adopted and placed on file with the Department.

On April 20th, 1925, a circular letter was sent to all insurers licensed to transact automobile insurance in Ontario. This

circular required all such insurers to file with the Superintendent on or before the first of May following, any and every schedule of premium rates fixed, made or charged for automobile insurance in the province as of the date of the return, including any schedules or plans of rating fleets of automobiles, together with a statement of the effective date of such schedules. In due course the filings were completed. Seventy-two insurers, members of the Canadian Automobile Underwriters Association, the only automobile rating bureau in Ontario, filed the Association manual premium rates and rules. The other thirty-two insurers filed premium rates which may be classified roughly as follows: Six insurers filed straight manual premium rates (though not members of the rating bureau), two insurers filed manual premium rates less a uniform percentage deduction of twenty per cent.; eight insurers filed manual premium rates less a variable percentage deduction according to the class of cover, and the remaining sixteen insurers filed what purported to be independent premium rate schedules.

Only two groups of insurers questioned the action of the Department in calling for premium rate and rule schedules. The complaint was that they had no fixed schedules, that they rated each risk "on its merits"; in other words, that they instructed their agents to review the moral hazard on each risk before fixing the premium rate to be paid. The Department suggested in that event a schedule of premium rates charged upon a representative couple of hundred risks would be accepted. The alternative proved unacceptable, and premium rate schedules, if they can be so called, were promptly devised and filed.

The Department analysis of the rating schedules proved interesting. The schedules of manual premium rates and uniform percentage deductions therefrom require no comment. The eight schedules showing variable percentage deductions from manual premium rates were probably the most enlightening of the general situation. Four of these insurers filed manual premium rates and added:

> "It is our usual practice to instruct agents to write business subject to a discount of twenty-five per cent. therefrom. We find from experience that better rates can be given on certain risks of which we have previous knowledge or which

have some favourable features to recommend them. In such cases a further allowance of five per cent. to ten per cent. is sometimes made. Our experience shows that the personal judgment of the company's agent or official is an important element in fixing rates, and this may lead occasionally to slight variations in the above."

Two of these insurers filed bureau manual premium rates subject to percentage deductions ranging from ten per cent. to twenty-five per cent. according to the class of cover, with the following additional special deductions:

"Fire extinguisher, fifteen per cent. off rate; bumpers (front) ten per cent. off collision rate; bumpers (rear) two and one-half per cent. off collision rate; locking device, fifteen per cent. off theft rate. No charge for extra equipment. An allowance up to fifteen per cent. for favourable experience. An allowance up to ten per cent. for private garage and/or chauffeur-driven cars. Groups of not less than twenty-five cars belonging to individual owners in common employment and/or fleets consisting of not less than five cars belonging to one owner may be submitted to head office for special rating."

The seventh insurer filed manual premium rates subject to certain exceptions, arranged by territorial classifications:

"Manual less ten per cent. seventeen named urban municipalities; manual less twelve and one-half per cent., one city; manual less fifteen per cent., one city; manual less twenty per cent., two cities; fleets—rates upon their merits."

Upon analysis it was apparent that this seventh insurer, for example, was charging full manual premium rates in City A, manual less ten per cent. in City B, and manual less twelve and one-half per cent. in City C, three small Ontario cities within a radius of a few miles of one another. In response to a verbal request for an explanation the manager for this insurer frankly admitted that his company was charging manual premium rates in City A, because its agent there thought he could get them; and that competition being more severe in City C, than in City B, it had been necessary to allow an extra two and one-half per cent. deduction in the former city. The last insurer of this group of eight filed manual premium rates less eight per cent. on the fire coverage and a note that theft rates were to be read as including accessories.

Upon receipt of the above mentioned premium rate schedules the Department initiated an inquiry in the head offices of a number of insurers. Needless to say, local competitive conditions seemed to be the only factor considered by some of the insurers in fixing their premium rates to be charged and, generally speaking, the insuring public did not appear interested in insurance legislation designed to prevent unfair discrimination in premium rates. After the Act was amended in 1925 allowing any *insurer* to file with the Superintendent a written complaint, a number of complaints were received presumably by reason of large individual risks which were offered by agents or brokers whose chief object was to higgle the market for the lowest available price.

Concerning the first ten insurers examined by the Department, it was found that six insurers were charging manual premium rates less variable percentage deductions with ample evidence that the filed premium rates were not being applied. It may be remarked in this connection that the statutory provision requiring a written application for automobile insurance signed by the insured was invaluable in checking up adherence to premium rate schedules and unearthing instances of unfair discrimination. In the case of the public liability premium rates for standard limits of one insurer—same hazard and same territorial classification as per manual—there was a range in discounts from ten per cent. to forty-three per cent. Property damage rates charged by the same insurer varied with discounts of from ten per cent. to forty per cent. Two actual cases may be cited as examples: Two neighbours, a man and woman, residing door to door in the city of Toronto, insured their Ford sedans through different agents with this insurer within a few days of each other, no change in rating policy having taken place in the meantime. A scrutiny of the written applications showed the risks as alike as two peas in a pod. The woman paid a thirteen per cent. higher rate than the man. The only explanation of the discrimination on the daily report was "Premium arranged by A.H.B.". "A.H.B." were the initials of a general agent of the insurer.

The second case was that of a civil servant at the Parliament Buildings, Toronto (whose name was at once recognized by the examiner) who had his private car insured for public liability

and property damage. He was paying the full manual rate, although this was the insurer which filed premium rates showing variable percentage deductions from manual rates of from ten per cent. to fifty per cent., and any number of cars of essentially the same physical hazard in Toronto were being insured by it at up to forty per cent. deduction from manual premium rates.

The foregoing discussion of rates filed and rates charged has been related to individual passenger cars only. Concerning fleets, it was found that the ruling of the Department had been absolutely ignored by several insurers, and that not only were employees' cars being insured with commercial fleets at discounted premium rates, but persons in common employment, such as bank clerks, were insuring their cars at twenty-five per cent. to fifty per cent. off manual premium rates and frequently at twenty-five per cent. below premium rates offered by the same insurer to the general public.

When the automobile premium rate situation in Ontario had been thus surveyed, the Superintendent of Insurance undertook to test out the enforcement machinery of the law and to make some exemplary orders respecting unfair discrimination.

On September 18th, 1925, two insurers were ordered by the Superintendent to remove unfair discrimination in automobile insurance premium rates and to refund the excess of premiums paid by other policyholders (not included in groups) within thirty days from the date of the order. Subsequently, satisfactory evidence was filed with the Department that the refunds so required to be made had been paid and that the Orders in other respects had been obeyed.

On December 15th, 1925, a memorandum was sent by the Superintendent of Insurance to all licensed insurers undertaking automobile insurance in Ontario which read in part:

> "Pursuant to subsection 2 of section 260 of the Ontario Insurance Act, 1924 (as enacted by 1925, c. 54, s. 34) you are hereby required to file with this Department on or before the first day of January, 1926, a return, duly certified by affidavit, embodying complete schedules of automobile insurance premium rates effective for 1926 business in Ontario, including therein any schedules or plans of rating fleets of automobiles. If 1926 rating schedules are not ready by the 1st day of January, 1926, the return should be filed as soon

thereafter as the schedules are formulated, and in any event, before they are made effective.

All schedules hereby required to be filed must conform to the requirements of Part XIV of the Act and must avoid discrimination between risks of essentially the same physical hazard in the same territorial classification.

Fleet Rates

Plans of rating fleets of automobiles should be carefully reviewed before filing, in relation to illegal discrimination. Some methods of fleet rating filed by insurers in 1925 manifestly violated the anti-discrimination section of the law. In connection with the 1926 schedules, insurers will be asked to justify their fleet rating methods and to eliminate from their rating plans all terms which are discriminatory in their application, etc."

On April 3rd, 1926, an Order to remove unfair discrimination in automobile insurance premium rates was issued against a third insurer. In this case a number of employees' and officials' cars were insured in the fleet policy of an employer at a substantial discount from the insurer's manual premium rates respecting individually rated cars. The refunds affected by this Order were also paid to other policyholders in the territory who had paid higher premium rates.

Regarding the Order issued against this third insurer, the case attracted wide interest and attention, both among those directly concerned in the insurance business and the general public. It was evident that the intention and effect of the Ontario rating law had not been generally understood and appreciated because the practice which was illustrated by this case (employees' privately owned cars included on a fleet policy at a substantial discount) had been fairly general among insurers in Ontario. The proceedings in this case brought forcibly to the attention of the public, the insurers, the Department and the Legislature, the necessity of reviewing the principles of legislation and supervision upon which the rating law was founded, in order that the law might be strengthened by the Legislature then in session or, in the alternative, repealed.

It was interesting and important to notice the reaction of the insuring public and the insurance business to the proceedings. Opinion among insurer managers seemed sharply divided. Some

believed that the intervention of the Legislature and the Department was both necessary and desirable. Others objected to any measure of government regulation of premium rates. It remained for the associated fire and casualty insurance agents of the province to give a strong lead to insurance opinion on the matter as they did in a memorial presented to the government, reading as follows:

> "Whereas there is reputed to be a very small number of insurance companies and brokers who are using every effort to discredit the administration of the provisions of the Ontario Insurance Act, which prohibits unfair discrimination between automobile risks of essentially the same physical hazard in the same territorial classification and are opposing the enactment of any further legislation at this session for the furtherance and strengthening of the enforcement thereof, commonly known as Anti-discrimination Law".
>
> "And whereas this law is of vital importance to the business of insurance throughout the province of Ontario because it guarantees stability of rates, eliminates extravagant and wasteful competition and furthermore is recommended in the public interest by the Honourable Mr. Justice Masten in his report as Insurance Commissioner."
>
> "Be it resolved by the executive of the Ontario Fire and Casualty Agents Association in special meeting assembled at Toronto on Thursday the 25th day of March, 1926:
>
> 1. That the fundamental principles of the Ontario Rating Law applied to automobile insurance are absolutely sound and should be preserved and that any legislation introduced this session which has for its purpose the negation of such principles should be vigorously opposed and further that any legislation that has for its purpose the making more effective (the administration of) the Rating Law and (particularly the prohibition of deviation from filed) schedules of rates should be strongly supported by all persons who have the welfare of sound insurance at heart.
>
> 3. That our Association wishes to place itself on record as congratulating the Department of Insurance for the fearless and effective manner in which it has administered the law as laid down by the Ontario Insurance Act, 1924, and its amendments."

Undoubtedly the Government and the Legislature were influenced by this view. The amendments to the rating law subsequently enacted by the Legislature in sections 24 and 25 of the

Ontario Insurance Act, 1926 (1926, chap. 49) provided that not only might the Superintendent require rating bureaus and insurers to file complete schedules of premium rates with the Department as formerly, but that once filed, ten days' notice of any change in the schedules must be given and amended schedules duly verified under oath filed before the effective date thereof; further that any rating bureau or insurer which, having so filed its schedules of premium rates, fixed, made or charged any rate or received any premium which deviated therefrom should be guilty of an offence. Simultaneously, the Superintendent was given authority to make an Order pursuant to section 262 of the Insurance Act respecting unfair discrimination, not only upon written complaint as formerly but "upon such information filed with him as the Superintendent deemed sufficient to justify an investigation."

When these new provisions regarding premium rates became law on April 8th, 1926, the insurers were duly advised and requested to make a complete new filing of automobile insurance premium rates and rules applicable to Ontario. Numerous complaints concerning unfair discrimination and deviation from filed rates came to the Department after the new returns of premium rates had been filed in the spring of 1926, yet no further Orders were issued against insurers regarding unfair discrimination or with respect to departure from filed automobile rates. The general run of complaint was that cars privately-owned were being included in fleets of employers' cars, or in group fleets of people in common employment, or under similar circumstances, at rates lower than the general public obtained.

Thus two years' enforcement of the Ontario rating law terminated. Although it remained on the statute books, it was virtually a "dead letter" until resurrected in February, 1929, to expedite the work of the Royal Commission. The official records disclose no completely satisfactory explanation of what happened or why. It is true that evidence was presented before a Royal Commission in September, 1930, touching upon the period from the fall of 1926 to February, 1929, regarding the rating provisions of the Ontario Insurance Act, which stated in part:

> "That the companies, generally, did not seem to feel that the law was going to be enforced, with the result that there

> were so many complaints reaching the Department that it was physically impossible for the Department to effectually administer the law without a new mandate from the Legislature."

This statement merely points toward the true explanation. No prohibitory penal statute can be successfully enforced without strong backing from some influential class of the community. Unorganized public opinion is not interested in insurance rating laws. Organized public opinion represented in Ontario by the Canadian Manufacturers Association and Boards of Trade, etc., usually straddle the fence where governments and private business are in conflict. The associated agents and brokers did not follow up the strong stand taken in their memorial to the government in the spring of 1926, leaving individual brokers and agents to violently oppose the law. Insurance company executives either fought the Department openly or adopted a "wait and see" policy. In the result it would seem that the government decided it lacked any mandate to enforce the law and concluded that so long as the insurers, under the stress of unregulated competition were undertaking to give the public insurance at less than cost it was the best policy to sit back and watch matters develop. In any event, that is exactly what happened. It was only when the associated insurers undertook to increase premium rates sharply in 1929 that the government stepped into the rate inquiry field again. But the promptness with which it did so suggests that, if the Insurance Department had really been asleep during that three year period, it apparently had kept at least one eye open.

Appointment of a Royal Commission

At the beginning of 1929 the Canadian Automobile Underwriters' Association promulgated rates effective February 1st, 1929, increasing public liability and property damage rates by fifty per cent. and collision rates by twenty-five per cent. Insurers not members of this Association promulgated new rates effecting comparable increases. It may be said that the status of insurers licensed to transact automobile insurance in Ontario from 1922 to 1928 was as follows:

	Conference Insurers	Total Number of Insurers Licensed	Per cent. of Automobile Premiums Written by Conference Insurers
1922	71	103	
1923	71	103	77%
1924	65	102	66
1925	64	109	45
1926	65	121	37
1927	64	126	38
1928	99	140	80

Reference to the above will show that the Canadian Automobile Underwriters' Association strengthened its position considerably during 1928 with the result that early in 1929 it decided to make necessary increases in automobile premium rates as a move towards stabilization. This move, however, resulted in an Order being issued by the Ontario Government for an inquiry by a Royal Commission. The Hon. Mr. Justice Hodgins, one of the Justices of the Appellate Division of the Supreme Court of Ontario, was appointed Commissioner. An extract from the Commission reads:

> "Do hereby appoint you to be our Commissioner in this behalf with all the powers authorized by the said Act, to inquire into, investigate and report to our Lieutenant-Governor, upon:
>
> (a) The reasonableness of automobile insurance premium rates in the province as fixed by the Canadian Automobile Underwriters' Association and as charged by any licensed company.
>
> (b) The methods, rules, regulations and practices of the Canadian Automobile Underwriters' Association with regard to the making, promulgating, enforcing or controlling of rates, commissions, forms, clauses, contracts or the placing of insurance.
>
> (c) The existing laws of Ontario and their practical operation in relation to the supervision, regulation and control of insurance premium rates in the province.
>
> (d) Any matter which, in the opinion of the Commissioner, it is necessary to investigate in view of the above inquiries.
>
> And to make such recommendations in regard to the above as he may think advisable."

The Superintendent of Insurance was retained as counsel and the late Harwood E. Ryan, of the firm of Woodward, Fondiller & Ryan, New York, was retained as Actuary for the government.

After the Royal Commission was announced and before the first hearing the Superintendent of Insurance on February 8th, 1929, requested all insurers transacting automobile insurance in the province to file completed automobile insurance premium rates and rules applicable to Ontario. At that time 140 insurers were licensed to transact automobile insurance in the province—100 insurers members of the Canadian Automobile Underwriters' Association, 28 independent insurers and 12 insurers licensed but not transacting. For 1929 policy year approximately 72 per cent. of the total automobile premiums written in the Province were written by insurer members of the Association.

The first Session of the Commission was held on February 16th, 1929. A. W. Anglin, K.C., Glyn Osler, K.C., V. Evan Gray and J. A. R. Mason appeared as counsel for the Association and the Superintendent of Insurance appeared as counsel for the government.

Concerning the first session of the Commission, and after preliminary argument and statement of status and position, the Commissioner stated that the reasonableness of the automobile premium rates should be established by those who had instituted them. It was arranged that one month should be allowed the Association to prepare its case and that thereafter it should be presented through the Chairman of the Executive Committee of the Association appointed to represent the associated insurers before the Royal Commission.

At the second Session of the Commission held March, 1929, all premium rates and rules of insurers applicable to Ontario previously filed with the Superintendent of Insurance pursuant to his request of February 8th, 1929, were filed with the Commission by the Deputy Superintendent of Insurance along with the filing of the Association. At this session, counsel for the Association proceeded to inform the Commissioner they were prepared to justify the substantial increase in the 1929 automobile premium rates which were promulgated as a result of the successive rate decreases from 1923 to 1928; that in 1926 the deficiency on the claim cost of the insurers in Ontario was nearly $200,000; that in 1927 respecting claims paid the deficiency was nearly $750,000; that in 1928 this figure had grown to almost $850,000. The remainder of this Session was taken up by a discussion of the Asso-

ciation's case at which time a number of exhibits were filed including automobile experience data concerning policy years 1924 to 1927 inclusive, which had been received by the Association from member insurers. This data had been compiled in accordance with a statistical plan adopted by the Association in 1925. The Actuary for the Association was questioned by government counsel regarding this data in part as follows:

> "With respect to the years 1926 and 1927, what percentage of the total volume of business written by all companies is reported in this experience?
>
> *Answer*—1926, 36 per cent., 1927, 40 per cent.
>
> *Question*—Did all the Bureau member companies use and comply with the Bureau statistical plan each year during the period 1924 to 1927 inclusive?
>
> *Answer*—Do you mean the companies that were members of the Bureau during these years respectively?
>
> *Question*—Yes.
>
> *Answer*—No, they did not.
>
> *Question*—Then it is a fact that this exhibit does not represent the experience of your Bureau companies during these years?
>
> *Answer*—Yes, that is correct."

Government counsel, upon the advice of the government Actuary, thereupon submitted a strong argument urging the impossibility of any determination of the reasonableness of premium rates upon such faulty and incomplete data and applied for an Order requiring all insurers (tariff and non-tariff) which had not previously reported their loss cost experience for recent years to the Association to now prepare it under the supervision of the government's Actuary and file it with the Commission. After considerable argument this Application was accepted and on May 18th, 1929, the Commissioner issued an Order requiring all member insurers of the Association (which had not filed experience pursuant to membership) to file statistical data in a form approved by the Superintendent of Insurance embodying their loss cost experience in Ontario for the 24 months of policy year 1927, and the first 12 months' experience of policy year 1928.

The experience was to be filed on or before September 1st, 1929, with the Association. Non-tariff or independent insurers

were ordered to file loss cost experience covering the same period with the Insurance Department. All Insurers transacting automobile insurance in Ontario were ordered by the Commissioner to prepare their experience data for the policy year 1929 in accordance with the 1929 statistical plan of the Association, or such modification thereof as would be approved by the Superintendent of Insurance. The insurers were ordered to preserve such data available for production as and when may be ordered. All the foregoing data was directed to be prepared from the Canadian Automobile Underwriters' Association statistical plan by an independent statistical agency nominated by the Commissioner at the expense of the insurers.

The Association and the Ontario Insurance Department were both ordered to file with the Commission on or before October 1st, 1929, from the statements filed by the insurers, consolidated exhibits embodying the loss cost experience data for Ontario covering the 24 months of policy year 1927 and the 12 months' experience of policy year 1928. The work was to be done under the supervision of Woodward, Fondiller & Ryan, consulting actuaries, representing the Commission.

This is what really resulted in an eight months' adjournment of the inquiry, necessitated because the loss cost data so requisitioned was not available until January, 1930.

During the interim the Commission accompanied by counsel for the Association visited New York, Boston, Springfield, Hartford, Washington, D. C. and Baltimore, for the purpose of securing first hand information relative to various other matters concerning automobile insurance. Accident prevention was studied, the operation of the Massachusetts Compulsory Liability insurance law was investigated along with the various Financial Responsibility laws in force. On December 18th and 19th, 1929, the Commissioner held a special hearing for the purpose of obtaining the views of all who, with competent knowledge or useful opinions might wish to urge or oppose, or give their opinions concerning plans variously known as "Compulsory Automobile Liability Insurance" and "Financial Responsibility Laws".

On January 29th, 1930, the Actuary for the Association filed with the Commission the loss cost experience of member insurers covering the complete policy year 1927, and 12 months experi-

ence of incomplete policy year 1928, and the Deputy Superintendent of Insurance filed similar experience concerning the non-tariff insurers. At the same time the government Actuary who had access to the data while in course of preparation filed a report showing the combined experience of all insurers.

It now became apparent that loss cost indications based upon the data so filed could not be developed before May 1930, and that meanwhile additional data could be prepared and filed which, together with that already filed, would give a much more dependable volume of data than that originally requisitioned. Accordingly, government counsel made an application for a further Order and a second Order was issued by the Commissioner requiring the Association to file the loss cost experience of its members in Ontario for the 24 months of policy year 1928, and the 12 months of policy year 1929. Non-tariff insurers were similarly required to file their experience through the Insurance Department. All insurers transacting automobile insurance in Ontario were also ordered to prepare their experience data for the policy year 1930. This experience was to be prepared in accordance with the bureau statistical plan, or with such modification thereof as would be approved by the Superintendent of Insurance. Such data was to be preserved and available for production as and when hereafter ordered.

Interim Report of Commission

The interim report of the Commission was released March 3rd, 1930. In the interim report the Commissioner recommended automobile safety responsibility legislation and appended a draft bill to amend the Highway Traffic Act relative to financial responsibility of motorists. This bill which became law effective September 1st, 1930, is commented upon in a timely article prepared by Mr. Austin J. Lilly ("Motor Vehicle Safety-Responsibility Legislation," *Proceedings*, Vol. XVI, page 344).

Other comments contained in the interim report are quoted in part below:

> "I am, as Commissioner presently engaged in an inquiry into the reasonableness of certain rates in this Province on automobile casualty insurance, and into the existing laws in Ontario with reference to the regulation and supervision of

insurance rates generally. Those rates, the reasonableness of which is now before me, were raised to a degree which seemed to demand some explanation and public consideration, and while the working of the present Ontario law, respecting the regulation or supervision of rates generally, by the Superintendent of Insurance here, will have to be dealt with in a later report, I think it is not only wise, but necessary, that I should, in this report, give some consideration to that important question now, especially as I have progressed sufficiently far as to convince me that the present Insurance Act should be amended at the present Session, so as to give authority to the Superintendent of Insurance to order, after due notice, and a hearing before him, an adjustment of automobile insurance rates whenever they are found to be excessive, inadequate, unfairly discriminatory, or otherwise unreasonable.

The present increased rates came into force on the 1st of February, 1929. They have been enforced, pending this inquiry, for over a year, and whether I am able to complete my inquiry during this year or not, they will be enforced and exacted, not only until my report is made, but until the Legislature meets again in 1931, and until, thereafter, any powers then given, if any, can be properly exercised, unless some provision is made during the present Session.

If the powers I am now recommending should be given to the Superintendent had been vested in him in February, 1929, he would have been in a position to know almost immediately if the increase in rates was reasonable, and to have ordered their adjustment, if, after due investigation and a hearing, and subject to appeal, he had found them unreasonable.

Statistical Records

Many of the insurance company managers seem to fail to appreciate the importance of accurate statistical data as a basis for rate making, and the necessity of keeping such data accordingly to a uniform statistical plan. It is time that the companies realized that their right to combine to make rates should be conditioned upon an undertaking to keep such statistical records of their loss and expense costs as are necessary to make and judge the reasonableness, or discriminatory character, of the rates they promulgate and charge.

It is no hardship on the companies now that they have begun to keep records in scientific and useful form, to go on with the system, and any lapse into methods which are the reverse of what is now in vogue, will result in chaos and

inability, except by another inquiry to deal with the rates of 1930 or 1931, or any other subsequent year.

I make the recommendation now, rather than in my main report, because there is now available, as a result of the voluntary action of some of the companies before this inquiry opened, and as a result of my Orders respecting the remainder of the companies since this inquiry opened, a complete and accurate record of loss cost experience data dating from the 1st of January, 1927.

Accordingly, I make my recommendation now, in order that it may be acted upon at the current Session of the Legislature."

The two amendments (proposed by the Commissioner) to the Ontario Insurance Act and appended to his interim report follow and read:

"69*a*—(1) Every licensed insurer which carries on in Ontario the business of automobile insurance shall prepare and file when required with the Superintendent, or with such statistical agency as he may designate, a record of its automobile insurance premiums, and of its loss and expenses costs in Ontario, in such form and manner, and according to such system of classification, as he may approve.

(2) The Superintendent may require any agency so designated to compile the data so filed in such form as he may approve; and the expense of making such compilation shall be apportioned among the insurers whose data is compiled by such agency by the Superintendent who shall certify in writing the amount due from each insurer and the same shall be payable by the insurer to such agency forthwith.

(3) The provisions of subsections 2, 3 and 5 of section 69 shall apply mutatis mutandis to the provisions of this section.

275*a*—(1) It shall be the duty of the Superintendent, after due notice and a hearing before him, to order an adjustment of the rates for automobile insurance, whenever it is found by him that any such rates are excessive, inadequate, unfairly discriminatory, or otherwise unreasonable.

(2) Any order made under this section shall not take effect for a period of ten days after its date, and shall be subject to appeal within that time by any insured, insurer or rating bureau, in the manner provided by section 12 of this Act, and, in the event of an appeal, the order of the Superintendent shall not take effect pending the disposition of the appeal.

(3) The Attorney-General shall be served with notice of

any such appeal and shall be entitled to be heard by counsel upon the hearing thereof.

(4) Any rating bureau, insurer or other person failing to comply with any provision of such order shall be guilty of an offence."

Section 69*a* (relating to the filing of automobile experience) was to come into force on the day upon which it received Royal Assent whereas Section 275*a* concerning approval of automobile premiums was to come into force on a day to be named by the Lieutenant-Governor by his proclamation.

Concerning these two amendments to the Insurance Act as proposed by the Commissioner in his interim report, the Legislature then in Session enacted the legislation. The filing of automobile experience data became effective in April, 1930, one month after the interim report was released; but the section empowering the Superintendent to request an adjustment of automobile premium rates when he deemed it necessary was not proclaimed in force. It remained dormant and did not come up for consideration until the Commissioner had brought down his final report at the end of 1930.

April 22nd, 1930, the Commission again visited the United States, this time to Philadelphia and New York. A number of prominent insurance executives furnished valuable evidence relative to subjects connected with the automobile rates enquiry.

On June 9th, 1930, there was filed with the Commission the automobile loss cost experience of all insurers in Ontario for 24 months of policy year 1928 and 12 months of policy year 1929, pursuant to the Commissioner's second Order, thus making available for the determination of the reasonableness of the 1929 automobile premium rates promulgated by the Association the average experience of all insurers prepared on a uniform statistical plan under official supervision for the complete policy years 1927 and 1928, and the 12 months' experience of incomplete policy year 1929.

The summer of 1930 was devoted to the development of loss cost indications arising out of this "official" data both by the Actuary of the Association and the government Actuary.

Finally, on September 24th, 1930, the late Harwood E. Ryan, Actuary for the Commission submitted his report showing his

calculation of the loss cost indications and his opinion as to the reasonableness of the provision for losses in the premium rates of the Canadian Automobile Underwriters' Association.

This report was in three parts described as follows:

1. Pure premiums based on the experience of complete policy years 1927 and 1928 and incomplete policy year 1929, private passenger cars, public liability and property damage.
2. Pure premiums based on experience of complete policy years 1927 and 1928 and incomplete policy year 1929; private passenger cars, collision, fire, theft and commercial cars.
3. Interpretation of consolidated loss cost experience of complete policy years 1927 and 1928 and incomplete policy year 1929, with introductory text.

Opportunity was afforded the Association to cross-examine the government Actuary upon his findings relative to the interpretation of the loss cost experience.

A separate report was prepared and filed by the government Actuary concerning expense cost. The final Session of the Commission was held on December 3rd, 1930, and the final report of the Commissioner was dated December 20th, 1930, reading in part:

1. "I find that the automobile insurance premium rates, fixed by the Canadian Automobile Underwriters' Association the 'Bureau' effective February 1st, 1929, were unreasonably high and were not properly deduced from the experience which the companies then had, and are not justified by the later and detailed experience of the years 1927, 1928 and 1929 submitted to me since this inquiry began.
2. I find that the basis of the 1929 Bureau rates were the rates fixed in 1928, which in turn were founded on those of 1927. I further find that the 1927 rates were not properly deduced from the experience which the Bureau companies then had, but were purposely kept lower than was justified by that experience, for the purpose of competing with other companies and driving them out of business. I also find that, with a view of strengthening the Bureau organization and securing the adherence of outside companies, the rates for 1928 were left largely unchanged so as to induce those companies to become members, a policy which succeeded early in 1928, when upwards of 35 additional companies accepted membership in the Bureau. I further find that the method of increasing the rates in 1929 was unusual, unreasonable,

and unfair in that they were founded on rates which had not been fixed on a scientific or statistical basis, as was contended before me, and by the further fact that the provision for expenses was increased by 50 per cent. on two coverages, and 25 per cent. on one coverage, without any increase in the expenses of the companies. No evidence was adduced before me to warrant such increase.

3. I find that the justification of the 1929 rates on any scientific and statistically prepared basis was not made out. The rate making procedure described by the Bureau in Exhibit 10 had not been put into force before 1929, and even in that year it was not the procedure actually adopted, as only a percentage increase on the 1928 rates was made. The depression of the rates in 1927 and 1928 was at that time against the indications of previous years.
5. I find that the provision for expenses in the public liability, property damage, and collision coverages for private passenger and commercial cars is not justified, and was unwarrantably increased. Apart from that addition I find that there is no adequate or sound reason why the provision for expenses should be in excess of 45 per cent. of the gross premium rates and that the insurance companies should be left to make such adjustments in their various expense costs as will enable this percentage to produce a sufficient provision for expenses in the rates. I append as Appendix 'B' statement showing the 1929 Bureau rates for private passenger cars, contrasted with the rates indicated by my findings and the premiums chargeable in each case. Similar statements can be prepared for commercial cars and other types of vehicles if desired. The statement indicates that the 1929 Bureau rates for private passenger cars were excessive to the extent of $654,318."

The Commissioner's recommendations are given also in part:

2. "That Section 275*a* of the Insurance Act, as enacted by Section 12 of Chapter 41 of the Ontario Statutes of 1930, be proclaimed and put into force before the 1st of February, 1931, and when so proclaimed shall be made retrospective as of the date of this report."

Note. This Section of the Insurance Act referred to, deals with adjustment of automobile premium rates when deemed necessary by the Superintendent of Insurance and is referred to in the interim report of the Commissioner. It may for convenience be referred to as the approval of automobile rates law.

5. "That the loss cost of insurance in Ontario in the future should be established by the combination of the experience of all companies, and that such experience should be developed on the statistical plan prescribed, pursuant to Section 69*a* of the present Insurance Act."

The Commissioner further stated in the latter part of his report:

> "I think it is a great advantage to simplify the making, the testing, and approval of rates so as to avoid in the future an Enquiry such as the present one, with all its attendant expense and delay, leaving the reasonableness of the rates largely in the hands of the Ontario Insurance Department and of the Companies' members, or in case of difference, to the decision of the Ontario Insurance Department subject to an appeal, on the lines suggested in my report and recommendations.
>
> It is of the first importance that the insurance companies should be able to carry on their business at a reasonable profit, and equally so that the basis of their rates should be subject to early scrutiny and settlement.
>
> It is to the Canadian Automobile Underwriters' Association that I look for the most effective aid in the direction I have indicated. I think, from my experience as Commissioner in this Enquiry, I can thoroughly agree that the commendation of the Canadian Fire Underwriters' Association by Mr. Justice Masten, in his Report of 1919, might well be applied to the Canadian Automobile Underwriters' Association.
>
> His words were that the operations of such an Association 'have been, and are, to the advantage of and in the interest of the public, and that such a combination tends strongly to maintain the solvency of the companies, to stabilize rates, to eliminate discrimination, and assist in controlling the expenses of carrying on the business' and that 'it ought not to be abolished or hampered in its legitimate work, but, being a combination, ought to be fully subject to supervision and control by the state'.
>
> Although throughout my report I have indicated matters where I think the Canadian Automobile Underwriters' Association has, in some measure, failed to live up to its standards, the fact that I consider its assistance in improving conditions of the first importance, indicates my belief in its influence and purposes."

The report struck consternation into the hearts of the insurance companies. Loud protests were voiced on all sides. In

January, 1931, the Association presented to the government a report entitled "memorandum relating to the report of the Honourable Mr. Justice Hodgins on automobile insurance premium rates in Ontario". This memorandum referred to furnished the reaction of the associated insurers to the report of the Commissioner and contained some interesting reading which is quoted herein in part:

Item 1—The Bureau's General Grounds of Protest.

"In reaching his conclusions the Commissioner has used an arbitrary and unsound basis of actuarial and arithmetical procedure which has produced a wrong answer; he has rejected evidence of the actual operations of the year 1929 insofar as known as a test of the reasonableness of the rates, and in lieu thereof he has adopted an average for the three year period 1927, 1928 and 1929, as his standard for measuring 1929 rates.

Item 2—The Commissioner's Fundamental Error.

"The fundamental error which invalidates all the findings of the Commissioner with regard to 1929 rates is that he has arrived at a loss cost per car based on the average of the three years, 1927, 1928 and 1929, and has applied this average to the 1929 manual rates as the test of their reasonableness in the face of the higher loss costs actually experienced in 1929. The figures for 1929 and final vital statistics for 1926-28 show increases each year in the number of persons killed by automobile accidents and also increases in the number killed per registered motor vehicle. Whereas the registered motor vehicles increased by 4.3 per cent. between 1926-1929, the number of deaths from automobile accidents increased by 114 per cent., thus making the number of deaths per 10,000 motor vehicles 10.82 in 1929 against 7.23 in 1926, an increase of 50 per cent.

So far as the Bureau is concerned, it is important to remember that none of the statistical material which the Commissioner has used in this manner was in existence or available to the Bureau when it made the rates for 1929. In January, 1929, the Companies had to make automobile insurance rates for the ensuing year upon such statistical material as was then available, and upon their best opinions and judgment as to the conditions likely to prevail in the future period, which might change the loss cost of that period.

Item 3—The Use of Available Statistical Material.

"With regard to the Commissioner's finding that the 1929 rates were not properly deduced from the experience which the Companies then had; this question was never examined in evidence before the Commissioner; no report on this material was made by the experts of the Commission (except as to its incompleteness) and no submission was made to the Commissioner by any party that the action taken by the Companies in making the 1929 rates, was inconsistent with the evidence of the statistical material then in hand.

Item 7—The Expenses of the Companies.

"The Commissioner is incorrect when he states that the Companies increased the provision for expenses 'without any increase in the Companies' expenses'.

This statement is made in the very teeth of his own Actuary's report. It must be obvious that as a very considerable portion of the Companies' expenses is based on a percentage of their premium income, their actual expenditure must have been increased if their income was increased.

The Commissioner in suggesting a general reduction of 5 per cent. in the expense loading is apparently unable to find that any specific items of the increased expenses were too high or he has attempted to avoid possible embarrassment by advising this reduction in the Companies' formula without specifying under which item this reduction should be made. Insofar as 1929 rates are concerned, the payment of these expenses is an accomplished fact, and no part of them can be recovered by the Companies; but, notwithstanding this, the Commissioner includes this 5 per cent. item in his calculation of alleged overcharge by the Companies.

The Companies are as much interested as the insuring public in the reduction of expenses, since the margin of profit they may make is very largely influenced by this factor. The control of expenses is continually before the Companies and no opportunity is or will be lost of effecting any possible reduction. The Companies, however, do not think that any reduction can be made at the expense of the agents whose present remuneration in their considered opinion is not unreasonable.

Item 12—Alleged Coercive Action by the Bureau.

"The comment of the Commissioner that the Bureau kept rates 'lower than was justified by experience for the purpose of competing with other Companies and driving them out of business' is very unfair to the Bureau Companies and puts a

colour on the facts, to their disadvantage, which is not warranted. There is no evidence whatever that any Company was driven out of business by this rate competition. In that period the public had the benefit of insurance at less than cost, with resulting loss to the Companies. The re-establishment of a sound rate level upon an adequate rate basis was an inevitable and a very proper issue out of this period of competition. No action contrary to the public interest was involved in restoring a sound premium rate basis, as the most essential feature in the public interest of any insurance Company is its financial stability.

Item 15—Extension of Government Control.

"The Companies are seriously perturbed by the suggestion of the Commissioner that the Legislation of last session be brought into force giving authority to the Superintendent of Insurance to approve or disapprove rates for automobile insurance.

The Bureau feels that such an extension of the powers of the Insurance Superintendent is uncalled for and unnecessary and that it would be an interference by the Government in the conduct of a large and important business, for which no real cause has yet been shown, either in the carrying on of the business or by the Commissioners' review of its operations. Neither the Public, nor the Insurance Companies would in any way benefit, and the Government itself might at any time be embarrassed if it assumed the responsibility for the premium rates charged the Public by the Insurance Companies.

The enlargement of departmental or bureaucratic powers without any real justification is something which is against the best interests of the Province, and it must not be overlooked in this matter that a rate or rates promulgated by the Bureau and stamped with the Government's approval would not be binding upon non-member Companies who filed a different rate.

Item 17—Submission of the Bureau and all other Interests Associated with it in this Memorial.

"The Insurance business is a very large and important section of the business community of the Province of Ontario, many thousands of its citizens all over the Province being engaged in it. Its personnel is of an admittedly high type and the business in all its branches has always been carried on in an honourable manner, just and fair to the

Public. The Commissioner has found no fact to indicate the contrary, and the signatories hereto respectfully but strongly submit:

1. That there is no necessity for any extension of control of the Insurance business by any Government Department or official;
2. That such an extension of control would only mean additional expense to the Government and the Companies, and indirectly therefore to the Public, without any compensating benefit to the Public;
3. That the Insurance Companies are able to conduct their business themselves, as they always have done, in a lawful and proper manner, fair to the Public, the Province and themselves;
4. That control and fixing of rates by the Government for a class of insurance indispensable to so many citizens of the Province, would tend to make the question a political one, which would not be in the interests of the Government or the Public;
5. That an attempt by Government to fix prices and rates for services, goods or contracts is unsound economically and can be justified only in cases where a public monopoly has been granted, which is not the case in Insurance rates;
6. That the Insurance Companies' rights as individuals and as citizens of the Province to carry on such lawful business should not be ignored or restricted by the government without due and adequate cause being shown;
7. That competition in the insurance business as in most other businesses, is and will always be sufficiently strong to prevent any excessive prices being charged the public.

Respectfully submitted,

The Canadian Automobile Underwriters' Association,

Approved and subscribed to by —
Ontario Fire and Casualty Agents' Association
Toronto Insurance Conference".

After weeks of uncertainty the insurers coupled their opposition to the approval of premium rates by the Superintendent of Insurance and demand for self regulation with an offer to reduce private passenger car rates.

The authority recommended to be vested in the Superintendent to order an adjustment in the rates for automobile insurance whenever such rates were found by him to be excessive, inadequate, unfairly discriminatory or otherwise unreasonable, was

not brought into force. Nevertheless it remained and still remains a dormant section of the Insurance Act to be brought into force by the Lieutenant-Governor by his proclamation. At the same time the anti-discrimination provisions of the Ontario Insurance Act were suspended in April, 1931, through section 35 of the Statute Law Amendment Act. The official explanation which was given regarding this suspension follows, and reads:

> "The purpose of this is to remove the obligation presently imposed upon the Department to enforce sections 274 and 275 of the Insurance Act relating to the regulation of insurance rates (unfair discrimination only). It is necessary in order to accord with the policy of the government determined after consideration of the Hodgins Report. The sections may be brought into force along with section 275*a* if and when the government determines to undertake the regulation of insurance rates along the lines recommended by the Commissioner."

Thus the insurers received ample opportunity to regulate for themselves the business of automobile insurance in Ontario.

The outcome of the Hodgins report as viewed by the press may be indicated by reference to an article published by the Financial Post (Toronto) under date of April 2nd, 1931. The article stated:

> *"Hodgins Report in Ontario Establishes Important Principle in Rate Making"*
>
> Those who are following closely the rapid and interesting developments in the automobile insurance field in Canada are of the opinion that the report issued a short time ago by Hon. Justice Hodgins in Ontario is one of the most important documents of its kind to be published for many years.
>
> Its importance may be appreciated in part by the fact that only a few weeks after its appearance, and in spite of the fact that insurance companies protested vehemently against its conclusion, insurance rates in Ontario for 1931 were cut right and left, and reductions ranging from 2 to 38 per cent. on private passenger cars, with an average reduction estimated at 8 per cent. and involving a saving of at least $500,000 for the year to Ontario insurers. Increases were made in the commercial car field where an advance of about 12 per cent. in rates was promulgated. It is expected

that decreases in other provinces will follow the Ontario reductions.

Established Important Principle

The kernel of the Hodgins report was the fact that it established very clearly the fact that it is quite possible for insurance companies to show an actual out-of-pocket loss on a year's operations and yet be operating under too high a scale of rates.

At first this may seem an anomaly, but its veracity would seem to have been given very practical expression in the recent Ontario rate reductions which came in the face of loud protests that rates could not be too high when accompanied by an out-of-pocket loss of some $200,000.

Discrimination Practiced

What had been happening of course was that the companies had not been keeping to their rates but had been allowing various types of rebates and special commissions which were considered by Commissioner Hodgins to be discrimination against policyholders who were forced to pay the full tariff. In other words, the Commissioner maintained that if the companies had all charged the scale of rates the correctness of which he was investigating, there would have been no loss but rather an overcharge. The fact that the companies through competitive measures, did not maintain these rates uniformly to all policyholders and therefore lost money, did not therefore alter the fact that the rates were too high.

Quite apart from the immediate effect that the Hodgins report has had in securing lower rates for Ontario motorists, there seems little doubt that the principles of rate making so clearly analyzed and set forth in this report, will have an important and far-reaching effect, even perhaps in fields other than automobile insurance.

Good Loss Ratio

As to other events of 1930, the figures published by the Dominion Insurance Department at Ottawa this week reproduced elsewhere in this issue, indicate a very satisfactory year for the large number of companies operating in this field. The ratio of losses incurred to premiums written is 53.96 per cent. as compared with 56.78 per cent. the previous year and 70 per cent. in 1928, while on the basis of net

premiums earned and losses incurred, the ratio is 56 per cent. as against 64 per cent. the previous year.

The tremendous importance of automobile insurance may be indicated by the fact that premium income in 1930 reached the new high record of $18,258,000, which is approximately 50 per cent. of the total premium income from all types of casualty insurance. Furthermore, with the disappearance of workmen's compensation insurance from the joint stock company field on September 1st, 1931, the preponderance of automobile insurance will be even greater, so that it is not unreasonable to assume that in a few years' time with the passing of financial responsibility laws in most of the Canadian Provinces, it will account for at least two-thirds and perhaps more, of the casualty insurance total, and will even exceed the old veteran, fire insurance, in point of premium income."

The outcome of the Hodgins report as viewed by the insurance business is less easily described. A little more than a year ago the business thought it had won a great victory over the alleged menace of government regulation of premium rates. The intervening year has afforded opportunity for more sober reflection. Did the insurers pay too dearly for the whistle? And is the whistle really worth having? A substantial reduction in rates was a big price. And self-regulation has proved increasingly difficult.

Some prominent underwriters are so bold as to say "as long as we are prepared to sell insurance at less than cost we need not fear government regulation. But immediately we try to increase premium rates again we will have the same fight over again or gracefully accept the rating law".

The Ontario Insurance Act still provides for the filing of automobile premium rates and rules. This filing is useful to the designated statistical agency for the purpose of checking the individual automobile experience punch cards required to be filed pursuant to Section 69*a* of the Act enacted in 1930.

The following summary covers the present Ontario law on "Rates and Rating Bureaus":

1. Rating bureaus to file copies of their constitutions, by-laws, lists of members, etc., with the Superintendent of Insurance.
2. Automobile rates and rules applicable to Ontario are to be filed with the Superintendent of Insurance verified by

affidavit. All insurers make a separate filing and the Canadian Automobile Underwriters' Association files all rates and rules promulgated by it. The law, however, permits the Superintendent to request the filing of rates and rules concerning all classes of insurance but such filing has only been requested for automobile insurance coverages. Once a filing is made ten days' notice of any change must be given, duly verified by affidavit, before the effective date.

3. All insurers transacting automobile insurance within Ontario must file monthly with the designated statistical agency, loss cost experience cards punched in accordance with the approved 1931 "automobile statistical plan" and amendments thereto.
4. All insurers transacting fire insurance within Ontario must file yearly (on or before July 1st) an experience report of premium income derived from risks located in Ontario and of claims paid in respect of such risks according to the classification of occupancy hazards of the National Board of Fire Underwriters with such modifications as the Superintendent may prescribe.
5. The Superintendent or any person authorized under his hand and seal of office shall at all times have access to all such books, securities or documents of a rating bureau or insurer as are related to the schedules of rates of the rating bureau or insurer; and any officer or person in charge, possession, custody or control of such books, securities, or documents who refuses or neglects to afford such access shall be guilty of an offence.
6. The Superintendent may inquire into any question which an insurer, insured or a rating bureau may bring before him with regard to insurance rates fixed by any rating bureau or charged by an insurer and also with regard to any other question arising out of the relationship or proposed relationship of the parties with reference to the insurance in question.

   The Superintendent shall not make any order pursuant to an inquiry under this section, but the result of such inquiry shall be reported in his annual report.

1931 Automobile Statistical Plan

The 1930 amendment to the Ontario Insurance Act requiring all insurers to file automobile loss cost experience was to take care of future transactions after the Royal Commission investi-

gating automobile insurance premium rates had completed its work. The 1927, 1928, 1929 and 1930 policy years experience was ordered filed by the investigating Commission prepared in accordance with the 1929 statistical plan of the Canadian Automobile Underwriters' Association. This data was turned over to the Insurance Department when the Commission terminated in December, 1930. Meanwhile the Superintendent of Insurance had called a hearing in June, 1930, at which all insurers interested were invited to attend. The circular calling the hearing stated in part:

> "It will be observed that the form and manner and the system of classification according to which the experience data is to be prepared and filed requires to be approved by the Superintendent of Insurance.
>
> It is proposed to make this provision of the statute effective in respect of business written on and after January 1st, 1931. In order that the approved plan may be in the hands of insurers not later than October 1st, 1930, the preliminary work involved should be commenced at the earliest possible date."

The statistical plan so approved was unanimously recommended by a special committee appointed by the Superintendent of Insurance at the hearing in June, 1930, consisting of the representatives of seven insurers, members of the Canadian Automobile Underwriters' Association, and seven insurers not members of the Association, which, after several meetings, submitted its unanimous report on December 3rd, 1930.

Upon the unanimous recommendation of the said committee, the Canadian Automobile Underwriters' Association was invited to accept the designation of statistical agency and the designation so offered was accepted. All insurers, whether members of the Canadian Automobile Underwriters' Association or not, were accordingly ordered to file their data with this designated statistical agency for compilation. The individual punch cards have to be filed monthly (within 30 days after the close of a current month), and this applies without exception, to all insurers which have not applied to the Superintendent of Insurance for, and been granted the privilege of filing half-yearly returns by way of approved master cards. The filing of semi-annual master cards only applies to insurers which use 80 column punch cards

and have in their own organization 80 column tabulation equipment, as the approved statistical plan calls for the filing of individual 45 column punch cards, subject to the exception noted above.

As the Canadian Automobile Underwriters' Association (which had the personnel, mechanical equipment and office organization necessary to function efficiently as a statistical agency) was nevertheless an organization composed of member insurers; the Department of Insurance proposed to exercise a careful supervision over such agency which in itself would guarantee that the experience data filed by *all* companies would not be used improperly. There is nothing in the statistical plan which shows the agency from which the business originates or other information which could give a competitive advantage to another insurer.

In this way, having the individual punch cards filed by all insurers with the one designated statistical agency, the pro-rated cost of compilation is appreciably less and the Department of Insurance is not required to exercise dual supervision between bureau and non-bureau insurers.

The new statistical plan which became effective on January 1st, 1931, contains upwards of 40 pages and is elaborate considering the present volume of automobile insurance in Ontario. Nevertheless, it was intended that the plan should be as complete as possible in order to have at all times the necessary experience data. It is anticipated that the plan in its present form should be used for a number of years (except for revisions concerning principally new car models) in order that future automobile premium rates may be promulgated and judged upon dependable data.

It may be said that the loss cost upon cars fleet rated is taken care of regardless of fleet discounts, as the plan provides in part:

> "Where a number of cars are insured under a fleet policy and the risk is experience rated, the individual cars in the fleet are recorded separately in the same manner as individually rated cars, subject also to special codes provided for fleet rated cars in the coverage code in Schedule H."

The Department also received the technical advice of Woodward, Fondiller & Ryan, consulting actuaries, concerning its new automobile statistical plan.

General

In March, 1931, the designated statistical agency was directed to tabulate the Ontario automobile experience covering the transactions for calendar year 1930 combined in the following groups:

(a) Experience of tariff insurers
(b) Experience of non-tariff insurers
(c) Experience of tariff and non-tariff insurers combined.

In June, 1931, the tabulation was completed. A copy of the combined automobile loss cost experience in Ontario covering the 24 months of policy year 1929 and the 12 months' experience of policy year 1930 was sent by the designated statistical agency to all non-bureau insurers, furnishing the combined experience in the province of all insurers not members of the Association. Each non-bureau insurer was also advised that similar experience could be obtained (upon application and at cost) of all insurers in Ontario, bureau and non-bureau. The certified cost of the tabulation concerning the transactions of 1930 calendar year to the non-bureau insurers was $0.17585 for each $100 of reported premiums. Considering that the statistical agency was required to audit the individual punch cards in addition to the work of compilation, the cost mentioned above amounting to 1/6 of 1 per cent. of premiums reported by non-bureau insurers appeared to be very reasonable.

During 1930 one-third of the automobile premiums written in Ontario were reported by insurers not members of the Association. Since most of the non-bureau business is written below tariff rates it follows that such insurers accounted for something like 40 per cent. of the total volume of business actually transacted during the period. Here, we see independent insurers in the automobile field obtaining for the first time available statistical data in the manner as described herein. This also indicates the extent to which the Canadian Automobile Underwriters' Association is willing to co-operate in the matter of furnishing information upon which such non-tariff insurers may promulgate their rates.

In August, 1931, the statistical agency was directed to develop automobile loss cost indications from the combined experience of all insurers in Ontario covering the complete policy years 1927,

1928 and 1929, and the incomplete policy year 1930 (twelve months).

This material was received in November, 1931, whereupon it was my privilege to prepare a report addressed to the Superintendent of Insurance covering the cost of automobile insurance in Ontario with an interpretation of the loss cost indications received from the statistical agency using 45 per cent. gross manual premium expense loading, as recommended by the Commissioner. This report was completed at the end of 1931 in order to have available the necessary material in case the government desired to have a statement from the Superintendent relative to the reasonableness of 1932 automobile insurance premiums in Ontario.

Up to the time of writing, no increases in premium rates have been made. This means that the decreases in private passenger premium rates made voluntarily by the insurers early in 1931, are also being applied to the 1932 business. It may also be stated that recently in Ontario automobile premium taxes have been increased from one per cent. to two per cent. calculated on the gross premiums received (less return premiums). The Dominion government has commenced to tax premiums for automobile insurance and the rate of taxation in this connection is one per cent. of net premiums written in Canada. This means that expense loadings will have to be revised to take care of these amendments to premium taxes.

In the preparation of the writer's first report to the Superintendent of Insurance, concerning automobile insurance premium rates in Ontario, he followed largely the principles which were adopted by the late Harwood E. Ryan, in his report to the Commission. It should be added that Mr. Ryan's report was invaluable to the writer in the preparation of his report, and, he is deeply grateful to Mr. Ryan for the thoroughness with which he established his principles and his clarity of expression which was so evident in his report.

Up to the end of 1931, little of the casualty business has been written by mutual insurers. In fact, so far as Ontario is concerned, less than 5 per cent. of automobile insurance has been written by mutuals, and all compensation insurance in the province is carried by the monopolistic state fund.

The writer believes, however, that the stock companies will get more competition from the mutuals as time goes on. The Canadian Automobile Underwriters' Association recently ruled that mutual insurers could not be members of their Association. The mutuals of course are free to organize their own rating organization if and when they so desire. Two years ago two Manitoba local fire mutuals obtained incorporation by special act of the Dominion of Canada and are now writing in this province fire and casualty business. Both insurers had successful operation in the province of Manitoba before obtaining Dominion incorporation. None of the casualty business in Ontario is written by reciprocal exchanges.

For the calendar year 1931, 153 insurers reported automobile experience (applicable to Ontario) in the annual statement sent to the Department, out of a total of 174 companies licensed to transact this class of business. The ratio of losses incurred in the province (for all automobile insurance coverages) to premiums earned during 1931 was 51.25 per cent.

The independent or non-bureau insurers (including mutual business) accounted for 40 per cent. of the earned premiums reported and this experience concerning losses incurred to premiums earned was 51.20 per cent., which is favourable considering that the rating law is not in force and so many insurers in the field.

Early in May, 1932, two of our mutual insurers made important amendments to their filed automobile rates. It is anticipated that these amendments may change the course of the whole automobile insurance situation in this province.

The first amendment quoted in part below comes from one of the mutual insurers which previously along with others was asked to resign from the Canadian Automobile Underwriters' Association at the time the Association ruled that mutuals could not be members.

The rating amendment goes on to say:

> "Please be advised that we propose to amend our automobile fleet writing regulations to eliminate the requirement that cars to be eligible must be 'owned and registered in the name of' one owner.
>
> *Any fleet* of five or more automobiles is eligible for ex-

perience rating, provided it has been insured for one or more consecutive years (including the expiring policy year) and provided a premium has been received on at least five automobiles insured on the full time basis for the expiring policy year."

The amendment received from the second mutual insurer provides that this insurer's fleet rating plan is to be extended to cover private passenger cars insured in groups except, that such merit rate is to be determined at the end of the policy year in the form of a policy dividend based upon the group experience. The primary cash premium rate quoted at the inception of the particular group is in accordance with the insurer's cash premium rate or rates for any one person insured. Such a plan of course is not particularly sound to the extent that a special dividend may be allowed if the expiring policy for the group comprising the fleet produces favourable experience, but no provision is made to collect a surcharge in case the experience turns out to be unfavourable; and this particular insurer does not have any policy assessment provision for business transacted other than on the premium note plan.

Whatever may result from the two amendments to rate filings referred to, the Department is at least in the position of having the experience of all insurers through the filing of statistical material monthly. Much credit is due to Mr. C. H. Fredrickson, Actuary for the Canadian Automobile Underwriters' Association (acting as statistical agency for the Insurance Department) in his responsibility to the Department for the accuracy of the data which is supplied by the various insurers (all individual punch cards are required to be checked). Each insurer after the close of the year is required by Mr. Fredrickson to reconcile the total of its experience cards with the government annual statement.

Representatives of the Associated insurers recently met the Superintendent to see what might be done to have the anti-discrimination law brought into operation in order to meet the present situation regarding mutual insurers writing individuals on a fleet basis, or, in groups.

The Superintendent pointed out how difficult it was for the Department to effectually administer such a law without the law requiring general approval of rates. Some of the insurer repre-

sentatives referred to then suggested that in the best interests of the business it might be advisable to bring into force the approval of rates law as it appeared to work very well in New York State. The Superintendent then stated that *that* was the very reason why the Commissioner investigating automobile insurance premium rates had recommended it in his report.

The Superintendent also mentioned how the Associated insurers less than 18 months ago had opposed the approval of rates law as recommended by the Commissioner, that the matter should receive very careful consideration by the insurers themselves; and that the Department would be handicapped in the enforcement of a law requiring approval of premium rates by the Superintendent unless, the majority of the insurers were in favour of it.

At this date (July 1st, 1932) nothing further has been done regarding the above mentioned discussion.

At the time of writing, a committee of underwriters representing all insurers transacting automobile insurance in the province is presently engaged in the task of drafting out suitable automobile policy forms together with all endorsements therewith appertaining. All insurers are given the opportunity to make representations through the committee, and, when the work is completed, the said forms will be mandatory upon all insurers. It is also expected that the committee will become a permanent one in order that insurers subsequently submitting special forms of policy to the Insurance Department for approval, may have such forms referred to the committee (representing all insurers) for their opinions, suggestions and recommendations.

The new provisions recently enacted relating to automobile insurance contracts provide in part that the Superintendent of Insurance is to approve all automobile policies and endorsements issued or delivered in the province. The law also states what the application must contain. The insuring agreements and exclusions from perils are defined, and, in addition, the statutory conditions required to be contained in every contract are clearly set forth.

The automobile policy forms committee made its interim report to the Superintendent of Insurance on June 7th, 1932, after fifteen meetings had been held upon this subject. All

insurers have received from the Superintendent of Insurance (who was invited to act as Chairman of the committee) a copy of the committee's interim report together with the proposed standard forms and general instructions regarding the use of such forms. It is expected the committee will bring in its final report shortly, after insurers have made all suggestions and criticisms concerning such forms.

No insurer will be able to extend coverage in any way under the standard automobile policy except by standard endorsement for an additional stated premium.

The writer will be pleased to give particulars of further developments in Ontario at a later date. Before closing, however, a few comments ought to be made concerning conditions in this province and mentioned in this report:

1. The better insurance interests are in favour of an anti-discrimination law. In the absence of such a law it would appear that a small minority of insurers will practice unfair discrimination in quoting insurance premium rates, particularly with respect to schedule or fleet policies.
2. Politically it is difficult to administer an anti-discrimination law without an approval of premium rates law. For example, under an anti-discrimination law you are usually hitting at large target risks which obtain rates lower than the general public obtain. Under a general approval of premium rates law (properly administered), it is possible to approve premium rates for all the different coverages within a class of insurance, based upon the cost of insurance plus a fair return or underwriting profit to insurers.
3. Under the strain of competition and in the absence of an approval of premium rates law, small insurers are inclined to write business at rates lower than those charged by the larger insurers in order to obtain volume. On the other hand, if premium rates are fixed from the combined loss experience of all insurers with an approved expense loading, the larger insurers have the best chance of obtaining business. Let me put it this way, if a policyholder has to pay the same amount of premium for his insurance in a small company as he would have to pay in a large company, generally speaking, the larger company would in all probability obtain the business (assuming the policyholder knew the relative financial standing of each insurer). It may be said that a small insurer cannot afford to write business below the rates charged by larger insurers and, therefore,

should not be permitted to do so in view of the fact that casualty insurers have made small profit during the last number of years.

4. That under present conditions it is impossible for insurance companies to charge *for any length of time* excessive premium rates. The danger in the absence of a premium rate approval law is that certain insurers are prone to write business below cost.
5. No rating law can render proper assistance or be of real benefit unless at least 80 per cent. of the business is willing to co-operate, and that such insurers and brokers will give to the Insurance Commissioner sympathetic consideration in the proper administration of the law.

SOME NOTES ON CREDIBILITY

BY

F. S. PERRYMAN

The following notes arose out of current problems in rate making, principally automobile, and while arranged in some sort of logical order, are more or less separate. They cover a wide range of aspects of credibility and do not pretend to be either a complete study of the subject or even a complete survey of the specific points discussed. Indeed, as regards a good many principles of credibility (including some of the fundamental) actuarial opinion does not seem to be formed and one of the reasons for these notes is to provoke discussion of the whole subject, which is of increasing importance today on account of the great attention being paid by the carriers, the supervising authorities and the public to rates, especially automobile liability rates. Increasing insistence is being placed on the desirability of basing, as far as possible, rates for the various territories on the territories' own experience and accordingly it has become much more important to have reliable guides as to how far local experience can be relied on and to what extent it must be supplemented by experience in other districts. Thus credibility in the sense it is used in casualty rate making is of much greater importance nowadays than it was some years ago.

There is an excellent summary of automobile rate making credibility in the late Mr. R. A. Wheeler's comparatively recent paper entitled "Credibility and Automobile Rate Making" (*Proceedings*, Vol. XVI, page 268). In it he discusses the genesis of the usual criterion for credibility in automobile rate making and this criterion is the subject of my first note.

NOTE 1

Usual criterion for credibility of accident frequency.

The usual formula for ascertaining the amount of exposure necessary in order that a certain experience may be relied on is arrived at by determining an exposure large enough so that there is a very great probability that the number of accidents actually

observed is within a small percentage of the expected or most probable number. This is derived as follows:—

The probability P that the number of accidents is within $k(100k\%)$ of the most probable number nq, where n is the exposure and q is the accident frequency is, if $p+q=1$,

$$P=\frac{1}{\sqrt{2\pi\, npq}}\int_{-knq}^{+knq} e^{-\frac{x^2}{2npq}}\,dx \qquad \text{(a)}$$

or changing the variable x to $t=\dfrac{x}{\sqrt{2\,npq}}$

$$P=\frac{2}{\sqrt{\pi}}\int_0^{\frac{knq}{\sqrt{2npq}}} e^{-t^2}\,dt$$

If the criterion is to be (say) that for full credibility $P=.99$ and $k=.05$, then from a table of $\dfrac{2}{\sqrt{\pi}}\displaystyle\int_0^z e^{-t^2}\,dt$ we find that

$$.99=\frac{2}{\sqrt{\pi}}\int_0^{1.82} e^{-t^2}\,dt \text{ and } \frac{knq}{\sqrt{2npq}}=1.82 \text{ or } nq=2650(1-q). \qquad \text{(b)}$$

This is the usual credibility formula but some little time ago a question arose in connection with Owners', Landlords' and Tenants' area experience, as to why the unit of exposure should affect the result brought out by the formula since it is obvious from first principles that such a change should not affect the requirements for full credibility.

(For example, in the case of an accident frequency of one accident per annum for each 1,000 sq. ft., if the unit of exposure be a square foot, $q=.001$ and $n=\dfrac{2650\times.999}{.001}=2{,}647{,}350$ sq. ft., but if the unit be 100 sq. ft., $q=.1$ and $n=\dfrac{2650\times.9}{.1}\times1000=$ 2,385,000 sq. ft.)

Now formula (a) is derived as an approximation for

$$P=\sum_{r=(1-k)nq}^{r=(1+k)nq} {}_nC_r\,(1-q)^{n-r}\;q^r \qquad \text{(c)}$$

and is based on the assumption of n trials with a probability of happening in each trial of q, each trial being subject to the

(implied) condition that in it the accident either happens (probability q) or does not happen (probability $p = 1 - q$). Now this is not the case for liability assurance where q is the yearly accident frequency. There are not, in the case of an exposure of n with yearly accident frequency q, n trials with probability q in the above sense, for each unit of exposure may have none, one, two, three, etc., accidents in a year. To make the necessary change in the formula we proceed as follows: The unit of exposure is one unit of coverage exposed for a year: for clarity we will take the case of one car exposed for a year—a "car year": alter the car year exposure to an exposure of a car for an s^{th} of a year where s is ultimately to be made so large that we can regard a car exposed for $\frac{1}{s}$ years as being a single trial with only the two possible results, namely, no accident or one accident. Then in (b) we write ns for n, $\frac{q}{s}$ for q, and get $ns \times \frac{q}{s} = 2650\left(1 - \frac{q}{s}\right)$ or $nq = 2650\left(1 - \frac{q}{s}\right)$

Now making s very large we get $nq = 2650$, the proper credibility requirement.

Similarly if the criterion is to be that n is large enough so that the probability is P that the number of accidents are within $100k\%$ of the expected value nq, then the value of n is determined as follows:—

From tables find z so that $P = \frac{2}{\sqrt{\pi}} \int_0^z e^{-t^2}\, dt$

Then $nq = 2\left(\frac{z}{k}\right)^2$

It will be seen that the criterion becomes simply that the number of expected accidents shall be a certain fixed amount regardless of the accident frequency. This is an eminently reasonable result for it says in effect that 10,000 cars for one year are as credible as 20,000 cars for six months, or five thousand cars for two years, if they are all exposed to the same (annual) hazard of accident, or in the case of different accident frequencies, that 10,000 car years at one accident rate are as credible as 20,000 car years at half the accident rate, or 5,000 car years at double the accident rate.

The effect of this adjustment to the usual credibility formula is to increase slightly the requirements for full credibility: for example, for a yearly accident frequency of 10% the requirement is increased 11% and for a yearly accident frequency of q the increase is $\frac{100\%}{1-q}$.

One further point ought to receive consideration:—

(a) is the usual approximation to the binomial (c) if n is large, if k is not too large (and in practice both these conditions are fulfilled) and *if q is not too small.* But using the above modification of the usual credibility theory we are using in effect (a) with $\frac{q}{s}$ in place of q and ns in place of n, or

$$\frac{2}{\sqrt{2\pi nq}}\int_0^{knq} e^{-\frac{x^2}{2nq}}\,dx$$

as an approximation to

$$\sum_{r=(1-k)ns\frac{q}{s}}^{r=(1+k)ns\frac{q}{s}} {}_{ns}C_r\left(1-\frac{q}{s}\right)^{ns-r}\left(\frac{q}{s}\right)^r \quad \text{with } s\to\infty$$

and the question is whether this is a proper approximation since $\frac{q}{s}$ will be very small. Appendix A shows that under these conditions the approximation is satisfactory.

The conclusion of this note is that the criterion for accident frequency credibility usually used in casualty rate making for such lines as automobile, and which criterion is based on the probability integral (a) should be modified by the use of nq in place of npq. This reduces the criterion to a certain number of accidents, which number is independent of the accident frequency.

Note 2

Expression of criterion in terms of standard deviation.

For some purposes it is most convenient to express the credibility criterion in terms of the more usual statistical constants, the mean and the standard deviation.

In a normal frequency distribution of a variable with a mean μ

and a standard deviation σ the probability that an observation differs from the mean by less than $\delta = k\mu$ is

$$P = \frac{1}{\sigma\sqrt{2\pi}} \int_{-\delta}^{+\delta} e^{-\frac{x^2}{2\sigma^2}}\, dx = \frac{2}{\sigma\sqrt{2\pi}} \int_{0}^{\delta} e^{-\frac{x^2}{2\sigma^2}}\, dx$$

or putting $x = \sigma t \sqrt{2}$

$$P = \frac{2}{\sqrt{\pi}} \int_{0}^{\frac{k\mu}{\sigma\sqrt{2}}} e^{-t^2}\, dt$$

From a table of $\frac{2}{\sqrt{\pi}} \int_{0}^{z} e^{-t^2}\, dt$ we can determine for a given value of P the value of z as a function of P, say $f(P)$, i.e.,

$$P = \frac{2}{\sqrt{\pi}} \int_{0}^{f(P)} e^{-t^2}\, dt$$

Thus if $\frac{k\mu}{\sigma\sqrt{2}} \geq f(P)$ or $\frac{\sigma}{\mu} \leq \frac{k}{\sqrt{2}\, f(P)}$ (a)

then the probability is greater than P that an observed value will differ from the mean μ by less than $k\mu$.

For example, if $P = .99$ $k = .05$ $f(P) = 1.8214$

$$\frac{k}{\sqrt{2} f(P)} = .01941$$

so that if $\frac{\sigma}{\mu} = .01941$ then the probability is 99 to 1 that an observation will be within 5% of the mean, and if $\frac{\sigma}{\mu}$ is less than .01941 the probability is greater than 99 to 1 that the deviation will be less than 5%.

Usually in rate making we are dealing with the mean of a large number, say n, of individual observations or experiences, and even if the frequency distribution of the individual observations is not normal the frequency distribution of the means will usually tend to be normal and the larger n is the more normal the frequency distribution (of the means) will be and the smaller the standard deviation will be. If the mean of one observation of the variable observed is μ and the standard deviation is σ then the mean of the mean of n observations will be μ and the stand-

ard deviation σ_n will equal $\frac{\sigma}{\sqrt{n}}$. The problem that we have to solve is how large must n be so that there is a probability P that the variation of the mean of the n observations from the true value is less than $100k\%$. In other words we must determine from (a) the value of n so that

$\frac{\sigma_n}{\mu} \leq \frac{k}{\sqrt{2}f(P)}$. Now if $\frac{k}{\sqrt{2}f(P)} \geq \frac{\sigma_n}{\mu} = \frac{\sigma}{\mu\sqrt{n}}$, then

$$n \geq \frac{2\sigma^2\{f(P)\}^2}{\mu^2 k^2} \qquad \text{(b)}$$

and this determines the minimum value for n.

It will be seen that if P and k are fixed, n depends on the ratio for the variable observed of the standard deviation to the mean.

A few values of $\{f(P)\}^2$ are given together with some values of $2\{f(P)\}^2 \div k^2$.

P	$\{f(P)\}^2$	$2\{f(P)\}^2 \div k^2$				
		$k = .025$	$k = .05$	$k = .075$	$k = .1$	$k = .125$
.99	3.316	10,611	2,653	1,179	663	424
.98	2.706	8,659	2,165	962	541	346
.97	2.356	7,539	1,885	838	470	302
.96	2.108	6,746	1,686	750	421	270
.95	1.921	6,147	1,537	683	384	246
.90	1.353	4,330	1,082	481	271	173
.85	1.036	3,315	829	368	207	133
.80	0.823	2,634	658	293	165	105
.75	0.661	2,115	529	235	132	085
.70	0.537	1,718	430	191	107	069

From this we can easily calculate n as soon as $\frac{\sigma}{\mu}$ is known.

We can also now readily see the effect of changes in the credibility requirements. If k is changed, P remaining constant, n varies inversely as the square of k, e.g., if k is doubled, n is decreased to one-fourth. If k remains constant and P is changed, n varies as $\{f(P)\}^2$, e.g., if P is decreased from .99 to .80 n is decreased in the ratio of 3.316 to .823 or is approximately decreased to one-fourth. If both k and P are changed the net effect depends on the change in $\frac{\{f(P)\}^2}{k^2}$: e.g., if k is doubled and P is increased from .99 to .80, n is approximately unchanged.

To apply the above to the accident frequency criterion discussed in Note 1 we can proceed

either (i) from Note 1 we see that for an exposure n and accident frequency q, the mean expected value is nq and the standard deviation is $\sqrt{nq}$. Thus for the n observations $\frac{\sigma}{\mu} = \frac{1}{\sqrt{nq}}$ and from (a) $\frac{1}{\sqrt{nq}} \leq \frac{k}{\sqrt{2}\,f(P)}$ or $nq \geq \frac{2\{f(P)\}^2}{k^2}$ (c)

or (ii) from Note 1, for a single observation ($n = 1$) the mean expected value is q and the standard deviation is $\sqrt{q}$.

Thus for one observation $\frac{\sigma}{\mu} = \frac{1}{\sqrt{q}}$

and from (b) $n \geq \frac{2\{f(P)\}^2}{qk^2}$

or $nq \geq \frac{2\{f(P)\}^2}{k^2}$ as before

We can apply the above table directly to this.

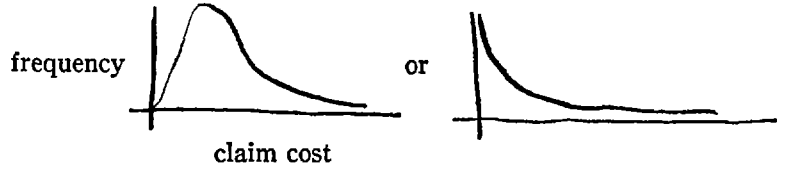
For example

if $P = .99$ $\quad k = .05$ $\quad nq \geq 2{,}653.$

$P = .80$ $\quad k = .025$ $\quad nq \geq 2{,}634.$

NOTE 3

In our formulae for full credibility we have considered so far only the variation in accident frequency and have derived criteria for determining whether the accident frequency shown by the experience can be relied on. This has been the usual procedure to date: with a credible accident frequency it has been assumed the pure premium is credible. But as the pure premium is the accident frequency multiplied by the average claim cost we must see how possible variations in the average claim cost affect the pure premium and how we must modify our credibility requirements accordingly. In a given territory for a given period the cost of a claim will form a frequency distribution which will usually when plotted graphically be something like



The frequency distribution will not be "normal" (i.e., not follow the "normal" curve of error), but will be either of a very skew cocked-hat type or else of a J or L type. Nevertheless the average of a large number of observations will tend to be normal (the larger the number the more normal) and if M, S are the mean and the standard deviation respectively of the claim cost distribution the mean and the standard deviation of the average of nq observations will be M and $\frac{S}{\sqrt{nq}}$ respectively.

Further, if nq is large so that the frequency distribution of the average claim cost is fairly normal the pure premium (arrived at by multiplying the accident frequency q which has a standard deviation of $\sqrt{\frac{q}{n}}$ and the average claim cost M which has a standard deviation of $\frac{S}{\sqrt{nq}}$) will have a mean value of Mq and a standard deviation of $\sqrt{\left\{M^2\frac{q}{n}+q^2\frac{S^2}{nq}\right\}}$ for the standard deviation of M_1M_2 where M_1, M_2 have standard deviations of σ_1, σ_2, respectively, is $\sqrt{\{M_1^2\,\sigma_2^2+M_2^2\,\sigma_1^2\}}$ if both M_1 and M_2 are normal. (This is a well known theorem in mathematical statistics). Thus for the pure premium

$$\frac{\text{Standard Deviation}}{\text{mean}}=\sqrt{\left\{\frac{1}{nq}+\frac{S^2}{M^2nq}\right\}}=\frac{1}{\sqrt{nq}}\sqrt{\left\{1+\frac{S^2}{M^2}\right\}}$$

Putting this value in formula (a) of Note (2) we must have for full credibility of the pure premium

$$\frac{1}{\sqrt{nq}}\sqrt{\left\{1+\frac{S^2}{M^2}\right\}}\leq\frac{k}{\sqrt{2}\,f(P)}$$

$$\text{or } nq\geq\frac{2\{f(P)\}^2\left(1+\frac{S^2}{M^2}\right)}{k^2} \qquad \text{(d)}$$

Comparing this with formula (c) of Note 2 we see that the volume of exposure required for full credibility of the pure premium requires the multiplication by the factor $1+\frac{S^2}{M^2}$ of the number of claims required for credibility of the accident frequency (notice the requirement is still expressed in number of claims).

This factor seriously increases the credibility requirements. For automobile public liability private passenger personal injury standard limits claims some countrywide figures show an average claim of about \$325 with a standard deviation of about \$715 so that $1 + \frac{S^2}{M^2} = 5.84$. Thus retaining the same requirements for full credibility, namely, .99 probability of a variation of less than 5%, the number of claims required would be increased from 2650 to 15500: or for an accident frequency of 5% the number of car years required is increased from 53,000 to 310,000! Corresponding automobile private passenger property damage figures show a \$40 average claim with a standard deviation of \$71 so that $1 + \frac{S^2}{M^2} = 4.15$ and the number of claims required would be increased from 2650 to 11,000 and the number of cars with a 12% accident frequency from 22,000 to 91,000!

Such great increases in credibility requirements could not very well be made in practice under present day conditions for they would greatly limit the employment of local data. It seems likely, however, that, as Mr. Wheeler remarks in his paper mentioned above, the present credibility requirements, which are based on accident frequency only, have been made unduly stringent to take care in a rough manner of the increased requirements for pure premium credibility. Thus a reference to Note 2 will show that, approximately, in the case of automobile property damage a requirement of .99 probability of a variation of less than 10% will quarter the number of claims required for 100% credibility and when applied to pure premiums as in this note will produce somewhat the same needed exposure as the requirement of .99 probability of a variation less than 5% applied to accident frequency. In the case of automobile public liability the requirement would have to be reduced to .99 probability of a variation of less than 12% to give the same number of claims.

The question of standard deviation of claim costs requires considerable further study. It would seem that claim conditions would vary considerably from state to state and accordingly a distribution of country-wide claims by size would form not a Bernoullian distribution but a Lexian distribution, and the stand-

ard deviation of a state's distribution of claims by size might very well be less than the standard deviation of the country-wide distribution. Theoretically when making rates for a given territory the frequency distribution of the claims for that territory shall be used. However, in most instances there would not be enough claims in the territory to give a reliable estimate of the average value and standard distribution.

The standard deviation of the average claim cost is greatly affected by the comparatively few large claims, particularly in the case of automobile personal injury. It has been suggested that probably better (that is, more stable) results could be secured by considering separately (i) the first $1,000 of each claim together with the complete cost of all claims of less than $1,000 and (ii) the excess of cost over $1,000 per claim for those exceeding that amount. By this method the pure premium would be split into two parts, namely, "normal" and "excess". (The terms "normal" and "excess" are here used in the experience rating sense.) This procedure would not entail much change in the calculation of the "normal" pure premium which would be calculated just as the full pure premium is at present. However, in the calculation of the "excess" pure premium it would be necessary (even if a lower credibility were used) either (I) to combine the experience of similar territories to get a sufficiently credible exposure (which procedure while easily defended is contrary to the present tendency to use local experience as much as possible) or else (II) use more years experience than for the "normal" pure premium (which procedure is open to many objections, chief of which is disinclination to go back any further than necessary into the past on account of rapidly changing conditions). The method mentioned in this paragraph has received some attention and warrants further study. However, it must be realized that credibility requirements would call for a considerable excess exposure as shown by the following example (which is based on actual experience).

$$P = .99 \qquad k = .05$$

(A) Full pure premium

$$q = .092 \quad M = 328 \quad 1 + \frac{S^2}{M^2} = 5.32 \quad \text{pure premium} = 30.2$$

Exposure required for 100% credibility = 153,000 car years.

(B) "Normal" pure premium

$q = .092 \quad M = 229 \quad 1 + \frac{S^2}{M^2} = 2.61 \quad$ pure premium $= 21.1$

Exposure required for 100% credibility = 69,000 car years.

(C) "Excess" pure premium

$q = .0066 \quad M = 1379 \quad 1 + \frac{S^2}{M^2} = 1.75 \quad$ pure premium = 9.1

Exposure required for 100% credibility = 702,000 car years.

The exposure required for full credibility for the "normal" pure premium is about 45% of that for the full pure premium, while that for the "excess" pure premium is over 450%.

NOTE 4

The next aspect of the subject of credibility which comes up for consideration is the treatment of experience which is not fully credible, according to the principles of the preceding notes or according to any other standards which may be used. The usual and most satisfactory procedure is to assign a credibility of less than 100% to the experience and then combine with some broader experience giving this latter the complement of the weight assigned. To illustrate, if we had pure premiums by class for a given state, and had also national pure premiums by class, then for classes for which the experience in the state had 100% credibility we would use the state experience and for a class for which the credibility of the state experience was less than 100% (say 60%) we would use 60% of the state pure premium plus 40% of the national pure premium. In practice we would allow for differences in conditions in the state and the rest of the country by a procedure which would put the national pure premiums on the state level, but I do not intend to go into many details here. The question of what credibility to assign to an exposure less than one warranting 100% credibility is usually decided by assigning a credibility of $\frac{1}{\sqrt{r}}$ to an exposure of $\frac{1}{r}$ of that required for 100% credibility. The reasons prompting the use of this do not appear very explicitly in casualty actuarial literature, but it seems to be based on the rule used in "combination of observations" (in such sciences as astronomy, engineering) that the best weight to be assigned an observation is the

reciprocal of its standard deviation: according to this the relative weights of two experiences, one (exposure n) entitled to 100% credibility and other $\left(\text{exposure } \frac{n}{r}\right)$ would be in the ratios of the reciprocals of their standard deviations or as $\frac{\sqrt{n}}{\sigma}$ to $\frac{\sqrt{\frac{n}{r}}}{\sigma}$ that is 1 to $\frac{1}{\sqrt{r}}$.

The rule seems plausible and practical. It is to be noted, however, that the principles upon which it was derived for use in other branches of science are not especially applicable to casualty rate making. It is further to be remarked that in an analogous problem in casualty actuarial practice, namely, the determination of the weight to be assigned to a risk in experience rating, an entirely different rule was used. The experience rating method, however, would give roughly the same results as the use of the method mentioned above. It will be noticed from Note 2 that the above mentioned rule amounts to this: if the criterion for 100% credibility is a probability P of a variation of less than $k\%$ the criterion for $\frac{100\%}{t}$ credibility is a probability P of a variation of less than $tk\%$ or alternately the criterion can be expressed (less simply) as a probability of P^1 of a variation of less than $k\%$ where $t\,f(P^1) = f(P)$. For example, if $P = .99$, $k\% = 5\%$, then for 50% credibility $t = 2$ and the criterion for 50% credibility is .99 probability of 10% variation or .80 probability of 5% variation since $2f\,(.80) = f(.99)$.

Nevertheless let us examine the procedure a little more closely using the principles of the preceding notes.

Let us assume an indication on local experience of p with a credibility arrived at as above of $\frac{1}{t}$ or, what amounts to the same thing, with a standard deviation of σt where σ is the minimum standard deviation required for full credibility. We are to combine this indication with an indication based on wide experience of P, the standard deviation of which we will suppose is x. The final pure premium will thus be

$$\frac{1}{t}p + \left(1 - \frac{1}{t}\right)P$$

and the square of the standard deviation of this will be

$$\frac{1}{t^2}\,\sigma^2\,t^2+\left(1-\frac{1}{t^2}\right)^2 x^2 \text{ or } \sigma^2+\left(1-\frac{1}{t}\right)^2 x^2$$

Now assuming (which will usually be the case) that p and P are nearly equal, the final pure premium will be entitled to full credibility (on the above principles) only if the square of the standard deviation is not greater than σ^2 which will only be the case if x is zero. This will not ever be quite true although we may *assume* x is very small if the wider experience is very extensive. It would appear then that we should give the local experience somewhat less weight than $\frac{1}{t}$, although it is not possible to give a simple rule.

The present rule is probably satisfactory enough in practice particularly as it is customary to limit the use of experience with very low credibility. However, this discussion shows that any changes in partial credibility formulas should not be in the direction of giving greater credibility.

It must be borne in mind that the above remarks are all based on the assumption of the existence of an available and applicable wider experience with which to make the combination of a partially credible experience and there is usually in practice some question as to the availability and applicability of wider experience.

It would take me too far from the objects of these notes to go into the difficulties—for they are many—of the treatment of experience with less than 100% credibility, and of the proper selection of wider experience with which to combine. Nevertheless the following will indicate the theoretical procedure for a simple ideal case. Suppose in one state, for a group of r territories all reasonably similar we have the following exposures, experience pure premiums, and credibilities,

Territory	1	2	3	$\cdots\cdots\ r$
Exposure	e_1	e_2	e_3	$\cdots\cdots\ e_r$
Experience pure premiums	p_1	p_2	p_3	$\cdots\cdots\ p_r$
Credibility	c_1	c_2	c_3	$\cdots\cdots\ c_r$

Then we wish to determine pure premiums solely from the group, we can proceed:—take for each territory pure premiums of

$$p_1\,c_1+(1-c_1)\,\pi,\ p_2\,c_2+(1-c_2)\,\pi, \text{ etc.}$$

where π is based on experience of the group so as to reproduce the experience as a whole.

Thus we must have $\sum_{s=1}^{r} e_s \{ p_s c_s + (1-c_s) \pi \} = \sum_{s=1}^{r} e_s p_s$

$$\text{or } \pi = \frac{\sum_{s=1}^{r} (1-c_s) p_s e_s}{\sum_{s=1}^{r} (1-c_s) e_s}$$

This procedure amounts to dividing the experience of any territory s into two parts c_s and $1-c_s$, and using the latter part to determine a broad pure premium.

In order that the final indications may be credible, it is necessary as shown earlier that $\Sigma (1-c_s) e_s \pi$ which equals $\Sigma (1-c_r) p_s e_s$ should be considerable larger than the exposure required for 100% credibility.

It will often be found in practice that if the r territories are, as assumed, reasonably similar, then practically the same results will be obtained by taking for π the average pure premiums of all the territories or $\frac{\Sigma p_s e_s}{\Sigma e_s}$

Note 5

Projection by Method of Least Squares.

The progressive increase in pure premiums for many coverages has given rise of late years to the use of "projection" methods aimed at using the trend of past experience to "project" the observed pure premium for past years so as to forecast the future pure premiums on the assumption that the observed trend will be continued. With the propriety of such attempts and the methods used, I am not concerned in these notes, my sole purpose here being to consider the effect on credibility of the method most widely used, namely, straight line projection by the method of least squares.

This method consists of setting down the pure premiums observed by years (usually policy years) and fitting by mathematical methods the straight line of best fit to these observations and

reading off the projected value of the pure premiums for the required future year. Thus if we have for r years of observation the following pure premiums

Year	1	2	3	$\cdots$	r
Pure Premium	p_1	p_2	p_3	$\cdots$	p_r

we fit a "straight line" so that the adjusted pure premium for the year x is $a + xb$ where a and b are determined from the p's. The name of "least squares" comes from the method used to determine a and b, which consists of choosing these as to reduce to a minimum the sum of the squares of the deviations, i.e., the sum of $(a + xb - px)^2$ for $x = 1, 2, 3, \cdots r$ is made a minimum: according to the mathematical theory of statistics this gives the best fit for the "straight line" $a + xb$.

Details of the calculation and the resulting formulas are given in Appendix B. A refinement can (in theory) be made by giving the different years varying "weights" in accordance with the varying credibilities of the various years' experiences. Usually, however, in practice varying weights are not used and we will deal with the simple case of equal weights which is the one set out above. The number of years used (the value of r above) is usually 4 or 5. I may say in passing that projection is usually applied direct to pure premiums but in theory there is a case for applying projection separately, as respects a class of business such as automobile liability, to the observed accident frequencies and to the average cost of an accident. Each of these two factors of the pure premium usually have their own trends and the result of combining the factors projected separately will be rather different from that obtained by projecting the total pure premium. The difference, however, would not usually be large and to make the projections separately would greatly complicate the work.

Taking now the case of equal weights, the least squares methods give a value for year $\frac{r+1}{2}$ (the mean year) of

$$\frac{p_1 + p_2 + \cdots + p_r}{r}$$

with an increase for each year beyond that of

$$\frac{6}{r^3 - r}\{-(r-1)\,p_1 - (r-3)\,p_3 - \cdots\cdots + (r-3)\,p_{r-1} + (r-1)\,p_r\}$$

so that the adjusted value for year x is

$$\frac{6}{r^3-r}\left[\left\{\frac{r^2-1}{6}-\left(x-\frac{r+1}{2}\right)(r-1)\right\}p_1+\cdots+\right.$$
$$\left.+\left\{\frac{r^2-1}{6}+\left(x-\frac{r+1}{2}\right)(r-1)\right\}p_r\right]$$

Notice that the sum of the coefficients of the P's is 1 and that some of their values can be and often will be negative. Thus for $r=5$, if $p^1{}_x$ is the adjusted value.

$$\begin{aligned}
10\,p^1{}_1 &= 6p_1+4p_2+2p_3+0p_4-2p_5\\
10\,p^1{}_2 &= 4p_1+3p_2+2p_3+1p_4+0p_5\\
10\,p^1{}_3 &= 2p_1+2p_2+2p_3+2p_4+2p_5\\
10\,p^1{}_4 &= 0p_1+1p_2+2p_3+3p_4+4p_5\\
10\,p^1{}_5 &= -2p_1+0p_2+2p_3+4p_4+6p_5\\
10\,p^1{}_6 &= -4p_1-1p_2+2p_3+5p_4+8p_5\\
10\,p^1{}_7 &= -6p_1-2p_2+2p_3+6p_4+10p_5
\end{aligned}$$

Writing now $p^1{}_x=\Sigma\, k_s\, p_s \qquad (s=1,2,\cdots r)$ if the standard deviation of each p_s is σ_s, the square of the standard deviation of $p^1{}_x$ is $\Sigma\, k^2{}_s\, \sigma^2{}_s$ and if the standard deviations σ_s are all equal (or nearly so) to a common value σ (which we can assume if the volume of exposure each year is fairly constant), then the square of the standard deviation of $p^1{}_x$ is equal (or nearly so) to $\sigma^2\,\Sigma\, k^2{}_s$.

Now $\Sigma\, k^2{}_s$ is smallest when $x=\frac{r+1}{2}$ and the further away that x is from this value the larger is $\Sigma\, k^2{}_s$. In fact for $x=\frac{r+1}{2}$, $\Sigma\, k^2{}_s=\frac{1}{r}$ and for other values x

$$=\frac{1}{r}\left\{1+\frac{12\left(x-\frac{r+1}{2}\right)^2}{r^2-1}\right\}$$

Thus for the middle of the range 1 to r, the adjusted value is the mean of the r observations, its standard deviation is then $\frac{\sigma}{\sqrt{r}}$ and is at its minimum. For other years the standard deviation increases as we get away from the middle of the range and when we project into the future the standard deviation of the

projected value increases rapidly. The following are the figures for $r = 4$ and $r = 5$.

Year	$r = 4$		$r = 5$	
	Square of Stand. Dev. for Adjusted Value	Ratio to Minimum Value	Square of Stand. Dev. for Adjusted Value	Ratio to Minimum Value
1	$0.7\sigma^2$	2.8	$0.6\sigma^2$	3.0
2	$0.3\sigma^2$	1.2	$0.3\sigma^2$	1.5
3	$0.3\sigma^2$	1.2	$0.2\sigma^2$	1.0
4	$0.7\sigma^2$	2.8	$0.3\sigma^2$	1.5
5	$1.5\sigma^2$	6.0	$0.6\sigma^2$	3.0
6	$2.7\sigma^2$	10.8	$1.1\sigma^2$	5.5
7	$4.3\sigma^2$	17.2	$1.8\sigma^2$	9.0

Now, since the amount of exposure required for 100% credibility increases as the square of the standard deviation (see Note 2), the exposure required for projection into the future is considerably above that required if, say the mean of the r years observations is taken. For example, if $r = 4$, then for projection 2 years beyond the end of the range, that is, to year 6, as compared with the amount of exposure *each year*, that would be required if we did not project but took the mean of the observations, we would require 10.8 times in order to secure equal credibility. Or to put it another way:

If we have four years' experience of about equal amounts of exposure and we are using a criterion (see previous notes) of 2650 accidents required for 100% credibility, then if we take the mean of the four years' experience for the indicated pure premium, then we require about 660 accidents per year for complete credibility, but if we decide to recognize trend and project to two years beyond the last year's experience we increase the requirement to about 6890 accidents per year: and that amount of exposure is credible only to the extent that the assumption of a straight line trend is justifiable.

This and similar results for other values of r and n indicate the need for adequate volume of experience when applying trend formulae.

SUMMARY

A summary of the conclusions reached is as follows:

In the case of liability insurance the usual credibility formula should be modified, giving slightly higher requirements for full credibility. The introduction into the credibility requirements

of the variations in claim costs in addition to consideration of the variation in the number of accidents, seriously increases the credibility requirements; to maintain anything like present criteria necessitates quite a sharp reduction in the stringency of the requirements for full credibility. The credibilities of experiences of less than full credibility need further study; they should be reduced, if anything. The methods of completing experiences of less than full credibility do not seem altogether satisfactory. Further consideration could well be given to this subject. The use of projection methods, such as the method of least squares, increases very greatly the volume of experience required for 100% credibility.

Appendix A

Required the approximate value of

$$P = \sum_{r=(1-k)nq}^{r=(1+k)nq} {}_{ns}C_r \left(1-\frac{q}{s}\right)^{ns-r} \left(\frac{q}{s}\right)^{r}$$

where nq is finite and $s \to \infty$.

Putting $ns = m$ $\qquad \frac{q}{s} = u$ $\qquad 1 - u = v.$

Let ${}_{m}y_x = {}_{m}C_{um+x}\, v^{vm-x}\, u^{um+x}$.

Then by Stirling's formula, since m, $um + x$, $vm - x$ are not small

$${}_{m}y_x = \frac{\left(1+\frac{x}{um}\right)^{-um-x-\frac{1}{2}} \left(1-\frac{x}{vm}\right)^{-vm-x-\frac{1}{2}}}{(2\pi m v u)^{\frac{1}{2}}} \text{ very nearly}$$

Now if $s \to \infty$ and $u \to 0$ $v \to 1$ and $nq \to$ finite

$$um = nq \qquad vm \to \infty$$

and $\therefore$ ${}_{m}y_x = \dfrac{1}{\sqrt{2\pi nq}} \left(1+\dfrac{x}{nq}\right)^{-nq-x-\frac{1}{2}} e^{x}$ very nearly

$$= \frac{1}{\sqrt{2\pi nq}}\, e^{x-(nq+x+\frac{1}{2})\log\left(1+\frac{x}{nq}\right)}$$

$$= \frac{1}{\sqrt{2\pi nq}}\, e^{x-(nq+x+\frac{1}{2})\left(\frac{x}{nq}-\frac{x^2}{2(nq)^2}+\frac{x^3}{3(nq)^3}-\cdots\right)}$$

$$= \frac{1}{\sqrt{2\pi nq}}\, e^{-\frac{x^2+x}{2nq}} \qquad \text{if } \left(\frac{x}{nq}\right)^2, \left(\frac{x}{nq}\right)^3, \text{ etc.}$$

and $\dfrac{x^3}{(nq)^2}$, $\dfrac{x^4}{(nq)^3}$, etc., are small and can be neglected from the exponent of e.

It is to be noted that we cannot neglect $\frac{x}{nq}$ for if x is small $\frac{x}{nq}$ will not be small in comparison with $\frac{x^2}{nq}$.

Thus $P = \sum_{x=-knq}^{x=+knq} {}_m y_x = \frac{1}{\sqrt{2\pi nq}} \int_{-knq}^{+knq} e^{-\frac{x^2+x}{2nq}} dx$ approximately.

But $\int_{-knq}^{+knq} e^{-\frac{x^2+x}{2nq}} dx = \int_0^{knq} e^{-\frac{x^2}{2nq}} \left(e^{-\frac{x}{2nq}} + e^{\frac{x}{2nq}}\right) dx$

$= 2\int_0^{knq} e^{-\frac{x^2}{2nq}} dx$ since $e^{-\frac{x}{2nq}} + e^{\frac{x}{2nq}} = 2\left\{1 + \frac{1}{2}\left(\frac{x}{2nq}\right)^2 + \ldots\right\}$

$= 2$ approximately.

So $P =$ very nearly $\frac{2}{\sqrt{\pi nq}} \int_0^{knq} e^{-\frac{x^2}{2nq}} dx$

Appendix B

Method of Least Squares.

If $L = \sum_{x=1}^{x=r} (a + bx - p_x)^2$ is to be a minimum.

Differentiate L first with respect to a and then with respect to b and put the two results equal to 0.

Then $(a+b-p_1) + (a+2b-p_2) + \cdots + (a+r\,b-p_r) = 0$

$(a+b-p_1) + 2(a+2b-p_2) + \cdots + r(a+r\,b-p_r) = 0$

or $r\,a + \frac{2}{r(r+1)}\, b = \Sigma\, p_r$

$\frac{r(r+1)}{2}\, a + \frac{r(r+1)(2r+1)}{6}\, b = \Sigma\, r\, p_r$

whence $a = \frac{2(2r+1)\,\Sigma\, p_r - 6\,\Sigma\, r\, p_r}{r^2 - r}$ $b = \frac{12\,\Sigma\, r\, p_r - 6(r+1)\,\Sigma\, p_r}{r^3 - r}$

This obviously gives a minimum; and in any case $\frac{\delta^2 L}{\delta a^2}, \frac{\delta^2 L}{\delta a\, \delta b}, \frac{\delta^2 L}{\delta b^2}$ are all essentially positive and therefore L has no maximum

for finite values of a, b. It has one absolute minimum, which is given by the above values of a, b.

From the above

$$a+\frac{r+1}{2}b=\frac{\{2(2+1)-3(r+1)\}\Sigma p_r-\{6-6\}\Sigma rp_r}{r^2-r}$$

$$=\frac{1}{r}\Sigma p_r=\frac{p_1+p_2+\ldots+p_r}{r} \qquad \text{(i)}$$

Also $b=\sum_{s=1}^{s=r}\frac{\{12_s-6(r+1)\}p_s}{r^3-r}$

$$=\frac{6}{r^3-r}\{-(r-1)p_1-(r-3)p_3-\ldots+(r-3)p_{r-1}+(r-1)p_r\} \qquad \text{(ii)}$$

From (i) and (ii) $a+xb$, for the value of x which is t over or under $\frac{r+1}{2}$ is equal to

$$\frac{p_1+\ldots+p_r}{r}\pm\frac{6t}{r^3-r}\{-(r-1)p_1-\ldots+(r-1)p_r\}$$

$$=\frac{1}{r^3-r}[\{(r^2-1)\mp 6t(r-1)\}p_1+\{(r^2-1)\mp 6t(r-3)\}p_3+\ldots$$

$$+\{(r^2-1)\pm 6t(r-1)\}p_r]$$

and the sum of the squares of the coefficients of the p's is

$$\frac{r(r^2-1)^2+36t^2\{(-r+1)^2+(-r+3)^2+\ldots+(r-3)^2+(r-1)^2\}}{r^2(r^2-1)^2}$$

$$=\frac{1}{r}+\frac{12t^2}{r^2-1} \qquad \text{(iii)}$$

ACTUARIAL, STATISTICAL AND RELATED ORGANIZATIONS IN THE UNITED STATES AND ABROAD

BY

JAMES S. ELSTON

In the November, 1924, number of the *Proceedings*, Mr. Richard Fondiller and myself presented a summary of the actuarial, statistical and related organizations in the United States and abroad. Mr. Fondiller had commenced that paper himself with the idea that a review of the principal organizations dealing with "actuarial science, statistical science, mathematical science and the sciences related thereto" would be of interest to the members of this society. Because I contributed several of the reviews, Mr. Fondiller was gracious enough to include my name as a co-author. Last year Mr. Fondiller suggested that I bring these reviews up to date, thinking that they would be of special interest as the tenth meeting of the International Congress of Actuaries was anticipated to occur shortly. I have therefore corresponded in general with the men who wrote the original reviews for the paper eight years ago and with various other actuaries in all parts of the world and am including herewith the material sent me by actuaries in Argentina, Australia, Bulgaria, Czechoslovakia, Hungary, Italy, Japan and the Netherlands not included in the previous paper. Mr. Edwin W. Kopf has also secured reviews of La Société de Statistique de Paris and Die Deutsche Statistische Gesellschaft, of which I have included summaries in English. As mentioned in the conclusion, letters requesting information to several other countries were not answered.

As stated in the previous paper, "these reviews indicate the permanent value of each organization in raising professional standards and in contributing to the development of insurance or of the field of science with which the organization is connected. The reviews also show what general influence each association has contributed toward the development of insurance science or related sciences, through the investigations it has undertaken and published in the form of monographs. The past publications and

the annual publications of each organization are also stated, together with the name and address of the Secretary."

These reviews were written as far as practicable by the men who contributed those in the previous number. Many of the new ones were contributed by officers of the respective associations. Preliminary copies of the reviews of the societies in non-English speaking countries have been submitted to officers of those societies for criticism.

Casualty Actuarial Society

RICHARD FONDILLER
Secretary-Treasurer

The Casualty Actuarial Society was organized November 7, 1914, as the Casualty Actuarial and Statistical Society of America, with 97 charter members of the grade of Fellow. The present title was adopted on May 14, 1921. The object of the Society is 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.

Prior to the organization of the Society comparatively little technical study was given to the actuarial and underwriting problems of most of the branches of casualty insurance. With the passage of legislation providing for workmen's compensation insurance in many states during 1912, 1913, and 1914, the need of actuarial guidance became more pronounced, and the organization of the Society was brought about through the suggestion of Dr. I. M. Rubinow, who became the first president. The problems surrounding workmen's compensation were at that time the most urgent, and consequently many of the members played a leading part in the development of the scientific basis upon which workmen's compensation insurance now rests.

The members of the Society have also presented papers to the *Proceedings* upon the scientific formulation of standards for the computation of both rates and reserves in accident and health insurance, liability, burglary, and the various automobile coverages. The presidential addresses constitute a valuable record of the current problems facing the casualty insurance business.

Other papers in the *Proceedings* deal with acquisition costs, pension funds, legal decisions, investments, claims, reinsurance, accounting, statutory requirements, loss reserves, statistics, and the examination of casualty companies. After three years' work the Committee on Compensation and Liability Loss Reserves submitted a report which has been printed in *Proceedings* No. 35 and 36. At the present time the Committee on Remarriage Table is engaged in important research work which will redound to the benefit of the casualty business.

There are two grades of membership in the Society: Fellows and Associates; while admission to either grade is in rare cases by election, in all other cases qualification is by examination, with the additional requirement of satisfactory experience in casualty insurance work. Examinations have been held every year since organization; they are held on the last Wednesday and Thursday in May, in various cities in the United States and Canada. There are two parts in the examinations to become an Associate; only Associates are eligible to take the examinations (also two parts) for the advanced standing of Fellow. Applications for examinations must be received by the secretary on or before February 15. Textbooks are loaned to students to assist them in preparing for the examination. The membership of the Society consists of actuaries, statisticians, and executives who are connected with the principal casualty companies and organizations in the United States and Canada. The Society has a total membership of 307, comprising 179 Fellows and 128 Associates.

In the order of election the presidents of the Society have been: Dr. I. M. Rubinow, James D. Craig, Joseph H. Woodward, Benedict D. Flynn, Albert H. Mowbray, Harwood E. Ryan, William Leslie, G. F. Michelbacher, Sanford B. Perkins, George D. Moore, Thomas F. Tarbell and Paul Dorweiler.

The annual meeting of the Society is held in New York in November and the semi-annual meetings are held in May, usually in Baltimore, Boston, Hartford, or Philadelphia. Officers elected at the annual meeting on November 18, 1932, were as follows:

President, Paul Dorweiler, Actuary, Accident & Liability Department, Aetna Life Insurance Company, Hartford; Vice-President, William F. Roeber, General Manager, National Council on Compensation Insurance, New York; Vice-President, Leon S.

Senior, General Manager, Compensation Insurance Rating Board, New York; Secretary-Treasurer, Richard Fondiller, Woodward, Fondiller and Ryan, Consulting Actuaries, New York; Editor, Robert J. McManus, Statistician, Casualty Actuarial Department, The Travelers Insurance Company, Hartford; Librarian, William Breiby, Fackler and Breiby, Consulting Actuaries, New York.

The governing body of the Society is the Council, which consists of the above officers and George D. Moore, Thomas F. Tarbell, Sydney D. Pinney, Winfield W. Greene, William Leslie, Frank R. Mullaney, Harmon T. Barber, Charles J. Haugh, Jr., Ralph H. Blanchard, Gustav F. Michelbacher, William M. Corcoran, Harold J. Ginsburgh and Clarence W. Hobbs.

The Society twice a year issues a publication entitled the *Proceedings*, which contains original papers presented at the meetings of the Society. The *Proceedings* also contain discussions of papers, reviews of books and publications, current notes and legal notes. There have been published thirty-eight numbers (in paper) which are contained in eighteen volumes bound in buckram. Single numbers of the *Proceedings* (except Number 4) may be obtained at $2.00 each. An Index to the first ten volumes has been printed in the same form as the bound volumes.

The Society publishes annually a Year Book which contains the list of officers and members, past examination papers, and information relative to the examination requirements. "Recommendations for Study" is a pamphlet which outlines the course of study to be followed in connection with the examinations for admission. These two booklets may be obtained free upon application to the Secretary-Treasurer, 90 John Street, New York.

Actuarial Society of America

The Actuarial Society of America was organized April 25, 1889, with thirty-eight charter members and is thus the parent actuarial society in America. The object of the Society was and is the promotion of actuarial science by personal intercourse, presentation of appropriate papers, discussion and such other methods as may be found desirable.

For some years the Society was conducted in certain respects as a club, members being admitted only by vote of the Council. A junior membership was established in 1896, so that since that

time there have been two grades of members; Fellows and Associates. Admission to either grade is by examination; the Constitution also provides for admission of members by election, but no one has been so admitted for several years. Examinations have been held each year beginning with 1900, the present practice being to hold them about the middle of April. The Associateship examination is divided into eight parts, the first four relating to pure mathematics through the Elements of the Differential and Integral Calculus with special emphasis on the Theory of Probabilities and Calculus of Finite Differences, and the last four relating to the application of mathematics to the Theory of Compound Interest and of Life Contingencies. The Fellowship is divided into two parts and covers practical actuarial science, accounting, finance, investments, insurance law, pension funds, and the application of actuarial science to branches of insurance other than life. Application for admission to the examinations, accompanied by the necessary fees, must be received by the Secretary on or before January 31 preceding the examination date. The Society has a membership of 315 Fellows and 263 Associates, 578 in all. These members are for the most part executive officers or actuaries of insurance companies or of State Insurance Departments, or are employed in some other capacity in connection therewith.

The moving spirit in the formation of the Society was David Parks Fackler,* who in March, 1889, sent a circular to the Actuaries of all companies in the United States and Canada, proposing a meeting the following April. The first president, elected at the organization meeting, was Sheppard Homans, after whom followed David P. Fackler,* Howell W. St. John, Emory McClintock, Bloomfield J. Miller, Thomas B. Macaulay, Oscar B. Ireland, Israel C. Pierson, Rufus W. Weeks, Daniel H. Wells, John K. Gore, Archibald A. Welch,* William C. Macdonald, James M. Craig,* Arthur Hunter,* Henry Moir,* William A. Hutcheson,* Robert Henderson,* Arthur B. Wood,* Edward E. Rhodes, James D. Craig,* and Wendell M. Strong.* The present president is John S. Thompson,* Vice-President and Mathematician of The Mutual Benefit Life Insurance Company. With one exception, each president has held office for two years.

The last annual meeting of the Society was held in New York

on May 12 and 13, 1932, at which time the following officers were elected: President, John S. Thompson;* Vice-Presidents, John G. Parker and Ray D. Murphy;* Secretary, Joseph B. Maclean; Treasurer, Edward W. Marshall; and Editor, John M. Laird.*

The governing body of the Society is the Council, which consists of the above-named officers, the ex-presidents and twelve elected members. The elected members of the Council at present are: James F. Little,* Benedict D. Flynn,* Alexander T. Maclean, Henry S. Beers, James E. Hoskins, Horace R. Bassford, Lorne K. File, James S. Elston,* Henry H. Jackson,* M. Albert Linton, W. A. P. Wood, and E. E. Cammack.*

Twice a year the Society issues a publication entitled *Transactions* which contains the various papers presented at the meetings of the Society together with discussions thereon. There have been eighty-seven numbers of the *Transactions* published, which, up to eighty-six, inclusive, have been combined into thirty-two volumes; at present two numbers, those of May and October of each year, constitute a volume. Some of the older numbers are out of print, but paper bound copies of all numbers from 46 up and of many of the older ones are still available. The price for Nos. 46 to 63, inclusive, is $1.50 per copy and from 64 to date, $2.00 per copy. If subscribed for in advance, the two numbers for any calendar year may be obtained for $3.00. The price of numbers prior to No. 46 depends on the quantity the Society still has on hand, although some are still available at the regular price of $1.50. An Index of the first fifteen volumes was published and later one for Volumes XVI to XXV. Each year the Society publishes also a pamphlet containing the list of officers, members and students, a copy of the Constitution and By-Laws and a statement as to the requirements for admission including the syllabus for the examinations. To assist students in preparing for the examinations, an additional pamphlet entitled "Recommendations of the Educational Committee" has been compiled which gives information as to the course of study to be followed in connection with the successive examinations. These two booklets last mentioned may be obtained without charge by applying to the Secretary at 393 Seventh Avenue, New York City.

Besides the *Transactions,* the Society has for sale the following publications: *Transactions of the Fourth International Congress*

of Actuaries, five *Actuarial Studies, Problems and Solutions* (covering first four parts of the present Associateship Examinations, 1915-1919 in one volume and 1927 to date separately), *Report of Specialized Mortality Investigation* (One Volume), *Report of the Medico-Actuarial Mortality Investigation* (Five Volumes), the *Report of the American-Canadian Mortality Investigation 1900-1915* (Two Volumes) with co-operation of American Institute of Actuaries), *Report of Committee on Disability Experience 1926, Joint Occupation Study 1928* (with Assoc. of Life Ins. Med. Directors), *Medical Impairment Study 1929* (with Assoc. of Life Ins. Med. Directors), *Supplement to Medical Impairment Study 1929.* The investigations, the reports of which have just been referred to, are in some respects without a parallel in the history of statistical investigation in connection with the life insurance business and constitute valuable aids in the practical process of selection and underwriting.

* Fellow, Casualty Actuarial Society.

American Institute of Actuaries

E. G. FASSEL
Secretary

The American Institute of Actuaries was organized in Chicago, May 12, 1909, and incorporated November 10, 1909, under the Illinois corporation law. The object of the Institute is to advance the science of insurance mathematics and the knowledge of the theory and practice of life insurance and related interests by associating together persons of like interests.

There were forty-two charter Fellows and twenty-two charter Associates. Provision having been made for Contributing Membership by legal reserve life insurance companies desiring to send representatives to the meetings, there were also twenty-two companies so represented at the first meeting. The membership has grown to 172 Fellows, 175 Associates, and 136 Contributing (Company) Members, of whom 411 reside in the United States, 66 in Canada, and 6 elsewhere.

In addition to the list of Fellows, Associates, and Contributing Members, the Institute has a large list of students preparing for the examinations held annually in April. At the 1932 sessions,

396 students wrote 920 examination papers towards admission as Fellows or Associates. Sessions were held at 43 centers in the United States, 9 in Canada, and 3 in other countries. The examinations are twelve in number, eight for admission as Associate and four in addition for the Fellowship degree. The Associateship examinations are identical with those of the Actuarial Society, being held jointly with that body. The examination subjects in the respective parts are: (1) College Algebra (to and including Binomial Theorem and also including Theory of Equations); (2) Plane Trigonometry and the Use of Logarithms, Plane Analytic Geometry; (3) Higher Algebra, Theory of Probabilities; (4) Calculus of Finite Differences, Differential and Integral Calculus; (5) Compound Interest and Annuities Certain (including Construction of Interest Tables), Elements of Statistics; (6) Life Contingencies Involving Single Life Functions; (7) Theory of Life Contingencies for More than One Life, including Probabilities of Life and Death and Calculation of Net Premiums, Reserves, and Other Functions, Construction of Tables Involving Life Contingencies; (8) Multiple Decrement Tables, Disability and Accidental Death Contingencies, General Nature and History of Life Insurance; (9) Mortality and Disability Investigation, Selection of Risks and Treatment of Substandard Risks; (10) Gross Premiums, Valuation of Liabilities, Non-forfeiture Values and Change or Reinstatement of Life Insurance Contracts; (11) Analysis and Distribution of Surplus, Life Insurance Accounts, Investments and Valuation of Assets, Banking and Finance; (12) Life Insurance Law, Preparation of Policy Forms, Pension Funds, General Topics of Actuarial Interest.

The Institute has a permanent office to which communications should be addressed as follows: American Institute of Actuaries, 720 North Michigan Avenue, Chicago, Illinois. A Year Book is published usually in August and may be had on request free of charge. Among other things it gives a list of the members and students with their addresses, the constitution and by-laws, requirements for admission and the syllabus of examinations, including a recommended course of study.

The American Institute of Actuaries holds two meetings each year, the regular annual meeting between May 15 and June 15, and the second meeting usually in November. Original papers

are presented and discussed at each session; topics for informal discussion are submitted in advance, thus affording the members an opportunity to exchange views and experience on their current problems and practice. The papers and discussions are printed in *The Record,* the official publication of the American Institute of which copies may be obtained from the Institute office. Numbers of *The Record* appear twice a year, price $2. Each volume consisting of the two current numbers is also issued in cloth binding, price $5. Standing orders are accepted to send *The Record* automatically as it appears. An index for the first fifteen volumes (1909-1926) may be had with paper cover, price $2, bound $3.

Problems and Solutions is published annually in conjunction with the Actuarial Society covering the questions in Parts 1 to 4 of the current year's examinations, price 50 cents.

The affairs of the Institute are managed by a Board of Governors consisting of the officers, the ex-presidents and other Fellows by election. The ex-presidents now living are H. W. Buttolph, O. J. Arnold, C. H. Beckett, George Graham,* L. M. Cathles, P. H. Evans, J. G. Parker, A. Coburn, and James F. Little.* The elected members of the Board are J. A. Budinger, James Fairlie, R. A. Hohaus, F. D. Kineke, A. J. McAndless, R. C. McCankie, W. F. Poorman, and H. L. Rietz. The officers elected June 3, 1932, were: President, Franklin B. Mead;* Vice-Presidents, Thomas A. Phillips and Wendell P. Coler; Secretary, E. G. Fassel; Treasurer, W. M. Johnson; Librarian, H. W. Curjel; Editor of *The Record,* J. S. Elston.*

* Fellow, Casualty Actuarial Society.

Fraternal Actuarial Association

J. E. LITTLE
Vice-President

The Fraternal Actuarial Association was formed in August, 1916, under the name of "Association of Actuaries of Fraternal Societies". Later in the year the name of the organization was changed to the present name.

The Association has for its object the promotion of actuarial science with particular application to the system of fraternal

insurance, by the presentation of appropriate papers, written and oral discussion, and any other means that may carry out this object.

Meetings are held semi-annually in February and August concurrently with the meetings of the National Fraternal Congress of America.

The membership of the Association consists of three classes: Active, Associate and Affiliated members. Active members alone may vote and hold office. Active membership is secured upon completion of technical examinations or upon presentation of evidence that equivalent examinations conducted by another recognized actuarial organization have been completed.

Associate members may attend the meetings, present papers and take part in discussions. Admission to Associate membership is gained upon approval of application by the Council.

Affiliated members consist of fraternal orders of life insurance companies approved by the Council who may designate representatives to attend the meetings of the Association. Such representatives shall have the same privileges as Associate members.

The Presidents in order of election were as follows: G. D. Eldridge, A. Landis, S. H. Pipe, C. W. Iliff, F. M. Speakman, W. P. Coler, W. N. Phillips, E. B. Fackler, R. D. Taylor, W. T. Eldridge, J. A. Blaha, D. D. Macken, and K. B. Piper.

The Association issues its *Proceedings* from time to time in book form, eleven of these volumes having been published up to the present. The *Proceedings* contain all the papers and discussions read at the different meetings of the Association, and may be obtained from the Secretary, R. D. Taylor, Cedar Rapids, Iowa, upon application. The price per volume is $2.50.

The officers for 1932-1933 are as follows: President, J. E. Little; Vice-President, C. L. Alford; Secretary, J. A. Blaha; Treasurer, W. T. Eldridge; Editor, G. E. Ault; and Librarian, Frances E. Partridge.

The Institute of Actuaries of Great Britain

JOSEPH B. MACLEAN, F.I.A., F.F.A.

The Institute of Actuaries was founded in 1848 and incorporated by Royal Charter in 1884. The Institute originated from a suggestion made by the Manager of one of the Scottish Life Insurance companies, that an association be formed in London, to be conducted on similar lines to the Scottish Managers' Association. This latter association had for its object the discussion of questions of life insurance practice. A committee was formed in London and reported adversely on the suggestion, although it was admitted that "occasional meetings might be held with advantage if this should from experience be found to establish uniformity in dealing with points of practice". After considerable discussion the committee's report was disapproved and it was decided to establish a society, not, however, of the same nature as the Scottish Managers' Association, but "a scientific and practical association among the actuaries, secretaries and managers of the life assurance societies of Great Britain" (i. e., England and Scotland).

The first president of the Institute of Actuaries was John Finlaison, then (1848) actuary of the National Debt Commissioners. The Institute represented officially both English and Scottish Actuaries until 1855 when the Scottish members detached themselves from the Institute in order to form the Faculty of Actuaries in Scotland.

The objects of the Institute are "to elevate the attainments and promote the general efficiency of all who are engaged in occupations connected with the pursuits of an actuary; to extend and improve the data and methods of the science which has its origin in the application of the doctrine of probabilities to the affairs of life; and specially, to investigate all monetary questions involving a consideration of the effects of interest and probability".

There are four classes of members of the Institute of Actuaries, namely, Students, Associates (A. I. A.), Fellows (F. I. A.), and Honorary Members. Students are those who, having furnished evidence of general education, have been admitted as "Probationers" and have subsequently passed Part I of the examinations necessary for Fellowship.

A "Student" may be elected an Associate upon passing Parts II and III of the examinations and a Fellow upon passing Parts II, III and IV. Examinations are held annually in April in various centers throughout Great Britain as well as in the principal British Dominions and Colonies. No exemptions are allowed on account of the possession of university degrees.

The most recently published report of the council of the Institute gives the membership as 443 Fellows, 320 Associates, 618 Students, and 25 Corresponding Members, a total of 1381, this being the largest membership of any actuarial society. There are in addition 459 candidates admitted as probationers.

The Institute is governed by a Council made up of 30 Fellows, including the Officers (President, four Vice-Presidents, Treasurer, two Honorary Secretaries and, at present, one of the two Editors). At the election of officers in June, 1932, the following (*inter alia*) were elected:

President, William P. Elderton; Honorary Secretaries, E. H. Lever and A. W. Evans, Staple Inn Hall, Holburn, London; Treasurer, Henry Broun; Joint Editors, F. L. Collins and D. C. Fraser.

Meetings of the Institute are usually held monthly at Staple Inn Hall from October to May, with an annual general business meeting in June.

Papers read at the Sessional meetings together with other communications and items of actuarial interest are published in the *Journal of the Institute of Actuaries* ("J. I. A.") formerly a quarterly but, since 1922, published thrice annually. The Journal of the Institute was originally called the *Assurance Magazine,* the first two volumes bearing that title, and Volumes III to XXIV being called by both names. Sixty-three volumes have now been published.

In addition to the Journal, the Institute has from time to time published many volumes of great importance to actuaries and which are too numerous to be detailed here. Mention should be made, however, of the official textbooks of the Institute as well as of the *British Offices Life Tables 1893* and *British Offices Life Annuity Tables 1893* (published in conjunction with the Faculty of Actuaries) and the *Mortality of Annuitants 1900-1920.*

The *Institute Textbooks* (now three in number), primarily

intended to assist students of the Institute in preparing for the examinations, are recognized throughout the world as authoritative treatises on the groundwork of actuarial science. The first of these covers *Interest including Annuities Certain* by Ralph Todhunter (Revised Edition by R. D. Simmonds and T. P. Thompson). The second is a treatise entitled *Life Contingencies* by E. F. Spurgeon and the third, published in 1931, *An Elementary Treatise on Actuarial Mathematics* by H. Freeman.

The Institute of Actuaries Students' Society was founded in 1910 with the objects of assisting junior members of the Institute in preparing for the examinations, of increasing their professional knowledge, and of giving them practice and confidence in public speaking. Every Associate, Student or Probationer of the Institute of Actuaries (or of the Faculty of Actuaries in Scotland), and every Fellow within 10 years after graduation, is qualified to be an Ordinary Member. Fellows with more than 10 years seniority are eligible as Honorary Members.

The Society is governed by a Committee elected annually, one member of the Committee being an Honorary Member of the Society appointed by the Council of the Institute of Actuaries.

During each session the Society publishes a *Journal*, the present volume being the fourth. The Society has also issued several booklets on actuarial subjects.

The Faculty of Actuaries in Scotland

JOSEPH B. MACLEAN, F.I.A., F.F.A.

The Faculty of Actuaries in Scotland was constituted in January, 1856, and was incorporated by Royal Charter in 1868. It arose out of the voluntary detachment from the Institute of Actuaries (q. v.) of the thirty-eight Scottish members of that body. In a sense, however, the Faculty of Actuaries may be considered as antedating the Institute and as being the oldest actuarial association in existence. Periodical meetings of actuaries and other principal officers of life insurance companies in Scotland for the discussion of questions of practice took place prior to 1840 and it was the extension of this idea to England at the suggestion of the Scottish actuaries that led to the formation of the Institute

of Actuaries. The separation of the Scottish and English members of the Institute resulted from a difference of opinion on the subject of qualification for membership in the Institute, but was, in fact, largely due to the necessarily unsatisfactory representation of Scotland in the Institute due to inconveniences of communication between Scotland and England, as well as to differences in the practices and laws of the two countries.

In 1859 the Faculty, membership in which was then practically confined to the principal officers of Scottish life insurance companies, promoted the formation of the Actuarial Society of Edinburgh with a view to assist the studies and promote the professional attainments of the junior members of the profession. This society maintained a separate and successful existence for forty-one years until in 1901 it was merged in the Faculty of Actuaries. Many valuable papers are contained in its published proceedings, the *Transactions of the Actuarial Society of Edinburgh.*

The objects of the Faculty have been briefly stated as being to "associate professionally those *gentlemen* (women have been admitted since 1919) who are engaged in the management of Life Assurance Institutions, or who are otherwise following the profession of an Actuary; to promote the study of the Doctrine of Probabilities, of Vital Statistics and Statistics in General, of Finance as bearing on fluctuations in the value of money and of all cognate subjects, a knowledge of which is essential to the efficient discharge of the duties of a Life Assurance Manager or of an Actuary."

The membership of the Faculty consists of Honorary Fellows, Fellows and Associates. Any person desirous of prosecuting his studies in connection with the Faculty may, on recommendation, be enrolled as a student and after passing the four prescribed examinations may, if he (or she) has attained the age of twenty-one years be admitted an Associate. Associates are granted the diploma of the Faculty and may be admitted as Fellows on application and payment of the necessary fees. So far as concerns actuarial attainments there is, therefore, no distinction between an Associate and a Fellow.

Examinations are held annually in April in Edinburgh and in such other places as may be arranged. The diploma in Actuarial Mathematics of Edinburgh University is accepted in lieu of the

first two examinations and any student who has graduated in mathematical honors at any university approved by the Council may be exempted from Part I.

Persons who possess "qualifications which render their admission to the Faculty desirable" may be elected on the nomination of the Council and "gentlemen of distinguished attainments in mathematical, statistical or financial subjects or who have rendered distinguished service in promoting the objects of the Faculty" may be elected Honorary Fellows upon recommendation of the Council.

In June, 1932, there were 3 Honorary Fellows, 265 Fellows, 10 Associates, and 338 Students.

The Faculty is controlled by a Council, consisting of the President, not more than four Vice-Presidents, one or more Honorary Secretaries, Honorary Treasurer, and Honorary Editor, and not more than fifteen elected members. Sessional meetings for the purpose of hearing papers and other communications of interest to the profession are held at irregular intervals as required. The communications read at sessional meetings are usually printed and published and appear as the *Transactions of the Faculty of Actuaries* ("T. F. A.") of which Volume XIV is being published this year.

In addition to the *Transactions,* the Faculty has published (jointly with the Institute of Actuaries) the various volumes containing the statistics and graduated tables of the *British Offices Life Tables 1893* and the *British Offices Life Annuity Tables 1893.* The Faculty was also represented on the committees responsible for the production of the *Institute of Actuaries Life Tables (1863).*

The present officers of the Faculty are: President, R. Gordon-Smith; Vice-Presidents, R. M. M. Roddick, G. J. Lidstone, C. Guthrie, and Steuart Macnaghten; Honorary Secretaries, W. C. Reid and A. M. Douglas; Honorary Treasurer, A. E. King; and Honorary Editor, J. Davie.

The offices of the Faculty are at 23 St. Andrew Square, Edinburgh, Scotland.

The Faculty of Actuaries Students' Society was organized in 1920 with similar objects and method of operation to those of the Institute of Actuaries Students' Society (q. v.). The pro-

ceedings and papers of the Society are published in the *Actuarial Students Magazine.*

El Instituto Argentino de Actuarios

The Argentine Institute of Actuaries is composed of four classes of members, Members of Degree (Fellows), Associate Members, Corresponding Members, and Honorary Members. The first two classes must be residents of Argentine. Admission may be either by presentation of an acceptable original thesis or by examination. The standards to be met by applicants for membership seem very high, in keeping with the broad view of the function of the actuary expressed in the constitution of the Institute.

The association was formed October 16, 1919. In 1920, the first number of *Anales del Instituto Argentino de Actuarios* was published. Apparently this organ has no regular dates for publication, but is issued whenever sufficient suitable material has been presented. Monographs on any phase of actuarial science are acceptable.

The Actuarial Society of Australasia

H. VAUGHAN, F.I.A.
Vice-President

All the actuaries at present practising in Australia and New Zealand are Fellows or Associates of the Institute of Actuaries of London or the Faculty of Actuaries in Scotland, both of which bodies hold examinations in Australia. There is no Australian body granting actuarial degrees, but in 1897 the Actuaries in Sydney formed The Actuarial Society of New South Wales with objects analogous to those of the Institute of Actuaries Students' Society, though more ambitious possible objectives were also held in mind. In 1919 the name of the Society was altered to The Actuarial Society of Australasia and a separate branch established in Melbourne, Victoria. It is the custom for the President to be elected alternately from the Victorian and New South Wales branches. The same papers are read and discussed before each branch and it is a usual thing for the President of the year to read his presidential address in person both in Sydney and Mel-

bourne, thus helping to maintain the fellowship between the branches. There are members residing in the smaller states of Australia, but most of these are on the roll of the parent branch in Sydney.

Membership is open to laymen and does not necessarily imply any actuarial qualification. Membership of the Central Council and local committees is restricted to qualified actuaries.

The present membership is about 100, of whom approximately half are Fellows or Associates of the Institute of Actuaries of London. A few are members of the Faculty of Actuaries in Scotland.

Papers to be read before the Society are printed and circulated before each meeting, but are not subsequently bound into a volume.

The President is Mr. P. D. Touzel. The Honorary Secretary and Treasurer is Mr. H. N. Hirst of the Australian Mutual Provident Society in Sydney, N. S. W.

The Incorporated Australian Insurance Institute

H. VAUGHAN, F.I.A.

The above Institute came into being in the year 1919 as a federation, for certain limited purposes, of the existing Insurance Institutes of New South Wales (founded 1884), Victoria (founded 1884), South Australia (founded 1913), and Western Australia (founded 1911). Any person connected with insurance work is eligible, and some offices enter their whole staff as members, the subscription being paid by the office.

The work so far undertaken by the federated body has been mainly in connection with the holding of examinations. These are not difficult but are practical in nature, the intention being that the possession of the Institute's diploma shall be an indication that the holder is a capable officer in the branch for which the certificate was granted. Examinations are conducted in the Dominion of New Zealand as well as in Australia. The main intention is to help junior employees, and to this end lectures are arranged on the examination subjects.

The Local Institutes are autonomous. Office-bearers are elected annually and active work commences in the month of May (facing the winter months) when papers are submitted monthly for

discussion. Each Institute binds its proceedings into small volumes, e. g., the *Sydney Record,* and papers of sufficient general interest are reprinted in the *Proceedings of the Incorporated Australian Insurance Institute.* The membership of the Insurance Institute of New South Wales was 1014 in April, 1932.

Association Royale des Actuaires Belges

An historical review of the Association Royale des Actuaires Belges, which was founded January 8, 1895, was given in No. 30 of their *Bulletin.* At its inception actuaries were practically unknown in Belgium, but a few men were intensely interested in improving the basis of the many small insurance and other provident institutions which were not on a scientific plan. The Society attained its first recognition largely through calling the first International Congress of Actuaries. Since then through its members and its publications it has maintained a very successful struggle toward the improvement of the status of the various insurance institutions of Belgium.

The membership now consists of 26 Fellows (membres agrégés), 2 Associates (membres adhérents) and 14 Corresponding Members (membres correspondants). There are also 13 Contributing Members (membres donateurs). Fellows are Belgians elected only after passing a not very extensive examination on Social Economics (Social Insurance), Bookkeeping, Financial Operations, Theory of Probability and Life Contingencies. Election to Fellowship may be without examination by a three-quarters majority, provided that at least half of the Fellows are present at the Meeting. The Secretary is M. L. François, 18, Avenue de la Ramée, à Uccle (Brussels), Belgium.

The Society has published the *Bulletin de l'Association des Actuaires Belges* from 1896 to date (40 numbers in all) which is devoted largely to insurance organizations of a semi-social insurance nature, although it contains extensive articles on such subjects as Interpolation and many reviews of actuarial literature of foreign countries. Toward the end of 1900 the members, finding that the Bulletin was of too high a standing to reach the public, started the *Bulletin de la Prévoyance,* quarterly numbers of which until 1914 were devoted to a more popular exposition of sound insurance principles as applicable to their insurance organizations.

Association des Actuaires Bulgares

CHRISTO PETROV
President

The Association des Actuaires Bulgares was established in February, 1924, with fifteen members. It now consists of 26 members. Admission is open, without examination, to anyone approved by the Society, only men capable of dealing with insurance science being considered eligible.

The object of the Association, among other things, is to arrange lectures and discussions. As Bulgaria is a small country with limited opportunities for the insurance business, it has not yet been found feasible to commence the publication of any Review.

The President is Mr. Christo Petrov. The address is Rue Rakowski, 112, Sofia, Bulgaria.

Czechoslovakia

ING. VÁCLAV CHODĚRA

Spolek Československých Pojistných Techniků (Institute of Czechoslovak Actuaries) was founded in 1919. The chairman is Ing. Václav Choděra, Prague II, Havlíčkovo náměstí 23. A monthly review *Pojistný Obzor* has been published covering all problems of insurance practice, including also mathematical reports. Volume 11 is being published in 1932. The editor is Dr. J. David, Prague V, Bílkova 4.

Jednota Pro Vědy Pojistné (Union for Actuarial Science) was founded in 1919. The chairman is Judr. Karel Hermann-Otavský, Prague I, Staroměstské náměstí 8. Occasionally volumes under the title *Rozpravy* are published in Bohemian containing theoretical reports of an actuarial character on various lines of insurance.

The Verein Deutscher Versicherungstechniker der Tschechoslovakischen Republik was founded in 1919. The chairman is Ing. Alois Gütling, Prague X, Královská 112.

The Deutscher Verein für Versicherungswesen in der Tschechoslovakiashen Republik was founded in 1920. The chairman is Prof. Dr. Gustav Rosmanith, Prague—Dejvice, Zelená 1086. This publishes the *Versicherungswissenschaftliche Mitteilungen* in German, of which Volume 8 was published in 1932.

Aktuárské Vědy, a purely mathematical review, appears trimestrially. The principal articles are in English, French, or German, with book reviews and the notes in Bohemian. The editor is Prof. Dr. E. Schoenbaum, Prague II, Rašínovo nábřeží 66.

The juridical and economic problems of social insurance are treated in the review *Prager Zeitschrift für Sozialversicherung*, published in German, which is edited by Dr. H. Korkisch, Prague II, Tylovo náměstí 2.

The statistical part of actuarial science and population problems are also treated in the review *Statistický Obzor* which appears ten times a year. This is in Bohemian but some papers, summaries, etc., are in French. Vol. 13 is being published in 1932. The editor is Státní úřad statistický (Statistical office of Czechoslovakia), Prague VII, Bělského třída 2.

The *Zeitschrift für öffentliches Versicherungswesen und Volkswohlfahrt* is published by the Vereinigung Deutscher Krankenversicherungsanstaltan in der Č. S. R.

The *Die soziale Rundschau* is published by the Reichsverbande Deutscher Krankenversicherungsanstalten.

Pensijní pojištění and *Věstník Ústřední sociální pojišťovny* are further reviews in Bohemian of social insurance.

Deutscher Verein für Versicherungs-Wissenschaft

The Deutscher Verein für Versicherungs-Wissenschaft, founded September 26, 1899, consists of Corporate and Personal Members, the latter being those occupying leading positions in the Corporate Members and in the insurance state offices and other persons whose standing in the insurance business is acceptable. There are members in 42 different countries. This differs from the actuarial societies reviewed in that it covers all branches of insurance, including Fire and Marine, Life, Casualty and Social Insurance and in that it embraces all phases of each branch. It has the following separately organized sections: Insurance Law and Economics in two groups, Actuarial Science, Insurance Medicine, and Insurance Education, to any or all of which each member may belong. It serves as the actuarial society in Germany, although this is only one phase of its work. The library is one of the most extensive insurance libraries in existence. There are about 510

Corporate and 1,300 Personal Members. The Director is Prof. Dr. Alfred Manes, Johannisberger Strasse, 31 Berlin-Wilmersdorf.

The Society is this year publishing the 32nd volume of the *Zeitschrift für die gesamte Versicherungs-Wissenschaft*, which is published quarterly and covers all branches and phases of insurance, including occasional papers on actuarial science. Considerable space is devoted to insurance law and various phases of social insurance. Each number gives an international review also of new books. In addition to the *Zeitschrift*, the Society has published fifty monographs, some amounting to real books, each being devoted to one subject.

Commencing July 1, 1928, the Society has also published the *Blätter für Versicherungs-Mathematik und verwandte Gebiete.* The first volume consisted of ten numbers. Eight numbers of the second volume have now appeared. These numbers are devoted to the actuarial phases, particularly of a mathematical nature, of insurance. They also contain reviews of books on these subjects.

Magyar Biztositástudományi Társulat
(Hungarian Association for Assurance-Science)

DR. ERNST SÓS
General Secretary

The Magyar Biztositástudományi Társulat, founded April 4, 1929, consists of Corporate and Personal Members. There were 25 Corporate and 325 Personal Members during the year 1932. It has several sections for Economics, for Insurance Law, for Casualty Insurance, for Actuarial Science, for Insurance Medicine, and for Office Management. The managing president is Dr. J. Altenburger; general secretary, Dr. E. Sós. (Budapest, Hungary, VI. Andrássy ut 43. I. 1.)

The Association is publishing a review, the *Magyar Biztositástudományi Szemle* (Hungarian Review for Insurance-Science) in Hungarian, with extracts in English. The third volume is being published this year. It contains different papers, most of which have been read at the sessions of the sections. The Association has established a collection for Insurance-Science, containing materials about the history, principles, and conduct of insurance, including particularly publications of companies such as rate books, advertising literature and health and safety publications.

Papers of interest to actuaries sometimes also appear in the *Journal de la Societé Hongroise de Statistique.*

Istituto Italiano Degli Attuari

GR. UFF. PROF. PAOLO MEDOLAGHI
President

The Istituto Italiano degli Attuari was founded on October 10, 1929. Previously there had been in Italy the "Associazione Italiana per L'Incremento della Scienza Degli Attuari," founded in 1897.

The object of the Institute is to encourage actuarial studies and in general all studies relating to the technique of insurance.

The Institute publishes a quarterly review under the title of *"Giornale dell'Istituto Italiano degli Attuari"* of which, up to the present, there have been ten issues. The Institute also holds scientific periodical meetings, decides the National Congresses of the Science of Insurance; maintains its own Library, etc.

The members of the Institute are of three categories: (a) Ordinary Members (Effective Members and Probationers); (b) Associates; (c) Societies. Honorary and Corresponding Members may also be admitted.

As a rule, Probationers are admitted to the category of Effective Members after two years in the probationary category and the passing of an examination. Persons who make a special study of some particular branch of the technique of insurance are admitted to the category of Associates.

In January, 1932, there were 239 Members, of whom 6 were Honorary Members, 76 Effective Members, 59 Associates, 48 Probationers and 50 Societies.

The President of the Institute is Gr. Uff. Prof. Paolo Medolaghi, the Vice-Presidents are Prof. Luigi Amoroso, Dr. Gino Sestilli and Prof. Guido Toja; Secretary General, Prof. Francesco P. Cantelli, and Treasurer, Prof. Ignazio Messina.

The address is Via Marco Minghetti, 17, Rome.

Although it is published entirely independent of the Istituto Italiano degli Attuari the *Giornale di Matematica Finanziaria* should be mentioned because it contains many mathematical, actuarial and statistical articles that should be of interest to actuaries. This is published under the direction of Filadelfo

Insolera by Casa Editrice Giovanni Chiantore, 40, Corso Oporto, Turin. This was commenced in 1928 before the founding of the Istituto Italiano degli Attuari. The first series through Volume 12 ran through 1930. Volume 2 of the second series is being published this year.

THE INSTITUTE OF ACTUARIES OF JAPAN

T. MORITA

The Institute of Actuaries of Japan was founded November 20, 1899, with nine members at the instance of T. Yano,* K. Awazu, and other leading insurance men. The original object of the Institute was to study or to discuss actuarial problems and practices by means of personal intercourse and friendly meeting among the members. The organization was changed into the present form in 1912 and the present regulations were formulated. The membership now consists of 28 fellows, 110 associates, and 1 honorory member.

The Institute published only four transactions of special meetings which were held in commemoration of different events. The reports of the general meetings and the papers submitted to the Institute appear in the Japanese language in the *Journal of The Japan Society of Insurance Science*** or the *Transactions of The Association of Life Insurance Companies in Japan.****

The present officers include: President, Dr. Y. Miura; Vice-President, Dr. T. Kameda; and Secretaries, S. Takeshita, Actuary, The Yasuda Life Insurance Company, Tokyo, and T. Suzuki, Actuary, The First Mutual Life Insurance Company, Tokyo.

* Mr. T. Yano is now the President of The First Mutual Life Insurance Company, Tokyo, and a Fellow of the Actuarial Society of America.

** "The Japan Society of Insurance Science" was founded in 1895 with the aim of promotion of insurance science. The Society issues a journal quarterly (every month formerly). There have been three hundred and thirty-two numbers of the Journal published.

*** "The Association of Life Insurance Companies in Japan" was established in 1908.

THE NETHERLANDS

PROF. DR. A. O. HOLWERDA†

The Vereeniging voor Verzekeringswetenschap is an association of all prominent insurance men of life as well as of other branches. Members are directors, higher officials of the companies, under-

writers, the leading men of the Dutch social insurance system, etc. At present there are about 245 members.

At the regular meetings papers of a purely scientific or general character are read and discussed. These are usually published in *Het Verzekerings Archief*. It has been published since 1920 by Martinus Nijhoff, Lange Voorhout 9, 's-Gravenhage. The price is ten florins. The editors are: Prof. Dr A. O. Holwerda, Prof. Dr. H. R. Ribbius, Prof. Dr. M. van Haaften, Mr. H. T. Asser, Mr. E. L. G. den Dooren de Jong.

From 1897 until 1919 the name of this publication was *Archief voor de Verzekeringswetenschap*. Seventeen volumes were published during this period. Until 1925 it was under the supervision of the Vereeniging van Wiskundig Adviseurs mentioned hereafter.

The Vereeniging tot Bevordering van het Levensverzekeringswezen was founded in 1923 by the Dutch life assurance companies. Practically all the Dutch companies and the three sub-associations described hereafter are members. This association arranges regular meetings for discussing the practical problems of the business. It succeeded the old Vereeniging voor Levensverzekering which published thirty-one "jaarboekjes" from 1891 to 1922. These contained some information about the principal life assurance companies and articles of scientific or practical interest.

The present society publishes several papers: (1) The *Verzekeringsbode*, a monthly paper containing information about life assurance, short articles, etc., (2) The *Driemaandelijksch Tijdschrift*, a quarterly paper containing articles of more general importance—as a rule papers of a purely actuarial aspect not being published. (Subscriptions at the rate of 5.60 florins are received by H. Hijmans, Postbus 58, Dordrecht); and (3) a short weekly paper of only two pages for instruction and education of the agents of the industrial branch.

The sub-association members of this society are:

1. The Vereeniging voor Levensverzekeringswiskunde, founded in 1925, embracing practically all the actuaries and assistant actuaries in the Netherlands. This association publishes the actuarial section of Het Verzekeringsarchief mentioned above. Formerly the Dutch actuaries were organized in the Vereeniging van Wiskundig Adviseurs. There are in the Netherlands no examinations for actuaries. Actuaries and assistant actuaries are

as a rule appointed from young men of general mathematical education who are practically trained in the offices. This association conducts examinations embracing only the first principles of actuarial science for employees of the actuarial departments of the companies.

2. The Nederlandsche Vereeniging van Geneeskundige Adviseurs van Levensverzekeringmaatschappijen was founded in 1901 by the medical officers of the societies. There are at present only about seventeen members.

3. The Buitendienst has also been a sub-association. This, founded in 1923, consists of members of the regular full-payment field forces of the life assurance companies. Only part of the employees of the companies are members; a few members are not life insurance men, but inspectors, etc., in the fire or other branches. This association issues *De Buitendienst*, wherein problems of special importance for the members are discussed.

Actuaries of the most important companies have also founded the Kring van Actuarissen. In their regular meetings problems of importance for the business as a whole are discussed but these discussions are not published.

† President of the Vereeniging vor Verzekeringswetenschap.

Scandinavian Actuarial Societies

Den Danske Aktuarforening, founded in 1901, includes about 70 members. The Secretary is Chr. Hansen, Aaboulevard 84, Copenhagen, Denmark. The Finlands Aktuarieförening, founded in 1922, includes about 34 members. The Secretary is E. Keinänen, Runebergsg. 15, Helsingfors, Finland. Den Norske Aktuarforening, founded in 1904, includes about 60 members. The Secretary is M. Andresen, Vibesgate 20, Oslo, Norway. The Svenska Aktuarieföreningen, founded in 1904, is composed of persons following the profession of actuary in Swedish insurance companies or occupying other positions connected with the technique of insurance. It now comprises about 85 members. The Secretary is Reinh. Palmqvist, Bredablick 22, Lidingö 1, Sweden.

In 1904 an abortive effort was made toward the present joint publication of these societies which resulted in publication of Vol. I of *Aktuaren*. For the years 1914 to 1917 the *Svenska Aktuarieföreningens Tidskrift* was printed in four volumes. Since

that time the three Scandinavian societies and the Finnish society (after its founding) have cooperated in publishing the *Skandinavisk Aktuarietidskrift,* which is thus the successor in both form and content of the previous publication. It is printed in four numbers (occasionally double numbers) each year, 1932 being the fifteenth year. Practically all the papers are in German, French, or English, but most reviews of foreign literature, copies of actuarial examinations in the University of Copenhagen, Proceedings of the Meetings, etc., are in Scandinavian languages. The papers are principally mathematical and of the highest standard. The most striking contributions to actuarial science are the numerous papers advancing the typical Scandinavian treatment of the higher mathematical theory of statistics, including Interpolation and Summation. An index of the *Svenska Aktuarieföreningens Tidskrift* and of the first ten volumes, 1918 to 1927, of the *Skandinavisk Aktuarietidskrift* increases the value of these volumes. The subscription price is ten Swedish crowns. The Chief Editor is Dr. Reinh. Palmqvist, the Secretary of the Svenska Aktuarieföreningen.

Vereinigung Schweizerischer Versicherungsmathematiker

The Vereinigung Schweizerischer Versicherungsmathematiker was established June 17, 1905, with 36 members. It now consists of 28 Corporate Members, 13 Corresponding Members and 243 Ordinary Members. Admission is without examination to applicants with satisfactory technical and practical standing, but it is noteworthy that nearly half of the Ordinary Members have the Doctor's Degree, many of them from the University of Berne, Switzerland. The Secretary is Dr. J. Riethmann, Alte Landstrasse, 113, Zollikon-Zurich, Switzerland.

Twenty-seven volumes of the *Mitteilungen der Vereinigung Schweizerischer Versicherungsmathematiker* (Bulletin de l'Association des Actuaires suisses) have been printed containing papers of the highest standing, mostly mathematical. The special feature of this publication has been the application of Calculus and the higher mathematics to the solution of the problems involved in social and private insurance institutions of Switzerland. A large majority of the papers are in German, though an occasional

one and some other material is in French. In late years the book review and periodical section has been exceedingly comprehensive.

International Congress of Actuaries

International Actuarial Congresses have been held in 1895 in Brussels, in 1898 in London, in 1900 in Paris, in 1903 in New York, in 1906 in Berlin, in 1909 in Vienna, in 1912 in Amsterdam, in 1927 in London, and in 1930 in Stockholm. Papers have been presented and discussed on practically all actuarial problems and many broader insurance problems including actuarial notation, mortality formulae, mortality investigations on various special classes of lives, valuation of life insurance contracts, calculation of premiums, substandard insurance, old age pensions, the interest rate, investments, reinsurance, friendly societies, insurance on infantile lives, invalidity insurance, workmen's compensation and other social insurance, taxation, history of insurance, fire insurance, government mortality and morbidity statistics, and university and other instruction on insurance. Usually several papers were presented at the same time on different phases of the same question, particularly on the development of the question in different individual countries. Complete reports comprising from one to four volumes have been issued covering each of the Congresses, the total reports comprising twenty-three volumes, including 13,808 pages. An index of the volumes through the 1912 Congress was published by the Institute of Actuaries, thus increasing their value.

The Comité Permanent des Congrès Internationaux d'Actuaires organized by the first Congress has maintained continuity between the congresses and performed other valuable services in bringing the attention of actuaries to work done in other countries. The *Bulletin*, which has been published since 1896, and of which No. 32 or the 1931 *Bulletin* was the last to appear, has been the best single source of keeping in touch with the literature on insurance published in other countries. The special feature is the review of insurance each year in the different countries, including a bibliography of publications. The *Bulletin* also includes occasional original papers of a high standard. It may be obtained from Établissements Émile Bruylant, rue de la Régence, 67, Brussels. It is sent to members of the Permanent

Committee. Such membership is open to Fellows and Associates of the Casualty Actuarial Society upon vote of the Council of the Permanent Committee. The General Secretary is Albert Théate, rue du Congrès, 13, Brussels, Belgium. The Secretary for the United States is Robert Henderson,* Vice-President and Actuary, Equitable Life Assurance Society, 393 Seventh Avenue, New York City. The Secretary for Canada is John G. Parker, Actuary, Imperial Life Assurance Company, Toronto, Ontario.

* Fellow, Casualty Actuarial Society.

THE INSURANCE INSTITUTE OF AMERICA, INCORPORATED

The Insurance Institute of America was organized in Philadelphia, April 23, 1909, resulting from a conference called by the Fire Insurance Society of Philadelphia, and attended by representatives of insurance societies in New York, Boston, Chicago, and Hartford. The name originally adopted, "The Association of Insurance Societies and Institutes of America", was later changed to the Insurance Institute of America. In May, 1924, the Institute was chartered as an incorporated body by an act of the Legislature of the State of New York.

The purposes of the Institute, as set forth in the Charter, are as follows:

(a) To provide and maintain a central organization for the promotion of efficiency, progress and general development among persons employed in connection with insurance of any kind, whether members of the Institute or not, so as to secure and justify the confidence of the public and employees by reliable tests and assurances of the competence and trustworthiness of persons engaged in insurance.

(b) To encourage and assist the study of any subjects bearing on any branch of insurance.

(c) To publish a journal and any other matter deemed desirable.

(d) To form a library for the use of the members of the Institute.

(e) To offer money or other prizes for essays or research on any subject bearing on insurance.

(f) To devise and impose means for testing the qualifications of candidates for the certificates of the Institute by examinations in theory and practice or by any other tests and to grant certificates of qualifications to the successful candidates.

(g) To establish an honorary membership and to take such appropriate action, not inconsistent with the laws of this State, as to the executive committee may seem fitting and proper for recognizing and honoring work of distinction and particular merit in the field of insurance.

The present Officers of the Institute are: James V. Barry, President; William D. Winter and Lawrence E. Falls, Vice-Presidents; Edward R. Hardy, Secretary-Treasurer. The offices are located at 80 John Street, New York City.

The present membership of the Institute stands as follows: Associate Members (being graduates of the Institute courses), 396; Corporate Members (being insurance companies), 154; Corresponding Members (being citizens of other countries, elected primarily because of their qualifications in the field of insurance), 2; Fellow Members (being insurance executives or others possessing the proper qualifications, or those qualified through the writing of an acceptable thesis), 314; Honorary Members (being those elected because of conspicuous service in the field of insurance education and economics), 19; Organization Members (being insurance societies whose dominant purpose is educational), 23.

Organization Members are found in Atlanta, Ga.; Baltimore, Md.; Boston, Mass.; Chicago, Ill.; Cleveland, Ohio; Glens Falls, N. Y.; Hartford, Conn.; Manchester, N. H.; Newark, N. J.; New Haven, Conn.; New York, N. Y.; Philadelphia, Pa.; Rockford, Ill.; San Francisco, Cal.; Seattle, Wash.; Spokane, Wash.; Springfield, Mass.; Utica, N. Y.; Vancouver, B. C.; Washington, D. C.; Watertown, N. Y.; and Winnipeg, Man.

In 1911 thirty-seven students sat for the first Institute examinations in Casualty, Fire and Marine insurance. This year (1932) 1,579 students registered for the examinations in Casualty, Fire, Life, Marine and Suretyship. The examinations were held in all parts of the United States, Cuba, Hawaii, and parts of Canada.

The Casualty, Fire and Marine Courses are three years in length; whereas the Life and Surety courses are two years in length. Students take up the work in one of three ways, by membership in an insurance society or group, where the courses are given by the class method; by individual study, where the student reads recommended material on his own initiative and prepares himself for the examinations; and by the correspondence course method, a recent development in the Institute work. So far, the Casualty and Fire Courses are being developed into correspondence courses, with prospects of additional courses being given in this manner in the future.

On the completion of a course of study, the student receives the Final Certificate of the Institute and becomes automatically an Associate Member, with the degree A.I.I.A. Associate Members may become Fellows by the submission of an acceptable thesis on an insurance topic. The best of the theses submitted by candidates for fellowship are published from time to time. Other publications include the Syllabus, a catalogue of courses and recommended readings; The Flying Post, a bulletin; and the Proceedings of the Annual Conference, held each year on the fourth Tuesday of October.

Once each year a prize of $25.00 is offered to the student in each of the five branches who receives the highest percentage marks in the examinations of that branch, irrespective of the Part, or year, in which he sits. The Edward Rochie Hardy Prize of $100 is also offered to the most distinguished student completing his course in the year, as determined by the Committee on Education.

American Institute of Accountants

JOHN L. CAREY
Secretary

The American Institute of Accountants was organized in 1916 as successor to the American Association of Public Accountants, founded 1887. The predecessor association had commenced in New York and its members had been instrumental in the passage of the first C. P. A. (Certified Public Accountant) law adopted in that state in 1896. Other states speedily followed the example of New York by adopting statutes providing for the issuance of the C. P. A. certificate and prescribing qualifications of those who

might assume that title. Membership in the old association was available to members of the constituent state societies of certified public accountants. When the American Institute of Accountants was formed in 1916, it was provided that membership could be obtained only by individual application and the by-laws of the new organization set up prerequisites to which applicants must conform, including a certain amount of preliminary public accounting practice and the passage of an examination.

Twelve rules of professional conduct to which members are required to adhere have been adopted by the council of the Institute and the by-laws provide machinery whereby the council sitting as a trial board may hear charges of violations of the rules.

C. P. A. laws are now in force in all states and territories of the United States. The examination questions of the American Institute of Accountants are used by about two-thirds of the state and territorial accountancy boards as a test for candidates for the C. P. A. certificate. The arrangement whereby local boards may cooperate with the Institute in conduct of examinations has been in effect since 1917.

The Institute owns a five-story building at 135 Cedar Street, New York, which contains the executive offices, offices of the American Institute Publishing Company, Inc., a subsidiary corporation, and a library of some 13,000 publications which constitute the most complete collection of accounting literature in the country.

The American Institute Publishing Company publishes *The Journal of Accountancy*, official organ of the American Institute of Accountants, now in its fifty-third volume, and a monthly bulletin reporting news items of interest to the profession. The publishing company also produces and sells books on accounting and related subjects which, in the opinion of the committee on publication, are worthy contributions to the professional literature. The publishing company's list of books now includes thirteen titles, many of which are standard authorities.

Through special committees the Institute cooperates with bankers, stock exchanges, arbitration association and other organizations in considering problems of mutual interest. Other active committees, whose titles indicate their functions, are the committees on professional ethics, education, federal and state

legislation, accounting procedure, international double taxation, natural business year, placements and terminology.

The membership of the Institute at September 1, 1932, beginning of the current fiscal year, was 2,183.

American Statistical Association

EDWIN W. KOPF* AND WILLFORD I. KING†

The Association was organized in Boston, Massachusetts, in 1839. It is the oldest of the learned societies in the United States. The first constitution stated the purpose of the Association to be the "collection, preservation and diffusion of statistical information in the different departments of human knowledge". How these objects were to be attained was set forth in the by-laws, no less than thirty-three in number. From the outset, membership in the Association was taken seriously, each member upon his election being obligated to conform to the Constitution and By-Laws. It was made the "duty of every fellow to prepare at least one article a year on some statistical subject which shall be at the disposal of the publishing committee."

From its beginning, the Association developed national and international contacts, and within a year had corresponding members in many states. At its first quarterly meeting it elected foreign members, the first of whom was the foremost statistician of his day, Adolphe Quetelet. Within its first ten years, more than thirty important addresses were made before the Association on a wide range of topics. The Association became closely identified with the affairs of the United States Census, and this relationship has continued to the present day. In 1844, it petitioned Congress "that the Sixth Census be revised and a new and accurate copy be published." At each succeeding Census various members of the Association cooperated in furthering the accuracy and completeness of the statistics.

Beginning with 1860, the Association has been in continuous touch with the International Statistical Institute. The Association has passed through several eras in the development of statistics. It has witnessed the rise of official statistics, the gradual evolution of modern analytical technique, and the penetration of the statistical approach to problems of human well-being and progress. At no time has it assumed any partisan attitude. Its

officers have been called upon to act as arbiters in numerous controversies, with a political tinge, and in each case, unbiased opinion and other service has been rendered.

The Association has been served by a number of distinguished scholars in the office of President and Secretary. Beginning with the Hon. Richard Fletcher, the President's office has been filled by Shattuck, Jarvis (thirty years), Walker (1883 to 1897), Wright (1897 to 1909) and a considerable number of men now living, who have achieved standing in the teaching and practice of statistics. Its Secretaries, Joseph B. Felt, Davis R. Dewey, Carroll W. Doten and Robert E. Chaddock, gave long years of faithful and efficient service to the Association.

At the present time its officers are:

Irving Fisher, President, and Seymour L. Andrew, William L. Crum, Lowell J. Reed, Horace Secrist, Leon E. Truesdell, and Mary van Kleeck, Vice-Presidents. Willford I. King is Secretary-Treasurer (New York University). Frank A. Ross is Editor of the Journal and Harry C. Carver is Editor of the Annals. The Editors are each assisted by an Editorial Board.

Membership in the Association is open to all who are interested in statistics. Fellows, of whom there are less than 100, are selected from the membership by a committee, on the basis of distinguished achievement in statistical work or of service to the Association. Statisticians of established reputation in foreign countries are elected to honorary membership. Corporate membership is open to organizations conducting extensive statistical enterprises.

At the present time, the Association has considerably more than 2,000 members and holds annual meetings which attract as many as five hundred members. It actually cooperates in the development of official and private statistics. Committees are at work on problems of business research, the census, dependency and child welfare statistics, governmental labor statistics, institutional statistics, price statistics, real estate statistics, vital statistics, and other subjects. The Association publishes quarterly the *Journal of the American Statistical Association* and the *Annals of Mathematical Statistics,* each of which may be purchased by subscription at $6 per annum. The New Series of the Journal commenced in 1888 and comprises 26 volumes which in-

clude 177 numbers. Publication of the Annals began in 1930. Two volumes and part of the third or eleven numbers have been printed since then.

The Association is aiming at the present time to include in its membership every statistical worker in the United States and Canada. Efforts are being made to enlist the interest of universities and colleges, business organizations, actuarial and mathematical societies and government officials.

* Fellow, Casualty Actuarial Society.
† Secretary-Treasurer.

Royal Statistical Society

EDWIN W. KOPF* AND H. W. MACROSTY, O.E.E.†

The Society was organized at the suggestion of the eminent Adolphe Quetelet, mathematician, astronomer and statistician. In 1832, a Statistical Section was added to the British Association for the Advancement of Science. Among other members directly interested were Mr. Charles Babbage, Mr. Drinkwater Bathune, Hallam, the historian, Professors Malthus and Empson, the Rev. Richard Jones, Sir John Lubbock and M. Quetelet. The inquiries of the Section were restricted to "facts relating to communities of men which are capable of being expressed by numbers, and which promise when sufficiently multiplied to indicate general laws." As M. Quetelet considered this to be too limited a point of view, a Statistical Society was formed in London, March 15, 1834, with three hundred members. The Marquis of Lansdowne was the first President. The Society went to work energetically and communication was opened with statistical organizations elsewhere. In 1838, the *Journal of the Royal Statistical Society* was established, the current volume of which is XCV. In January, 1887, the Society was incorporated by Royal Charter.

"The objects of the Royal Statistical Society are to collect, arrange, digest and publish facts, illustrating the condition and prospects of society in its material, social and moral relations; these facts being for the most part arranged in tabular forms and in accordance with the principles of the numerical method. The Society collects new materials, condenses, arranges, and publishes those already existing, whether unpublished or published in diffuse and expensive forms in the English or in any foreign lan-

guage, and promotes the discussion of legislative and other public measures from the statistical point of view."

A Committee of the Society's Council was appointed in 1840 to consider the best method of taking the census of 1841. The Society has performed distinguished services for the British Census ever since that time. Throughout the ensuing years, the addresses at the meetings and the pages of the Journal have been a repository for the facts concerning population, manufactures, commerce, health, vital statistics, civil order and general public welfare of Great Britain and the Dominions, as well as for technical papers on mathematical statistics. The published proceedings of the Society furnish very often the only accessible facts on the rise in well-being of the British population during the nineteenth century. The Current Notes, Book Reviews and Bibliographies included are very valuable to the statistician.

The Society has had the support and confidence of the Governments of Great Britain since its inception; the outstanding personalities of the nineteenth century were its officers and members. The influence of the Society has been world-wide and its establishment led to the formation of societies of statisticians in other countries. At the Jubilee Meeting of the Society in 1885 Dr. Mouat, formerly an Honorary Secretary, read a paper on the History of the Society in which he said: "To enumerate a few of the names of those who have passed away, and will ever occupy niches in the temple of fame, I have merely to mention Porter, Tooke, Babbage, Whewell, Richard Jones, Malthus, Farr, Newmarch, Dudley, Baxter, Jevons, Lords Jeffrey, Macaulay, Lawrence, and Lansdowne, the descendant of Sir William Petty, the father of political arithmetic; Grote and Hallam, the historians and philosophers, Fletcher and Jacob Waley, Roderick Murchison, the geologist, and many other men of mark in their time." To these we may now add Lords Avebury, Courtney, Welby, and Wolverhampton, Sir Charles Dilke, Charles Booth, Major Craigie, Sir R. Giffen, and Edgeworth.

At the present time, the Society is in a flourishing condition; it includes more than 1,000 Fellows; its library contains more than 70,000 volumes; meetings are held monthly from November to June; its members are in every branch of the Government service and in all walks of life where numerical data are of prime

importance. Relatively to population, the Society's activities and its membership lead the world and set an example for emulation in America. The offices are at 9, Adelphi Terrace, Strand, London, W.C. 2.

* Fellow, Casualty Actuarial Society; Fellow Royal Statistical Society.
† Honorary Secretary, R. S. S.

La Société de Statistique de Paris

M. A. BARRIOL
Secretary-General

La Société de Statistique de Paris was founded June 5, 1860, by the principal French economists and statisticians of that period: Villermé Chevalier, Wolowski, Léonce de Lavergne, Members of the Institute of France, Clement Juglar, etc.

Recognized as an association of public value by a decree of June 19, 1869, it has never ceased to function regularly. The number of its members is 776, of which 727 are regular members, 42 honorary members and 7 corresponding members. It intends to popularize the results of statistical research by its publications. Each month the members meet to take part in the discussion of a question chosen by the officers.

These discussions are printed in the *Journal de la Société de Statistique de Paris,* which appears each month except during the vacation period. This publication also contains original articles which are not discussed, for example, theses in whole or in part presented at the Institut de Statistique de l'Université de Paris, also articles on banking, money and exchange, agriculture, demography, etc.

The Society possesses an important library of about 10,000 volumes which is located in a special room in the Faculté de Droit de Paris.

The President is Mr. Dugé de Bernonville, the Secretary-General Mr. A. Barriol, 27, Rue de Mogador, Paris (IX^{e}).

Die Deutsche Statistische Gesellschaft

PROFESSOR JOHANNES MÜLLER
Secretary

The Deutsche Statistische Gesellschaft was founded as a section of the Deutsche Gesellschaft für Soziologie, the first meet-

ing taking place on June 17, 1911, the 70th birthday of the well known German statistician, G. von Mayr, its first president. Its aim was to help the professional interests of its members and especially to advance the knowledge and practice of statistics as such. Meetings were held every two years until interrupted by the war and then from 1920 until 1926, after which meetings have been annually. Prior to 1928 papers presented had been printed only separately and their circulation had been almost limited to the membership. After that the proceedings of the meetings have been presented as the *Allgemeines Statistisches Archiv*, which has had much wider circulation. This has increased the recognition and prestige of the society materially. Especially since that time statisticians in industrial concerns and other statisticians and others interested in statistics in commerce and industry have assumed a much more important part in the society. A number of leading industrial organizations are represented, partly through statisticians who are members and partly as corporate members. Prior to that time most of the membership had been confined to statisticians employed by the German government, by the governments of the various states of Germany and by the various cities, with a large representation of professors of statistics and allied subjects in German universities and other higher schools. The membership has increased from about 100 at the beginning to 277. In 1929 complete separation was effected from the Deutsche Gesellschaft für Soziologie, though the connection with the latter had been increasingly less. Space doesn't permit listing the numerous subjects considered at the meetings, but these include all phases of the theory, technique and practical use of statistics, especially population statistics and statistics of industry.

The Mathematical Association of America

H. E. SLAUGHT
Ex-President

The Mathematical Association of America was organized at Columbus, Ohio, in December, 1916, with 1097 charter members. It was incorporated in the State of Illinois on September 8, 1920.

The object of the Association, as set forth in the charter, is to assist in promoting the interests of mathematics in America, especially in the collegiate field, by holding meetings in any part

of the United States or Canada for the presentation of and discussion of mathematical papers, by the publication of mathematical papers, journals, books, monographs and reports, by conducting investigations for the purpose of improving the teaching of mathematics, by accumulating a mathematical library and by cooperating with other organizations whenever this may be desirable for attaining this or other similar objects.

There are two kinds of membership in the Association, individual and institutional. Both are attained on application, properly supported, and on election by the Board of Trustees. There are at present over 2,000 individual members and over 130 institutional members, including many of the leading colleges and universities of the country. Each institutional member is entitled to send a voting delegate to all meetings of the Association and is thus vitally interested in the progress of mathematical education.

The Association has seventeen sections which hold yearly or semi-annual meetings in as many parts of the country, thus bringing the stimulus of personal contact and the reading and discussion of papers within a reasonably near distance of all members. These sections are located in Kansas, Ohio, Missouri, Iowa, Indiana, Minnesota, Maryland-District of Columbia-Virginia, Kentucky, Rocky Mountain region, Illinois, Texas, Southeastern region, Louisiana-Mississippi, Michigan, Nebraska, Eastern Pennsylvania, and Southern California. The Association holds two national meetings annually, one in the Christmas holiday week and one in September. These meetings extend over two days and attract speakers of national prominence in the mathematical field.

Some of the outstanding accomplishments of this, the youngest and largest, mathematical organization in the collegiate field, are as follows:

(I) The publication of a high grade mathematical journal, the *American Mathematical Monthly,* devoted to the interests of collegiate mathematics, and to stimulating the beginnings of mathematical research.

(II) The contribution of a subsidy to another journal—the *Annals of Mathematics,* for the publication of expository papers too extended for inclusion in the monthly.

(III) The appointment of the National Committee on Mathematical Requirements, which was financed by the General Educa-

tion Board, whose membership of fifteen included leading mathematicians in both the collegiate and secondary fields, whose far-reaching investigations extended over a period of four years, with the cooperation of more than one hundred local mathematical organizations, and whose final report of 652 pages was published in 1923. This report has made, and will continue to make, a profound impression upon the status and progress of secondary mathematical teaching in America.

(IV) The securing of a generous and notable gift from Mrs. Mary Hegeler Carus, director of the Open Court Publishing Company of Chicago, for the publication of a series of Mathematical Monographs whose purpose is to make accessible in convenient form a series of expository presentations of the best thoughts and keenest researches in pure and applied mathematics, to be set forth in a manner comprehensible not only to teachers and students specializing in mathematics, but also to scientific workers in other lines, and especially to the wide circle of thoughtful people who, having a moderate acquaintance with elementary mathematics, are willing and eager to extend that acquaintance, provided it can be done without prolonged and critical study of the mathematical treatises. This series, which is capable of far-reaching development, promises to be unique in its scope and possibilities for usefulness. It is hoped that the Association through this medium will render service in promoting the spread of mathematical knowledge.

The monographs thus far issued are: (1) *Calculus of Variations,* by Gilbert A. Bliss of the University of Chicago; (2) *Analytic Functions of a Complex Variable,* by David R. Curtiss of Northwestern University; (3) *Mathematics of Statistics,* by Henry L. Rietz of the University of Iowa; (4) *Projective Geometry,* by John W. Young of Dartmouth College. Numbers 5, 6, and 7 are in preparation. The monographs are distributed to the general public through the Open Court Company. Members of the Association secure copies at cost directly from the Secretary at Oberlin, Ohio.

(V) The publication of the *Rhind Mathematical Papyrus* made possible by a generous gift of the late Chancellor Arnold Buffum Chace of Brown University. This is the oldest mathematical document known. It is published in two sumptuous volumes of

200 pages and 140 plates, containing photographic reproductions, hieroglyphic transcription, literal and free translation and an extensive bibliography of Egyptian mathematics. These volumes represent twenty years of devoted study and the expenditure of many thousands of dollars on the part of Chancellor Chace. The result is a worthy monument to his name and a valuable asset to the student exploring the beginnings of mathematics.

American Mathematical Society

R. G. D. RICHARDSON
Secretary

The object of the American Mathematical Society is to encourage and maintain an active interest in mathematical science on the research level. It was founded in 1888 at Columbia University as the New York Mathematical Society; the name was changed to American Mathematical Society in 1894. The Society was incorporated in the District of Columbia in 1923.

The list of Presidents of the Society includes Emory McClintock, 1891-1894, one of the most distinguished American actuaries.

The Society is governed by a board of trustees, who have charge of financial matters, and by a council whose function is to formulate and administer the scientific policies of the Society and to act in an advisory capacity to the board of trustees; both trustees and council are elected by the Society. The Council consists of the officers of the Society, of certain ex-presidents and ex-secretaries, and of fifteen elected members.

The officers elected for 1932 include President, L. P. Eisenhart; Secretary, R. G. D. Richardson; Editorial Committee of the *Bulletin*, D. R. Curtiss, E. R. Hedrick; W. R. Longley; Editorial Committee of the *Transactions*, R. D. Carmichael, F. R. Sharpe, J. D. Tamarkin; Editorial Committee of the *Colloquium*, E. T. Bell, R. L. Moore, Oswald Veblen; Representatives on the Board of Editors of the *American Journal of Mathematics*, E. W. Chittenden, A. B. Coble, G. C. Evans.

The Society publishes two journals, the *Bulletin of the American Mathematical Society*, an historical and critical review of mathematical science, and the *Transactions of the American Mathematical Society*, whose object is to make known as widely as possible important researches presented at the Society's meet-

ings. In addition, it shares with the Johns Hopkins University the financial support and editorial supervision of the *American Journal of Mathematics*. The Society also publishes a series of *Colloquium Lectures*, each volume embodying recent developments in some special field of mathematical science.

Another activity of the Society is the awarding of prizes for research. The library of 8,000 volumes, which is deposited in the care of Columbia University, is especially strong in mathematical journals.

About eleven meetings are held every year in various parts of the country for the presentation and discussion of mathematical papers; three in New York, two in or near Chicago, three on the Pacific Coast, and the summer meeting and Annual Meeting at places designated by the Council. The Annual Meeting for 1931 was held in New Orleans and that of 1932 will take place in Atlantic City.

Election to membership in the Society is by vote of the Council. In addition to ordinary membership, there has been established a Sustaining Membership open to persons or institutions who contribute at least one hundred dollars annually to the support of the Society; sustaining members have the right to nominate a certain number of persons for election to membership in the Society, such persons to pay no dues.

Applications for membership, subscriptions to the journals, and any inquiries with regard to the Society may be sent to the American Mathematical Society, 501 West 116th Street, New York, N. Y.

Other Actuarial Societies

The following Actuarial Societies are listed in their last Bulletin as members of the Permanent Committee of the International Congress of Actuaries: Asociacion Actuarial Matematica de Espana, 17, Calle Fernando VI, Madrid, Spain; Institut des Actuaires Polonais, 36-40, rue Kopernika, Warsaw, Poland; Association des Actuaries Portugais, 18, Avenida da Liberdade, Lisbon, Portugal. No reply was received to letters, unfortunately in English, sent to these. The Institut des Actuaires Polonais (Polski Instytyt Aktuarjuszy) was apparently founded June 30, 1920, and has published a journal.

Several Actuarial Societies ceased to exist about the beginning of the World War. The Mathematisch-Statistischen Vereiningung des Österreichisch-ungarischen Verbandes der Privatversicherungs-Anstalten had published *Mitteilungen* for several years. There had been a Société pour l'Etude Scientifique des Questions d'Assurances organized at the end of 1908 in Russia. The early Associazione Italiana Attuari practically ceased to exist upon the establishment of the state monopoly of life insurance in Italy. It had published the *Bolletino* for several years.

It will be noted that this paper is intended to cover all the actuarial or similar societies of the world, but that it covers only some of the most important of the statistical societies and only American mathematical and other societies. Little information is available about various European associations and congresses devoted to life, casualty, fire, or social insurance. Most of these are associations of companies engaged in the various lines of business. Brief notes about their current work is given in a special section on "Vereine und Kongresse" in the Zeitschrift für die Gesamte Versicherungs-Wissenschaft. The numerous similar other organizations in the United States and Canada also are not covered.

ABSTRACT OF THE DISCUSSION OF PAPERS READ AT THE PREVIOUS MEETING

CRITICISMS AND ANSWERS—G. F. MICHELBACHER

VOLUME XVIII, PAGE 260

WRITTEN DISCUSSION

MR. FREDERICK RICHARDSON:

Business men boast of their skill and cunning
But in Philosophy they are like little children:
Bragging to each other of successful depredations
They neglect to consider the ultimate fate of the body.
What should they know of the Master of Dark Truth
Who saw the wide world in a jade cup,
By illumined conception got clear of Heaven and Earth:
On the chariot of Mutation entered the Gate of Immutability?
From the Chinese of Ch'en Tzu-ang (Seventh Century)

I.

Not the least part of my pleasure in reading this paper was derived from its literary quality. Besides, if it is true, as Nietzsche says, that "A good fight will hallow any cause", it cannot be less true that a brilliant rearguard action will make up for the loss of more than one untenable position.

And let me say before passing on, that I for one make no protest against the introduction of poetry into our proceedings, in fact it has my unqualified approval! Nor do I quarrel with the sentiments expressed in Christopher Morley's verses, although it is to be feared they are not as genuinely Chinese as those I have just quoted. Though I may be one of those who sit in the seat of the scorners, and though I do belong to the class of business men who *in philosophy are like little children,* I trust that the author does not merely regard me with toleration. That would be—if I may coin a word—unfellowly! No!

If in the measure of another's heart
I rank so low that I'm but tolerated,
Let the frail links which bind us fly apart!
When I'm not loved let me be roundly hated!

II.

But something too much of this! What concerns us more nearly at the moment is the issue raised as to whether the casualty actuary has given a good account of himself. Yet, whether he has or not, it does seem to me that the cartoon of an actuary drawn by Mr. Michelbacher, really does, after allowing for exaggeration, depict the counterfeit resemblance of what we ought to think he is like and what actually he should be like. And why not? What room is there for drama and emotion in his professional attitude? Why should he not be serenely confident in the integrity of his scientific results provided he knows they are worthy of confident acceptance? If he has demonstrated truth, if he has produced formulas that work, why should he falter though supervising officials are incredulous, though executives rage, agents howl, and the heathen rage furiously together? Rather would we have him be a rock in a thirsty land, rather would we have him mutter like Galileo when making a pretense of recantation, *Eppur si muove!* anyhow it moves. Therefore I find no fault with Mr. Mowbray's statement (*Proceedings*, page 87, Volume XVII).

It is unfortunate that rate making has almost always been carried on in an atmosphere of competition either between classes of carriers or between carrier interests and political interests as a class under pressure of economic interests among the constituents. This has precluded the calm and dispassionate investigation of the statistical technique necessary to a sound solution of the problem.

A fair statement of the case for the actuary, if you ask me! And without shadow of turning.

III.

However, we have asked that rate makers have a heart for the sufferings of others who are bound to abide by their actuarial findings, and that they should not be like the geometrician in Voltaire's *"L'homme aux quarante écus"*.

THE GEOMETRICIAN

I admit that you will perish of hunger, and I, alas, and the State also; but let us hope God will have pity on us.

THE MAN WITH FORTY CROWNS

One passes his life hoping and dies hoping. Adieu Monsieur! You have informed me, but my heart is broken.

THE GEOMETRICIAN

That is often the fruit of science.

It is a belated satisfaction to us to be assured that the entire actuarial body now shares our griefs, and for that—in the *cliché* of the grateful but inelegant orator—I thank you!

More than that, I forgive you.

But it seems that the author of *Criticisms and Answers* would like to incarcerate me and other severe critics in *some institution where our activities could be closely observed.* These are his words, and I presume he means a lunatic asylum. And having so imprisoned us he suggests it would be good fun to demand that we assume the entire burden of rate making; at least it would be good fun if the experiment were not fraught with grave danger to the business. Apparently it is in no danger now.

And all I ask you is, how could he be so cruel? How could he!

The following "howler" appeared in a recent issue of the *Brooklyn Citizen:*

> *"A passageway about* 90 *feet long and eight feet wide, built by the French in the time of Louis XIV, was discovered. Statistics had formed so densely in some places that they blocked the way."*

Now supposing I have been incarcerated and Mr. Michelbacher as the Warden is keeping me under close observation, and, like Scheherazade of the *Arabian Nights,* I have to be a captivating captive or lose my head—what shall I do? Well, I might scatter a nice large pile of stale statistics, and having sprinkled it with a choice selection of mathematical equipment and theories, including a few inappropriate curves and series, furtively set fire to it. Whereupon the Defender of the Faith would rush in to save the Sacred Relics and I should escape in the smoke and the con-

fusion, all the while quietly repeating to myself the wise words of Mr. Mowbray, (*Proceedings*. Volume XVII, page 87).

*But back of the whole problem is the fact recognized by most company actuaries and executives * * * that our series are Lexian and not either Bernoullian or Poisson. With changing forces giving unstable probabilities, rates should be based on trends, not on the exact indication of a fixed period whatever the volume of data.*

I shall desire you of more acquaintance, good Master Mowbray, and if my head is in danger I shall make bold with you!

IV.

There are a few questions I would like to ask those of you who are engaged in the difficult task of rate making.

1. How long ought we to put up with a definite error in the credibility before we may harbor scepticism of the instrument?

2. What mathematical processes would you use if you were an officer of gunnery engaged in determining the gun elevation and charge required to hit a receding target?

3. What steps would you take to measure the effect of new elements on the *quæsita* of compensation rates?

4. Do you think you could apply a law of error which would enable you to get reasonably close to a *quæsitum* for each type and class of risk, and for individual risks separately, as postulated by Mr. Michelbacher?

5. Is it possible to establish complete uniformity by scientific segregation of the units, or must we, on account of practical difficulties, call things by the same name or tally them with the same number, although they are actually disparate? In other words, is compensation rate making ever likely to be anything more than a half science?

6. As the elements have so far been broadly generalized, and will probably continue to be, what is the logical objection to *a posteriori* reasoning to correct a dangerous error in the probability if the strict *a priori* method affords us no remedy?

7. When everything else has been done, is it possible to measure the elements of competition and selection so that we may avoid further failure to approximate the *quæsita*, with consequent and continuous loading of the rates to no settled purpose?

8. Is it better that many assured should each make a small gain in underpayment of premium, whilst a few insurers suffer a great loss, or better that the few gain and the many lose, if their loss prove to be ultimate gain in the strengthening of the insurance structure?

9. Supposing you had been called upon to make universal rates for risks large and small as the actuaries of carriers engaged solely in the compensation business, how would you have met the problem of inadequacy which has existed for the past ten years, and if you had not met it, what would have been the result, and would you still be in possession of your jobs?

I ask these questions as a lay brother seeking enlightenment. Perhaps some of you will answer them.

V.

The favorite answer to my criticism has been to say that I propose to employ mere guesswork to overcome the error in the general credibility instead of exact mathematical rules. But call it guessing, or playing a hunch, or judgment, or common sense or what you will, we have at last been forced to make empirical changes in a hopeless effort to escape from the painful impasse where we now find ourselves through a too slavish adherence to methods which were good in themselves, but not quite good enough. All I have ever requested was the use of a judgment factor based upon careful observations. It might not have been necessary if our technique had been adequate, and that it conceivably could have been adequate is suggested by Mr. Mowbray, unless Herr Lexis leaves us sadly up in the air, just as Monsieur Bernoulli and Monsieur Poisson have done, in which case we had better wish him also a fond *Auf Wiedersehen,* and go about our business.

Now supposing the trends had gone as markedly the other way, would such a correction as I have advocated have been renounced and denounced on the theory that it was unscientific, and lest the pendulum swing past the center of its arc and the carriers make a loss? Pardon me if I smile at the possibility! It is all very well to present you with a caricature of a so-called practical man endeavoring to make up a set of rates out of his head, but if some are fooled by that kind of extenuation I hope

it does not blind *you*. It is an old game to set up a dummy tricked out to look remotely like some protagonist and then set fire to it accompanied by the cheers of the assembled schoolboys. I say this in the process of argument and with the keenest enjoyment of the attempt to get away with it.

What I ask is, does guessing only cease to be guessing when it persists in relying upon a method which as persistently refuses to provide the solution? As far back as 1924 it would not have taken a genius to determine the required level of rates at that time with the experience of 1921, 1922 and 1923 before him.

VI.

At this point it is necessary for me to refer to one of those mathematical conundrums of infinity shrewdly suggested by Mr. Senior in a correspondence on the subject. After traversing the usual ground relating to the property of judgment in its relation to exact science, he says:

*Let us assume for the moment that the divine gift of judgment and foresight has been granted to one in our chosen profession and that our formula has been enriched by a factor of perfect judgment resulting in an adequate system of rates—a system that includes a complete provision for future development * * *, the next question that arises is this: How shall we maintain this new and perfect system of rates? We may anticipate that the companies will adhere to this new system to a reasonable extent in the so-called regulated states, but what about the large area which is free from all legal restraint? Will the gentleman's agreement suffice to maintain observance among the bureau companies, and will the companies within or without the bureau possess sufficient moral stamina to withstand the pressure of economic competition? * * * Unless we can obtain reasonably complete adherence to the new formula so laboriously evolved * * * we shall have failed and at what price? Of what use is our formula unless put to good use? We might be even in a worse position than with our original imperfect formula. We might even be drawn into that vicious circle where competition, finding its lowest level, keeps on demanding higher and still higher judgment rates of a nominal value.*

Here you see old Sisyphus again rolling his ponderable stone up the mountain,

With useless endeavor,
Forever, forever.

It is a weighty statement and I intend to deal with it as such. So in the first place I hazard the opinion that the essential problems of rate making are no different in this country from what they are in any other, the only difference being in the method of approach. In Great Britain, where there is plenty of competition, the thing that Mr. Senior fears does not happen. Why? Because a comparatively small discount on selected risks is sufficient to satisfy the competitive and predatory interests of the ungodly, and the profits of the business are jealously conserved by the redeemed and the unregenerate alike. The British are a seagoing people and they know that if you load a boat to the gunwale it becomes dangerous to navigate, and will be constantly shipping water, which, if not baled out, will cause it to sink. However, if you give it a fair amount of freeboard it will ride through a gale. That's the difference of approach.

However, this is America and we must state the argument in native terms. So I express the right to suppose that the present inadequacy in regulated states is not due to competition between carriers. Further, I am entitled to believe that, although in unregulated states the inadequacy may be increased by competition, there has been failure to provide an adequate scale of rates in any event. The measure of the inadequacy in either regulated or non-regulated states may largely be determined by the experience of the group of carriers having the lowest loss ratios. This is complicated, of course, by the factor of selection, but we must assume that the carriers are out to make as much or to lose as little money as possible, so that the degree of observance is to be determined by the experience of this group or we have no standard at all. Therefore, when we find a substantial group not losing any longer but making a fair profit, we are in a position to determine whether the trend factor is still required to give an equitable result.

Of course, we are dealing with a mixed problem and that is why I have asked the following question: When everything else has been done, is it possible to measure the elements of competi-

tion and selection in order to avoid further failure to approximate the *quæsita,* with consequent and continuous loading of the rates to no settled purpose?

I am sure that we can measure, for all practical purposes, the element of pure competition—or impure competition, if that is what you prefer to call it. It has been done elsewhere and it can be done here. But I am not so sure that we can find a measure for the elements of selection and selective competition. There is a subjective quantity in the problem, and although mathematical science takes more and more daring flights, it has some distance to go before it can measure heterogeneous qualities and attributes along with the more concrete units under consideration. These things may be separable, and it is probably along these lines that Mr. Michelbacher is thinking when he says: *More and more the demand is for correct rates, not in the aggregate, or for broad classifications, but specifically for individual risks.* Nevertheless, I am convinced that broader classifications are necessary to secure stable averages, although I am not opposed to the separation of disparate units provided that after analysis there is synthesis. When all is said and done, we cannot hope to settle every problem at once and some of them we may never solve. The important thing is not to withhold relief because we have failed to find a specific.

Mr. Michelbacher speaks of the actuarial science of life insurance as though it were an almost perfect instrument. True it is much less imperfect than the *quasi* science of compensation rate making, but it might soon find itself in the position we are in if it had to provide a change of rates every year on the basis of strict *a priori* experience for the purpose of satisfying supervising officials. Something may be said of a system which permits each company to have its own table of rates, and to collect more than it generally needs, retaining a part and returning a part of the overplus. This provides against the dark days of war and pestilence, of financial panic and shrunken values. Unfortunately, we are not in that position. It is obvious that malingering, suicide, selection for and against the company and the feature of indeterminability in disability contracts are subjective elements which affect the problems of life insurance, as some of them, and others not enumerated, affect us. The life companies

have by no means succeeded in measuring all of them and, therefore, are to some extent in the same boat. But the difference between them and us is that they work within a margin of safety, whereas we work within a margin of loss. In which, I may venture to say, lies the difference between heaven and hell; those life companies which furnish net cost contracts being located at present somewhere between the two places.

VII.

My injunction not to treat supervising officials *like children to be circumvented instead of seriously minded adults to whom the problem and its solution should be demonstrated* was made in reference to the fiction that present increases in the rates are due to an emergency and not to a definite breakdown of the rate-making structure. I am not aware that the life companies raised their rates to meet the emergency of the influenza epidemic, and in my opinion emergency should play no part in a proper system of rate making. The emergency passes, and what then? Your rates may be too high when the storm has gone or they may be just about right. Are you going to relinquish the emergency increases in either event? The ability to meet unexpected crises and catastrophes is the property of the surplus funds, and it is only because our method has failed to meet normal costs and has ignored the element of surplus profit that we now find ourselves without provision against the rainy day, doomed to call upon the reserves required for our other lines of business and for security depreciation, and to face the dire task of convincing the authorities that we are neither knaves nor fools. Of course, the supervising officials and other interested parties must always put up the other side of the case, but what have we done to convince them of the error of their ways? Next to nothing! How could we convince them when we had no settled convictions ourselves and no comprehensive plan? We fell prostrate for the theory that there should be no loading for profit reserve on the firing of the first shot, and we have acted, all of us, like the merest tyros. No wonder I described this latest proceeding as being fatuous. The institution of insurance owes it to the public to make its gains when its constituents as a whole are making gains, and its losses when they are making losses. Any other assump-

tion goes contrary to the broad principle of insurance, to orderly thinking and sound public policy. That we should have to ask for large increases now is nothing short of a calamity, although, Heaven knows, we need them. The right time to repair leaks is when you find them and not when a fierce gale is blowing and the ship is in danger of foundering. The responsible officials and executives were aware of serious inadequacy early in 1924, but most of us were lulled to sleep by a siren voice saying: "Just wait a little and the sacred formula will take care of everything". Was there ever such invulnerable optimism, such doctrinal pride, such a superlative degree of scientific integrity?

The only alternative to my position is to say that we were faced with an impossible task from the start and did not know it. If that is so we might as well fold our tents and admit we are licked. Why go on? Let us approach the supervisory officials and say: "The conditions you have laid upon us make it impossible for us to provide the required service and so we relinquish the task. There are limits to human endurance and we cannot perform miracles. You are unjust and unwise task-masters." And I for one should be interested to hear their reply, that is if they deigned to make one.

My own view is that if we had been right-minded ourselves, and if an authoritative group of actuaries and executives had stood out for reasonable conditions we could have had them after going through the preliminary skirmishes.

VIII.

This brings me in conclusion to what I conceive to be the principal aim and function of the Society. There are no men with whom I am more proud to be associated than its members. I really do believe in your scientific integrity and in your absolute sincerity of purpose. In a wicked world I have never doubted it. Moreover, I find in our proceedings an intellectual fiber not common to all of our insurance gatherings and a unique body of literature that is most vital and stimulating. You have done and are doing notable work, and although I have vigorously criticized methods which some of you have as vigorously defended, the furthest thing from my mind has been to slight a group to which I am fortunate enough to belong, and for which I have a sincere

admiration. There are no bad feelings, and if now and then my far from *ex cathedra* statements sound harsh and unpleasing, you may just call it *pretty Fanny's way* and leave me so.

I recognize the incompatibilities of rival carriers, the bias of political consideration, the whims and the discordances, the alarums and excursions in the struggle for advantage, and know how these have befogged problems and solutions and increased the difficulty of your tasks. But these things need not discourage you. You must meet them philosophically and in a new spirit; not one of protest and extenuation, but by assumption of authority and responsibility. This body should seek through its Council to secure official recognition for itself by making responsible decisions and pronouncements on subjects of vital importance within its province. It should be prepared to undertake the arbitration and settlement of difficult questions in a broad scientific and practical spirit, regardless of partial interests and short views. It should emerge from its modest retreat and begin to play confidently its inevitable part in the world as a qualified, conservative and indispensable group which has benefits to offer and professional purposes to be served. In some such manner might we advance more boldly to the solution of our problems and, growing in strength, at last be able to take in our stride obstacles which now seem almost insurmountable. Then, and not till then, will men say: *These are they who know the Master of Dark Truth who on the Chariot of Mutation entered the Gate of Immutability.*

MR. GEORGE F. HAYDON:

Judging from the quotation with which Mr. Michelbacher prefaces his paper I have gained the impression he fears he might be charged with treason to his associates and to the traditional practice as established during the last decade in the establishment of workmen's compensation insurance rates. If he is possessed of such fears, I am confident they are unfounded. Insofar as my own convictions are concerned, I am absolutely at one with him, and I suspect I am not the only one. In fact, I rather suspect most of us feel the same way about it. But it is apparent Mr. Michelbacher has the greater courage, if the fact that he has committed his conclusions to paper be any criterion. And be-

cause I agree with Mr. Michelbacher, naturally, this consignment becomes most difficult, if I am supposed to confine myself to constructive criticism whereas my inclination is to applaud.

Mr. Michelbacher may consciously or unconsciously have believed he was scaling the heights of iconoclasm. But he has only to look around and he will find he is just merely a little in advance of the regular procession. Mr. Michelbacher emphasizes, in a way, that the principles underlying the making of workmen's compensation insurance rates have not met expectations, and have not been productive of satisfactory results. And our critics ask us how it could be otherwise when we are committed to a plan that unbalances and swings hither and yon; that is constantly at the mercy of the vagaries of a flexible wage level; that pays but scant notice to practical considerations; that depends in part upon factors picked out of the ether; that is so complicated as to virtually defy any attempt to satisfactorily explain its ramifications to policyholders; that penalizes an employer for engaging high-grade help and paying good wages; that has failed miserably in its attempt to anticipate events, and wherein rules are changed as frequently as women's fashions. In all, our critics charge we have developed an inefficient, unresponsive plan which has not been improved by having grafted onto itself an experience rating plan relating current rates to an experience period, the center point of which is four years prior to the mid-point of the policy period, the latest year being totally disregarded.

After many years of seeming complacency, our critics, largely drawn from the great body of executives and underwriters, apparently have concluded the idol of actuarial science, insofar as workmen's compensation insurance is concerned, possesses that form of pottery underpinning made famous by history. The underwriter's position has not been an enviable one. He has had to take up the shock of unfavorable loss ratios. He has been torn between the dictates of his common sense and his fear of what he is now somewhat inclined to consider an actuarial monstrosity. It has been suggested to me that the relation between the underwriter and his actuarial confreres bears similarity to that which existed between the magician and an unlearned and wholly superstitious people during medieval times, when the

necromancers with their potions, their philters, their crucibles and their wands, would dispense their wares for the general edification, wonderment and astonishment of all who possessed the price. The poor deluded people admitted their impotency to understand it all; they merely accepted it, although their common sense rebelled. And finally common sense prevailed—much to the discomfort of the very able gentlemen who were popularly supposed to be in league with his satanic majesty.

I am not prepared to believe the parallel goes the entire distance. I do not believe underwriters are actually sold on the belief that actuaries really have a working agreement with his satanic majesty or even with his chief competitor, Mephistopheles —at least not beyond a certain point. My observations do lead me to believe, however, that, for some time past, the bulk of the body of underwriters have believed and felt that the actuaries were on the wrong track, and that their plans and predictions were destined to prove a losing venture; however, they hesitated to protest too vigorously, and why?—merely because they feared their own impotency to cope with what seemed to them to be the necromancy and magic of the actuarial cult. And now it would appear the veil has been torn asunder; the imperfections of the rating plans stand forth in all their nakedness; the losses have been on the verge of the cataclysmic, and the whole structure of workmen's compensation rate making science is on trial.

"Today" is in the possession of those who have consistently attacked the rating plan. And we may no longer hide behind the claim that the science of workmen's compensation rate making is still in its infancy and that we are yet in the pioneering stage. But we may in all conscience claim the extenuating circumstances so ably presented by Mr. Michelbacher, particularly as respects the hopelessness of ever expecting conditions to stay "put" combined with the ever increasing demand for more individually correct rates which naturally would be detrimental to the theory of broad classifications and to the theory of a smooth rating curve rather than one of sharp fluctuations. These facts, though they may not balance the imperfections and meet all the criticisms, most certainly do constitute a defense of no mean proportions and merit, and exercise a decided ameliorating influence.

In conclusion, and as a brighter note in an otherwise somewhat hopeless atmosphere of doubt and defeatism, as Mr. Michelbacher infers, merely because the present rating structure is on trial and is under fire does not necessarily portend its abolishment; neither does it prejudice the dignity nor standing of its framers, and, after all, it is not the only line suffering from a temporary setback. However, it would be idle to pretend that the whole scheme is not due for a drastic overhauling or that courageous measures are unnecessary if we are to hope that confidence in the science of making workmen's compensation insurance rates will eventually be restored.

I have nothing but praise and admiration for Mr. Michelbacher's paper. He has struck a chord which must reverberate throughout the entire insurance business. It is to be sincerely hoped that his efforts will not prove abortive.

MR. B. D. FLYNN:

It seems a pity to attempt to add a word to Mr. Michelbacher's comprehensive, well-pointed and, I may say, artistic contribution. He knows his subject well and has handled it in his usual capable and thorough manner. It may be that a few remarks may be added with propriety, however, along the same general line of thought—although, I am afraid, not in the same entertaining vein.

Mr. Michelbacher compares the accomplishments of casualty actuaries in their comparatively short term of service as rate makers with those of actuaries who have for many years been studying and solving the problems of life insurance. Life insurance, because of the long-term character of its contracts, which necessarily introduces the element of interest, the uneven distribution of expense during the term of its policies, the diversified forms of benefits, the variation of cost by ages, and for various other reasons, undoubtedly presents a much more complex problem in its rate making than casualty insurance. But, on the other hand, although casualty insurance is generally written in short term contracts with a definite single set of benefits and with a level annual distribution of expense, its rate making work is hampered with so many limitations and restrictions, so many practical difficulties, which are either inherent in the nature of

the contingency to be rated or which have grown up in the administration of the business, that the problem presented is one which would tax the breadth of understanding and knowledge of any actuary. In my own opinion, considering the many difficulties encountered, the record of the casualty actuary as a rate maker, so far as he has been allowed to assume responsibility, has been one of remarkably fine progress—one which does not compare unfavorably with that of the life actuary when consideration is given to the tools with which he has been obliged to work and the number of years in which he has been engaged with the task.

Let us consider in a broader way the criticism which happens to have been directed to the rate making work of the casualty actuary. We all know that there have been heavy losses in the casualty business of stock companies—particularly in the major lines. If we couple the rate making underwriter with the actuary as joint culprits in the case, I believe we can study the situation in a clearer way and possibly point our finger at some of the weaknesses of their work and perhaps find some ground for criticism—or at least point to possible improvement of methods.

Let us look over the rate making of one line only, workmen's compensation—a line in which the casualty actuary has probably had his greatest opportunity and which has produced most unsatisfactory results. You will recall that a few years ago the National Council demonstrated for the period including policy years 1926, 1927 and 1928, that if manual rates had been collected for all business of the country a sufficient volume of premiums would have been obtained to meet all losses and cover the provision for expenses in the rates. It would appear, therefore, that the manual rate making work of that period when checked in total produced satisfactory results. During the years covered by the report, however, excess losses equal to approximately 6 per cent. of premium income were shown for all stock insurance carriers combined. We should go further, therefore, to learn why with adequate manual rates practically every company suffered large losses under this business.

Workmen's compensation manual rates differentiate solely by industrial classification but risks vary greatly within the industrial classification both as to their expense producing and loss producing character. It is well known that because of the mate-

rial "per policy" expense total management expense is much greater than the provision in manual rates for that large group of policies in the small risk class whereas it is much lower than the provision for the large risks. Further, studies have shown that the loss costs of the small risks are in general greater than those of larger risks within the classification. If one company were to write the bulk of its business in the small risk class, therefore, it could expect to find manual rates entirely inadequate, whereas if that company were to write mainly the larger risks it would find both the expense provision and the loss provision redundant.

To attempt to remedy this clear weakness of manual rates and to fit more closely the wide range of risks within the industrial classifications, various rating devices have been set up. In an effort to make the rate adequate for the smaller risks the device of an expense constant has been used in recent years to a certain extent to make allowance for the larger per policy expense of the small risks, and similarly, a loss constant has been added in certain states in order to provide for the poorer experience of risks in that class. Another device has been schedule rating, a scheme which fixes prospectively charges and credits for certain physical qualities of the risk. To a limited extent also, under this plan of rating, allowance is made for the existence in the plant of a safety organization which it is presumed will improve the character of the risk. Then there is experience rating applied to the larger risks which it is presumed may be able to indicate their character upon the basis of their loss experience over a period of time, say, the most recent four or five years. This plan not only modifies the loss charge in the rate but for some unaccountable reason it modifies the expense provision also upon the basis of the risk's loss experience. Then there are risks, generally in the larger sizes, which have characteristics that are not properly measured by the set rule of the rating plans and must be treated individually. These are handled under equity rating.

The question immediately arises—why with manual rates adequate over all the companies suffered losses approximately 10 per cent. greater than the provision in the rates. The answer in my opinion lies in the failure of these rating devices to overcome the inherent weakness of manual rates which differentiate only

by industrial classification. As the main differential within the industrial classification is size of risk, why not have more than one manual rate for each industrial classification and do away with some of these rating devices which because of inadequacy or structural weaknesses have failed to meet the situation. A start has been made along this line by Pennsylvania in excluding the large risk class from the experience upon which the manual rate is based, thus recognizing, to a certain extent, the necessity for a differential by size of risk within the industrial classification. Why should we not go further, however, and establish, let us say, three manual rates by size groups within the industrial classification which would recognize the necessary variance in both expense and loss provision?

There would be objections raised I realize against such a plan. It might be stated that the risk near the upper border of the small sized group might pay much more than the one slightly larger in the next sized group. If this were thought important the plan might be modified by charging the risk in the second sized group the maximum premium of the first group plus the balance of payroll at the rate for the second sized group—and so on. A practical solution of this difficulty can I believe be worked out. It might be stated that the fitting of manual rates to the risk would be more complicated than at present. On the other hand, however, some of the present rating devices which are complicated and expensive to apply could be eliminated. As to the question of unfair discrimination I agree with others that there would be none; that the plan would follow approved business practices in other lines such as the making of public utility charges.

We all know, however, that a closer fitting of manual rates to the range of risks to be rated and the elimination of various ineffective rating devices will not clear our present rate troubles in workmen's compensation. Various new factors have entered the cost of this line in recent years to such an extent that if a test were applied today manual rates undoubtedly would show a material inadequacy over all. This situation is due mainly to the increasing cost factors which have not as yet been given full weight. The effect upon loss cost of reduction in wages, the introduction of new claim sources, such as, industrial disease, the

increasing liberality of claim administrative bodies, the increasing cost of medical attention, and finally, but not least, the increasing expense of handling a slightly reduced number of risks with a greatly reduced volume of premium income—which by the way really necessitates an increase in expense provision during these years—should all be taken care of so far as possible by the rate maker. The plan of projecting loss costs according to the trend of recent experience has been to some extent accepted by rate supervising authorities, but much more complete recognition of the necessity for such factors should be given; or else, a reasonable arbitrary factor to cover future contingencies should be approved.

The ideas above expressed are those of only one person—and are put forward with due humility. Still we all know the critical situation in workmen's compensation today and no thoughts which may lead in the direction of a solution should be left unexpressed. We all are aware, also, of the great difficulty of obtaining sympathetic cooperation from supervising authorities in these hard times when there is great opposition to increasing the burden of employer-constituents. The main hope at present appears to be in the evolution of a sound and more practical structure of manual rates and rating plans coupled with such increases in rate level as can be obtained. If actuaries and underwriters will do their utmost along this line certainly there can be no basis for justifiable criticism in the future of workmen's compensation rate making.

AUTHOR'S REVIEW OF DISCUSSIONS

MR. GUSTAV F. MICHELBACHER:

Mr. Richardson again demonstrates his remarkable ability as a master of argument. After reading only a few of his sparkling paragraphs an involuntary "ouch" escaped me. Before I reached his concluding remarks, I felt myself overwhelmed by an avalanche of rhetoric. By every rule of the game I should be thoroughly squelched; but I'm not! The fact is I am greatly encouraged because, if I correctly interpret Mr. Richardson's latest contribution to our joint debate, we are not so very far apart after all. This may be because I have modified my ideas with the passage of time.

I repeat my program of rate making principles for casualty insurance:

First, we cannot escape the tremendous body of statistical experience we have developed in this country. The indications of this experience must necessarily provide the foundation for future rates.

Second, we should avoid any effort to project this experience into the future by seeking to predict the probable course of obvious trends. Trends are deceptive in a business so susceptible to sudden and overwhelming changes as ours. Furthermore, in procuring approval of rates from state officials, it has been demonstrated that opportunities to exercise judgment, such as these predictions would create, may provide an excuse to inject considerations of expediency into the determination of rates, thus distorting the final results.

Third, we should strive to include in the rates a liberal factor of safety as a buffer against adverse developments affecting the cost of insurance. This may mean that rates will be too high at times; if so, the excess of premiums over the requirements for losses, expenses and a reasonable margin of profit should go to provide a reserve against the day when rates will be inadequate. In other words, the legal criteria of adequacy and reasonableness should be applied, long-range, to the results of a period rather than to the results of a particular year.

Finally, the rating system should be designed to afford a high degree of adaptability to the conditions of individual risks so that both loss and expense requirements of risks of all sizes and descriptions may be properly measured. In short, rates should be thoroughly equitable for individual risks.

I doubt whether Mr. Richardson would advocate any decided revision of these fundamentals. I might apply them one way, he another; but such differences I should encourage in this difficult period of experimentation when a practical solution of our problem that is at once simple and satisfactory seems just as far from realization as ever.

With Messrs. Haydon and Flynn I agree that our present rating plans are far from perfect. But then who can claim perfection for anything in this topsy-turvy world of ours? Defects are apparent in every phase of human endeavor. The best minds of our time are concentrating upon the problem of devising a structure which will withstand the pressure of changes of great scope and effectiveness. Our hope is that adjustments to the existing system will be found which will insure this result.

Beside the problems in the broad field of economics our problem of rate making fades practically to insignificance. We should not, therefore, be awed by it, nor should we regard it as insoluble. It can be solved and it will be solved if each of us will maintain an open mind, will exercise his thinking apparatus to its full capacity and will cooperate with others whose interest in producing a proper rating system is identical with ours.

Mr. Flynn shows the proper spirit by suggesting a new idea. Let us all do likewise; the more ideas we can throw into the laboratory the richer will be the material for experiment and the better will be the ultimate solution of the problem.

And, as a parting shot, I say this: when the solution is found, it will be discovered that casualty actuaries have blazed the way for its discovery.

THE ATTITUDE OF THE COURTS IN CONSTRUING THE WORKMEN'S COMPENSATION ACT—CLARENCE W. HOBBS

VOLUME XVIII, PAGE 269

WRITTEN DISCUSSION

MR. F. ROBERTSON JONES:

This paper contains (pages 281-381) a most valuable compilation of the decisions and principles followed by the courts in construing those provisions of the compensation laws which define the persons and employments covered. This matter is so clear, accurate and adequate, with a single exception, that I can find nothing therein to comment upon. The single exception is the matter (pages 352-355) under the heading "Employments within the Jurisdiction of Another State". This was too big and complex a subject to be dealt with adequately in a space that would fit in with the rest of Mr. Hobbs' paper.

But the extra-territorial application of the various state compensation laws, and the conflict of laws and duplication and confusion of remedies resulting therefrom, is a highly important subject and a cause of much uncertainty, waste and abuse. To a layman it looks as if the courts have been wabbling back and forth on this subject, pulling and hauling in various directions and poaching on one another's preserves, without due regard for comity or for the possibilities of valid constructions that would avoid rather than create interstate confusion. It is to be hoped that Mr. Hobbs will undertake a more intensive study of this particular subject and later favor us with an analysis of the decisions thereon, framed to give us insurance people a fairly definite picture of "where we are at" and some hints as to the possibilities and means of getting out of the mess.

Preceding (pages 269-281) and following (pages 382-384) the matter just commented upon, Mr. Hobbs presents some observations on the attitude of the courts in construing the provisions of the workmen's compensation laws in general. On this broader phase of the subject Mr. Hobbs concludes that while the courts construe the compensation laws "liberally", they are not (with an exception as to questions of constitutionality) construing them with "increasing" liberality (see pages 271, 384)—that the continually increasing liberality in the provisions of the compensation laws and in their application, which causes us so much uncertainty and trouble, is the work of the legislators and of the compensation commissions rather than of the courts.

With that conclusion, to some extent, I agree. If it were not for the courts many of the administrative commissions would be continually stretching the law illimitably in the way of vote-buying generosity in distribution of the insurance funds. And some of our worst troubles are due to acts of the legislators in depriving the courts of jurisdiction to interfere with awards based upon false presumptions and findings of fact contrary to the manifest weight of evidence. Nevertheless, I feel that the courts have a large part in the responsibility for the mad career of progressively increasing liberality in the distribution of largesses that now characterizes the administration of workmen's compensation in many states. In the beginning they let many unprincipled constructions and practices get by until it was too

late to put matters right. And whenever a new question arises, they still are prone to step off with the wrong foot and later only try to dam(n) the consequences of their own "breaks".

Much trouble, in my opinion, originated from the fact that our courts (with some notable exceptions) started off with the idea that the workmen's compensation law was an abandonment of all that is meant by "due process of law"—that it was a departure from all principles of justice and jurisprudence—that it was purely class legislation, intended as a sort of public relief or "social justice" for the benefit of a needy class, to be construed and applied, liberally and charitably, with a view solely to the interests of that class. There is no doubt but that such a doctrine prevailed with some of the framers of our compensation laws, or that it is now professed by many of the politicians who administer compensation.

But the majority of our compensation laws were distinctly based upon European precedents; and a study of the literature of the time of their origin will show clearly that the European compensation laws were based upon the doctrine of "trade risk". That is a juridical doctrine—a substitute for the old doctrine of employers' liability for fault only. Roughly, the doctrine of trade risk is that, in justice, industry owes to its employees and their dependents some compensation for the wage losses caused by risks to which they are subjected because of their employment, regardless of negligence. Though variously expressed, qualified or limited, I think that this doctrine stands out clearly as the basic intent of the legislators in the large majority of our compensation laws. But many of the courts have overlooked no pretext to ignore it.

To illustrate: The original Michigan compensation act, taken as a whole, clearly indicated a legislative intent that compensation should be based upon and amount to a proportion of the wage loss; yet, because the phraseology of one particular paragraph failed to express that idea unambiguously, the Michigan courts construed it, regardless of the context, to mean what manifestly the legislature never intended, namely, that where a permanent injury prevented a workman from resuming his old job but did not prevent his earning higher wages in another occupation, he was entitled to compensation for permanent *total* dis-

ability; Foley v. Detroit Railways, 157 N. W. 45; Seitz v. Labadie Co., 201 N. W. 485.

Similarly, the New York compensation act manifests an intention that compensation shall be for "loss"—though in fatal cases it provides for pensions which may far exceed all possible loss. Yet, because the provisions of the act relative to pensions for widows contains no express limitation to the contrary, the courts have construed the act to mean that a young woman who marries a fatally injured workman on his deathbed is entitled to a life pension as "compensation"; Nickerson v. Risley, 231 N. Y. App. Div. 744, Industrial Bulletin, Nov., 1930.

Another misconstruction of the compensation law, gross in its consequences, started in England, but has been blindly followed by nearly all our courts. The English compensation law then covered only "injuries by accident arising out of the employment". That phrase, at the time of the law's enactment, was carefully considered and was generally accepted to mean injuries *caused by* accidents and by accidents arising out of risks of the employment; but the House of Lords construed it to mean that where a workman, suffering from acute heart disease, fell dead as a consequence of the mere motion of lifting a spanner for the purpose of moving a nut, the injury was compensable; Clover, Clayton & Co. v. Hughes, 3 B. W. C. C. 275.

That construction extended the compensation law indefinitely into the field of pure health insurance. It eliminated the statutory requirements, as generally understood, of an "industrial accident" and that the injury must "arise out of the employment", and, instead, substituted a judge-made rule that it suffices if a pre-existing injury (*e.g.*, a disease) is brought to a culmination by some ordinary act or happening in the course of employment. Whatever may be said for the reasoning of the English courts —and ours—in support of it, this construction certainly manifests a spirit of liberality carried to an extreme, with complete disregard of legislative intent.

Turning to another phase of the law: It is within the memory of many of us that when the workmen's compensation laws were first proposed, great things were to be accomplished by requiring prompt notice of every accident or injury, down to the merest trifle. Employers were to have opportunity promptly to investi-

gate the facts, thereby eliminating many of the frauds and uncertainties of belated claims under the old liability laws, and to apply prompt first-aid and medical attention, so as to eliminate many then common aggravations and infections of injuries. Provisions intended, and generally appropriate, to effect such results and to develop among the workers a habit of prompt reporting of all injuries, were incorporated by the legislators in nearly all our original compensation laws.

Since then, however, some legislators and many of the commissions have been emasculating or nullifying such provisions, and the courts, quite commonly, have gone out of their way to construe the law to help the bad work along. For illustrations: The compensation acts of New York and Connecticut require prompt notice of injury. The manifest purposes of this provision call for notice of the *happening* of the injury. But the New York and Connecticut courts have seized upon the fact that the word "accident" is not used, to construe this provision to mean that no notice is required until after the "injury" has become serious—that is, until after the harm from neglect has been done or until it may be too late to ascertain the facts relative to the cause of the injury—thereby inviting and propagating the very evils the legislators clearly intended to prevent.

Moreover, I think that the courts have unquestionably gone far beyond the clearly expressed intent of the statute in construing the phrase "in the course of the employment". Consider the following case: A salesman employed with his automobile to canvass some country towns, spent the evening after his day's work in a social gathering at a country store. There was some evidence that business was once mentioned; but the meeting was almost entirely social, if not convivial. Leaving late in the night, the salesman made for home, but in trying to garage his car drove it over an embankment and was killed. Held that the accident occurred "in the course of the employment"; Crowell v. American Fruit Growers, 253 N. Y. 543, N. Y. Industrial Bulletin, March, 1930.

And consider this case: A traveling saleswoman in Boston was ordered to return to her employer's home office in New York City. The use of an automobile for travel was not contemplated by the employment, but the woman chose to make the journey in her

own car and, instead of proceeding directly, to go around by Syracuse, where her mother lived. While on the road between Syracuse and New York City she was injured in an automobile accident. Held that the accident arose out of and in the course of the employment; Fronce v. Prosperity, 255 N. Y. 613.

The effect of such decisions as these is to hold employers liable to compensate for losses resulting from multitudes of risks incurred by employees for their own purposes, regardless of the employer's interests, and, consequently, well beyond the intended coverage of the compensation laws.

I might extend this list of what I believe to be judicial misconstructions a little further; but I think I have gone far enough for my purpose, which is to show that the courts, although they, as Mr. Hobbs contends, have not construed the compensation laws with *increasing* liberality, yet have continually opened channels for increasingly liberal applications of such laws by excessively liberal constructions whenever new questions of construction have arisen.

It may seem presumptuous for a layman thus to criticize the judicial construction of statutes. But the situation is this: When those statutes were framed and enacted their intended purposes were generally quite well known to laymen who, like myself, kept in close touch with legislation on the subject. Now we find those intentions being progressively more and more exceeded, by authority of the courts. Whether the courts are right or wrong in their liberal tendencies is a question for the legal profession. But from the standpoint of a layman it is incontrovertible that the courts have been the originators of much of the progressive liberality in the application of the workmen's compensation laws, of which we, rightly or wrongly, complain.

MR. LEON S. SENIOR:

As originally planned by the Committee on Program, this paper was to establish in a positive way the prevailing belief that the courts have shown an increasing liberal trend in making decisions on questions affecting workmen's compensation. The author rejected the idea of writing a paper under a title which *a priori* accepted a situation that required to be developed by definite and unmistakable proof. Apparently he decided to give to his

paper a rather colorless title after reviewing a large number of decisions which convinced him that opportunism, unanchored to principle, was not a factor guiding the courts in cases presented on appeal from decisions of Industrial Commissions. But right at the outset he was confronted with the problem of defining "judicial conservatism" as contrasted with "judicial liberalism".

It is well known, of course, that the courts are consciously or subconsciously influenced by social movements reflecting the spirit of the times and that a given opinion reflects the social environment and political education of the particular judge. The author explains that statutory law, from the standpoint of interpretation, may be divisible in two classes: (1) statutes prescribing penalties or which are in derogation of common rights, and (2) statutes which are remedial in character or enacted in the interest of public welfare. The first are construed in a strict manner, while the second are subject to interpretation in what may be described as a liberal or equitable manner.

Workmen's compensation laws come within the second class and for that reason it is safe to assume that the courts, under these general principles of statutory construction, would apply liberal interpretations, resolving doubts in favor of the employee for whose benefit the law was enacted. Questions relating to evidence, to notice, and to time limits for appeals are resolved in a spirit free from any technicality, giving the widest latitude to the claimant in his effort to make out a case.

Mr. Hobbs' paper gives to the student a very clear understanding of the principles that underlie statutory construction and of the methods that are used by the courts in the process of interpretation. The author is especially at home in the discussion of certain important phases of the compensation laws of this country. For example, the review of cases relating to independent contractors is splendid and nowhere can one find a better statement of the doctrine which led to the assumption of jurisdiction by the Federal courts in the case of accidents sustained on water by workers engaged in maritime contracts.

On the other hand, the author has not fully developed the trend of decisions on certain important questions, *i.e.*, the extension of jurisdiction in extraterritorial cases, the length to which the courts will go in accepting as final the decisions of Industrial

Commissions on questions of fact, or the line of demarcation as between injuries due to accident and injuries due to disease, particularly where the claim arises on proof of casual relation between disease and accident. The author might have given greater effort to ferret out special instances of liberalism v. conservatism.

For example, in his discussion of extraterritoriality he makes no mention of such an important case as Cameron v. Ellis Construction Company, 252 N. Y. 394, a case that reflects very definite conservative leanings as compared with the earlier decision in Post v. Burger, 216 N. Y. 544. Some of the best tests on liberalism v. conservatism could be made in the field covered by the phrase "arising out of and in the course of employment". This the author wholly overlooks. Injuries due to extraneous risks come under this category. Here he could have found a contrast between the conservative decision in Lebeda v. Pongracz, 230 App. Div. 606, and the liberal decision in Garnes v. Feeney et al, Vol. 16, No. 10, W. C. Reports. In each case the employee was killed by a stray bullet from an unknown source. In the Lebeda case the award was dismissed, while in the Garnes case the award was affirmed.

The effect of discontinuance in third party actions opens a field for debate on liberalism v. conservatism. For illustration we may refer to the case of Breital v. Hinderstein Bros., 258 N. Y. S. 237. Here the claimant sought to recover against a third party, discontinued the suit and three years after the accident prosecuted a claim for deficiency under the Compensation Law. The Industrial Accident Board granted an award for deficiency. The Appellate Division reversed the award and dismissed the claim and in so doing it expressed the view that "any act whereby the election to sue is not carried to judgment on the merits in order to fix the deficiency is preventive of any award for deficiency unless the carrier has consented or has waived its right in some way".

And in Schubert v. Heller, 235 App. Div. 20, there is distinct evidence of a conservative trend. Here an award was granted notwithstanding the allegation by the carrier that the accident occurred prior to the effective date of the insurance policy. The carrier claimed an error in the policy date, but the Industrial

Board denied reformation of the contract on the ground that it had no equity jurisdiction. Reformation of the contract was directed by the Court of Appeals. The Board reaffirmed its award after hearing evidence on the merits of the case, but the court on further appeal dismissed the award against the carrier with an opinion confirming the plea to the effect that the accident took place subsequent to the effective date of the policy.

In a study of court decisions, care must be exercised not to confuse the attitude of the courts with that of the Industrial Accident Commissions and their referees. It is perhaps true that Industrial Commissions are influenced to a large extent by the ideas of social welfare workers whose judgment is naturally biased in favor of the injured person and whose horizon is limited by the workers' real or imaginary economic loss. Equally partisan in the opposite direction may be found the employer upon whose shoulders rest the burden of mounting compensation costs. Between these two opposing forces, each representing extreme ideas, the courts seek to administer justice in a liberal but impartial spirit and in accordance with established principles that have withstood the test of time and experience.

Mr. Hobbs' paper contains a liberal digest of cases illustrating the impartial attitude of the courts. In this respect it serves to supplement similar and more comprehensive compilations as, for example—

Workmen's Compensation Law & Industrial Board Rules—N. Y.,

Workmen's Compensation Legislative Law Bulletins of the U. S. Department of Labor,

Law of Workmen's Compensation by W. R. Schneider.

From the standpoint of the actuarial student, the frequent reference to cases offers a distraction which might have been avoided if the digest had been relegated to an appendix.

The reader who expects to find in Mr. Hobbs' paper confirmation of the belief that the courts have shown a growing spirit of liberalism will be disappointed. On the question of liberalism the author takes an impartial position, giving expression in his *résumé* to the effect "that the courts have on the whole exerted their powers in the direction of order, consistency and logic and

with an appreciation that, while the acts were designed for the benefit of the employee, the rights of the employer must also be considered". This answer will fail to satisfy the critics of our compensation system. I have in mind an address delivered recently by Mr. F. Robertson Jones entitled "Ominous Abuses Threatening the Insurability of Workmen's Compensation". One gets the impression from this address that the decisions of the courts are not only liberal but even partisan. Mr. Hobbs' paper is of value in that it serves to destroy such impression; it is prosaic in tone and judicial in character; it is non-partisan in spirit and the conclusions are substantially accurate.

My own judgment is based not only on cases from the law books, but also on opinions from disinterested sources. Naturally attorneys whose practice consists in contesting compensation claims are bound to get a biased view. On the other hand disinterested opinion seems to substantiate Mr. Hobbs' ideas to the effect that compensation cases on appeal are weighed in the same scales, measured by the same rules and determined in the same manner as all other questions of law, *i.e.*, by the fundamental principles applicable to the law of contracts, agency, master and servant, etc.

If Mr. Hobbs' study of court decisions has missed the objective which was in the minds of the Program Committee, it is not the fault of the author. Possibly the time is not ripe for a conclusive answer to the question originally designed as the central theme of Mr. Hobbs' paper. Some day a more precise answer may come to this question. It will require a far more elaborate study undertaken in a spirit of what the French call "libre recherche scientifique". When such a study is undertaken it would be my idea to concentrate attention on outstanding decisions in a relatively few states on a relatively few but important phases of the system for the purpose of discovering judicial trends and tendencies. It may then be possible to ascertain whether there truly exists a rising spirit of liberalism in the adjudication of cases involving the workmen's compensation law.

As a part of such study it will be interesting to develop the extent to which the courts have gone in the way of exercising legislative functions, for it is well known that court interpretation does not limit itself to the letter of the law. Judicial en-

croachment upon legislative function is frequent and at times becomes so material as to constitute a substantive change. This I have pointed out some years ago in my own modest study of court decisions in New York (A Study of Judicial Decisions in New York Workmen's Compensation Cases, *Proceedings*, Vol. XII, Page 73). After all, legislative enactments are lifeless and colorless until moulded by the judiciary into workable instruments for the material or spiritual uplift of the community.

AUTHOR'S REVIEW OF DISCUSSIONS

MR. CLARENCE W. HOBBS:

These discussions of my paper are too complimentary in tone to justify a rebuttal in detail. It is something of a gratification to find the main criticism one of non-feasance: a mild rebuke for failing to cover the subject more extensively and in greater detail. It is a just criticism. The field covered is but a minor part of the voluminous case-law on the workmen's compensation acts. It was chosen as being the part of the field most pertinent to the work of the National Council, and the part I have had most frequent occasion to traverse. It raises a host of law points, which are, perhaps, more truly indicative of the attitude of the courts than questions of mixed law and fact. To Mr. Senior's charge of failure to develop fully the trend of decisions on questions so copiously litigated as the length to which the courts will go in accepting as final the decisions of Industrial Commissions on questions of fact, the broad field of injuries "arising out of and in the course of employment" and the distinction between injuries due to accident and injuries due to disease, I can but plead guilty, alleging as my excuse no lack of appreciation of the importance of these questions but limitation of time, and some lingering scruples of conscience as to the amount of space I might fairly occupy. The full field could hardly be covered without writing a book.

A point touched on by both Mr. Jones and Mr. Senior is the failure to cover completely the subject of conflicting jurisdictions. The cases on this subject are many, but frankly irreconcilable. A part of the confusion appears to be due to a shift in the view of the courts as to the nature of the obligation to pay and

the right to receive compensation. The earlier view was, that these were incidents annexed by statute to the contract of service. If so, the state which has jurisdiction of the making of the contract is the state whose compensation law should govern. But the cases involving the maritime jurisdiction of the United States made this view untenable. The maritime jurisdiction of the United States applies to contracts of service maritime in character: but the Supreme Court of the United States indicated that State Compensation Acts might under some circumstances apply to employees whose contracts of service were characteristically maritime. This of necessity compelled an abandonment of the *ex-contractu* theory, and the development of a doctrine that rights and obligations are statutory incidents of the status of master and servant. Consequently, there is no need to refer back to the state where the contract was made. It is sufficient if the status exists in a particular jurisdiction for the compensation laws of that jurisdiction to apply. A decree binding on both employer and employee cannot, however, be made, unless the state has jurisdiction over both.

One other comment may be made on Mr. Jones' discussion. It is rather evident that Mr. Jones feels that the courts have not gone nearly far enough in holding the legislature to a straight and narrow path. It is probably true that our compensation laws were originally drafted upon European models with the idea that indemnity should be closely related to actual loss of earning power. But this idea has not been adhered to by the legislatures and is not necessarily the entire extent of legislative authority on the subject. The decisions of the Supreme Court of the United States upon the constitutional limits of legislative activity do exhibit an increasing liberalism; and I think this is mentioned in the conclusion of my paper. On the other hand, for the court to have written into the constitution such a limitation as Mr. Jones envisions would trench somewhat closely on the field of judicial legislation.

I am not disposed to dispute with Mr. Jones the point that the compensation laws have gone to the extreme of liberality, and that the need of a check is apparent. The compensation laws and the interpretations by industrial commissions are creatures of an age that is very possibly a thing of the past, when industry

was prosperous and when burdens were blithely imposed and accepted with pious resignation. The process could not go on, and cannot continue without a Fortunatus purse to finance it. Now industry is particularly hard hit, and burdens once tolerable have become crushing. But, unless we are prepared to reject altogether the democratic formula, the remedy is for the legislature to apply. That the legislature has been unwise, improvident or liberal beyond measure is no ground for the intervention of the courts save in such cases as the courts feel justified in interposing a "rule of reason". Governmental authority must reside somewhere, and it is vain to hope materially to guide or limit legislative discretion by vigorous application of "the rusty curb of Old Father Antic, the Law".

THE CHEMICAL AND DYESTUFF RATING PLAN—HARRY F. RICHARDSON VOLUME XVIII, PAGE 385

WRITTEN DISCUSSION

MR. GEORGE A. COWEE:

In reviewing this paper it is evident that the author has covered the description and operation of this unique rating plan in a characteristically thorough and comprehensive manner, outlining its advantages, weaknesses, and several construction suggestions for consideration.

You will recall that Mr. Richardson stated that the classifications employed for workmen's compensation insurance have been erected on three broad bases namely, (1) the product, (2) the process, or (3) the business, and that few, if any, classifications involve more than one of these three principles of classification.

Mr. Richardson pointed out that the Chemical and Dyestuff Rating Plan is the exception wherein both the raw material or product constitutes one factor, and the process involved another factor in determining rate groups and classifications, these being identified by code numbers only.

It must be admitted, by any one familiar with this rating plan, that it is an imperfect, yet ingenious, instrument for rating purposes and that its application results in only an approximation for determining rates in connection with a very involved and complicated problem. Anyone at all familiar with chemistry is

cognizant of the vast realm of chemical formulæ to which some classification system for rating purposes must necessarily be applied.

It will be recalled that risks which are rated under the chemical plan are grouped under code number classifications according to (1) the degree of hazard involved in the raw materials or the final product and (2) the degree of the hazard created by or during the processes of transforming the raw materials into the final product. The hazards of the former are measured in terms of "flammability" or their explosive qualities and represented as abscissae on a code classification and rate chart containing twenty-four different code numbers, while the latter are grouped into hazards according to the processes of transforming the raw materials into the final product and represented by ordinates on the rate chart.

The flammability or explosion hazard of a material is measured in terms of "flash-point" and a list of raw materials and products grouped according to flash-point are found in Table A of the plan. A grouping of the processes by hazard is found in Table B. The code number classification is, therefore, determined by the application of the hazards represented by both the abscissae and ordinates.

The highest rated hazard of both factors is used to determine the rate group in which the classification of the risk falls. Herein lies a certain weakness, since the highest hazard of either factor may represent a relatively small or incidental proportion of all the hazards on the average in a particular risk. A limited and incidental use of certain high hazard raw materials and processes determines the classification for the risk—not the average hazard. Practical difficulties have been encountered in not a few cases in attempting to justify rates so determined for particular risks. Furthermore, in most chemical risks, the hazard varies greatly at different times depending upon the demand for different types of chemical compounds or products. The rating of a risk today might produce an entirely different result from the rating of the same risk six months hence. It is doubtful if the hazards in any but a few other classifications fluctuate over as wide a range as they do under any specific chemical classification. Very dissimilar raw materials, products and processes may be

found under the same chemical classification code number in different risks.

An attempt to iron out the difficulties described above is represented by the so-called "average rating" employed in connection with the Chemical and Dyestuff Rating Plan. In other words, where the risk engages in a number of separate and distinct chemical processes, in different buildings or departments separated by so-called party or fire walls, an average rate is determined based upon the hazards and the number of employees in different departments. A weighted average is thus obtained. Even here, however, the hazards also fluctuate over a considerable range within the different departments and consequently within the risk as a whole.

Another weakness from a statistical standpoint, as Mr. Richardson has pointed out, is that approximately 50 per cent. of the experience is concentrated under those statistical code numbers which involve "average rating" and since this experience does not represent the hazard of a specific chemical process the use of such data in determining rates is questionable and somewhat objectionable. It has not, therefore, been utilized for rate making purposes. As respects the remainder of the experience, 85 per cent. of the payroll is concentrated in five of the twenty-four classifications, and about 45 per cent. of all the payroll is concentrated under one code number. The rates for the remaining groups, therefore, have to be determined largely by analogy or comparative hazards based to a considerable extent upon judgment.

Relativity of hazards in process groups 3, 4, 5 and 6 seems to have been now established, based on experience, with at least some degree of dependability, although it should be pointed out that this experience has been controlled and influenced to some degree by the hazards represented by the "flash-point" of the raw materials or products. Too much reliance, therefore, cannot be placed upon the existing relativity which, particularly in connection with groups 1 and 2, is largely conjectural.

As regards the "flammability" or "flash-point" in groups *A*, *B*, *C* and *D*, Mr. Richardson stated that, in the original plan, it was assumed that the maximum differential should be 200 per cent. whereas at present, based upon the experience available, it is now

slightly less than 25 per cent. He advances the opinion that the chemical engineers who originally developed the plan somewhat exaggerated the flammability or explosive hazard involved; on the other hand it is quite probable that the hazards of flammability are of a catastrophic nature, which is undoubtedly true, particularly in the highest rate group, which could only be expressed with dependability on an extremely broad volume of exposure.

Mr. Richardson points out that it would appear that the premise of using uniform rates for the diagonal squares of the diagram is not justified because the hazard differentials for the processes groups appear to vary more markedly than do the hazard differentials of the flammability groups. Whether this is so or not is problematical. At present it is necessarily a matter of individual or collective judgment. It may well be that the differential between groups *A* and *B*, for example, is too small rather than too high since *A* represents the most hazardous group as regards the flammability or explosion hazard. It should also be pointed out that the experience in the flammability groups is controlled and influenced to a considerable degree by the experience in the processes groups.

The foregoing illustrates the intricate problems with which chemical engineers and underwriters have to deal in formulating any workable plan for the rating of chemical risks. Improvements in the plan will undoubtedly develop from time to time as more experience is accumulated. Although the plan contains many uncertainties, a certain degree of unfairness and discrimination, and many imperfections, yet it has proven to be practicable and, as contrasted with the previous hit or miss method of rating, serves as a very useful and logical rating instrument.

MR. ALLAN W. WAITE:

From an underwriting point of view we are in agreement with Mr. Richardson that a plan of this type comprised of the charting of a risk according to its abscissa and ordinate, especially for chemical and dyestuff rating where there is such a diversity of hazard, has proved itself an effective plan of classification and rating.

Scientifically, this plan should lend itself to accuracy because the factors taken into consideration, namely, flashpoint, explosibility, corrosion, causticity and poison hazard, can be specifically assigned to a rate making plan with a high degree of accuracy.

It is my understanding that the originators of this plan had in mind the fact that sooner or later the twenty-four classifications now incorporated under the Chemical and Dyestuff Rating Plan would ultimately be condensed so as to make the plan not only easier to apply but also to decrease the possibility of the misplacing of a risk by an inexperienced underwriter because of the extreme flexibility of the Plan. From an underwriting point of view the main question concerning the use of this rating plan is whether the flexibility of the plan with twenty-four classifications is of greater value in caring for our multitudinous ramifications in the chemical industry than would result from a plan limited to nine or sixteen classifications.

In all fairness to the discussion of this paper, we must take cognizance of the fact that Mr. Richardson points out: "It is unfortunate that the remaining experience—85 per cent. of the payroll—is concentrated in five of the twenty-four classifications, and that about 45 per cent. of all the payroll available for the determination of the relative hazards of the several classifications is concentrated in one square, namely Code 4815 (D-4)."

While we realize that this plan is still in a process of evolution, it would seem in line with scientific underwriting to follow very closely the experience developed on each one of these classifications so that when a revision is made, careful consideration may be given to the possibility of concentrating our actual experience on the Chemical and Dyestuff Rating Plan within fewer classifications, thus making the actual experience in each group of more value because of increased volume.

From an underwriting point of view the real problem connected with the Chemical and Dyestuff Rating Plan consists in the fact that the larger chemical risks which in reality fall within a number of these coded classifications eventually have their rates promulgated under one or two specific classifications. When this experience is compiled, it will not reflect the exact loss ratio in that classification because it is in reality a composite of a large number of classifications of the plan.

While we realize that the problem of rating chemical and dyestuff risks does not lend itself to ready solution insofar as classification is concerned, we believe that the present plan is far superior to the old method of rating this type of risk wherein every chemical risk was dealt with as an *A* classification and individually rated. We believe, however, that Mr. Richardson's paper has brought out the need of study of the Chemical and Dyestuff Rating Plan from the viewpoint of economy and efficiency of application, and accuracy of compiled experience. If the Chemical and Dyestuff Rating Plan eventually lends itself to the ultimate end of providing a dumping ground in one classification of a large number of hazards which might be more accurately measured by other specific classifications in the group, we are not getting the accurate experience necessary in the rating of our Compensation business.

As Mr. Richardson has pointed out, it is true that the results of experience rating risks which are subject to the Chemical Plan have shown wide fluctuations from the basic rates, probably greater than for other groups of risks. It would seem that the condensing of this rating plan to a smaller number of classifications would result in even a wider fluctuation from the basic rates. If there is any group of classifications which should lend itself to a wide swing in the experience rating plan, it would naturally be a classification with a diversity of exposure similar to the chemical industry. This might be because of a number of reasons; primarily because of the diversity of methods and processes in our chemical industries, even though these industries may be producing identically the same product.

AUTHOR'S REVIEW OF DISCUSSIONS

MR. H. F. RICHARDSON:

The author wishes to thank Messrs. Cowee and Waite for emphasizing some of the more serious defects of the Chemical and Dyestuff Rating Plan. The sooner these defects become better understood, the sooner will attempts be made to properly correct them. These defects appear to be of two general types:

1. The underwriting difficulties of assigning a specific risk to the appropriate rate group. Among these underwriting difficul-

ties are the procedure of assigning a high hazard rate to an entire risk when only a small proportion of the total exposure is subject to the high hazard chemical or process; the fact that conditions vary from time to time as respects the chemical hazards within a given risk; that in the larger risks there may, in reality, be two or more separate and distinct situations as respects hazard. All of these constitute serious defects and, although "average rating" has apparently helped some, there is still much to be desired in the rules for assigning risks to the appropriate chemical classifications so that we can feel satisfied that these risks are being treated with equity and fairness.

2. The statistical basis of the rates. Because of the catastrophic nature of the hazards of certain materials and processes, and because of the limited use of such chemicals and processes, it will take a long time to develop sufficient experience to truly indicate the relative hazards of the various rate groups. Fortunately, our present basic methods of combining experience on a standard national level will eventually bring together enough experience to develop a dependable guide as to this relativity. Perhaps, as Mr. Waite suggests, the experience will indicate that fewer rate groups will suffice—if that is so it will, undoubtedly, help in the underwriting problems.

In spite of these defects, it is interesting to note that two such capable underwriters as Mr. Cowee and Mr. Waite, feel that the Chemical and Dyestuff Rating Plan is a decided improvement over the previous basis of rate assignment to risks of this character. That this start has been reasonably satisfactory should be a spur to those of us who are trying to improve the Plan to make it a truly scientific, practical and accurate rating instrument.

REVIEWS OF PUBLICATIONS

CLARENCE A. KULP, BOOK REVIEW EDITOR

Compensation for Automobile Accidents. A Symposium. Young B. Smith, Austin J. Lilly, Noel T. Dowling. Columbia Law Review, Vol. XXXII, No. 5, May, 1932.

This is a discussion from three different angles of the report of the committee to study automobile accidents.

To begin with the last, the discussion of the constitutional aspects of the question by Noel T. Dowling arrives at the conclusion that there is nothing in the commerce clause or in the "due process" clause of the Federal constitution which is fatal to the plan outlined by the committee of a scheme of indemnities irrespective of fault and an insurance plan to spread the cost over all automobile owners. Some provisions of state constitutions he admits do lie squarely in the way of a compulsory plan.

With regard to the commerce clause, one is inclined to agree with his conclusion. The paramount jurisdiction of the United States over interstate and foreign commerce does not inhibit the exercise of a police jurisdiction by the state over that commerce and its instrumentalities, provided it does not go to the extent of prohibition or an unreasonable restriction, particularly in the absence of congressional legislation on the subject. As to the "due process" clause, his conclusions are to be accepted with more reserve. It is true that liability without fault is not unknown to the common law: yet the elaborate reasoning of the Supreme Court in the workmen's compensation cases, aimed at the proposition that to make the employer primarily responsible for the injuries of the employee irrespective of fault is in accord with "natural justice" may serve as a warning that the principle of liability without fault, and the further principle of merging individual rights of recovery into a compensation scheme are not necessarily capable of indefinite extension. Certainly the course of reasoning used, that employer and employee are engaged in a

common enterprise; that injuries to the employee are to be treated as an incident of, and a proper charge against the common enterprise; and that it is proper to charge the cost of those injuries against the employer because he has control of the business and enjoys the entire profit, and can fix wages and regulate prices so as to provide for the cost, has no application to compulsory compensation for automobile accidents. The justification must be made out on entirely different lines. True, a presumption exists in favor of the constitutionality of a law, and it is a hardy person who would aver too confidently that the Supreme Court will not be able to find a justification for nearly any law they desire to approve.

The articles by Young B. Smith and by Austin J. Lilly are mutually antagonistic. Mr. Lilly does not like the plan; Mr. Smith does. Mr. Lilly indicates an opinion that the plan as drawn would prove unexpectedly costly: Mr. Smith regards the cost as immaterial save as it may serve to stir up opposition to the plan, and criticises the plan submitted as not going far enough.

Undoubtedly the plan is an innovation. It is a step beyond the workmen's compensation acts in that it is not buttressed on a mutual relationship. I think the courts have latterly inclined to base the compensation acts on the status of employer and employee rather than upon contract; but whether contract or status, neither is present here. The act deals with the rights and duties of the class of automobile operators and the general public among whom they operate. It imposes on the one hand duties to pay and rights to recover irrespective of fault, and on the other hand measures these rights and duties, not by any rule of loss actually suffered, but by a statutory yardstick. It is a grouping on a large scale; a substitution for individual rights and duties of class rights and class duties. Automobile operators are regimented into an insurance plan; and the public is regimented into reliance on that plan for recovery. In this respect it follows the lines of the several types of social insurances.

Undoubtedly we are socially, whether we like it or not, drifting away from the highly individualistic ideals embodied in the common-law. Frankly those ideals do not fit our present social and industrial organization, wherein independence is becoming

more and more the exception, interdependence more and more the rule. The individual tends more and more to sink into the position of a cog in a great machine which may in its final development become part of a super-industrial organization or part of a socialistic state. The individual therefore is losing his significance, and his individual rights and duties tend to merge into the rights and duties of the class to which he belongs. By looking at the class rather than the individual it is undoubtedly possible to achieve a greater quantum of social justice and to make a more even distribution of the benefits of that justice. A line of reasoning such as this lies at the bottom of all compulsory insurance plans.

On the other hand, the merging of the individual into the group is not an unmixed blessing. Individualism carried too far becomes anarchy: but to a social system which once emphasized the individual we owe many sterling qualities—initiative, personal responsibility, thrift. Social regimentation is not an atmosphere in which these qualities flourish: and the development of the highly organized state appears very likely to be attended by a warping and degeneration of the individual elements. The danger of social insurances generally is, by the very facility with which relief can be obtained, to induce prospective beneficiaries to relax all endeavor to look after themselves, and to exploit to the full every possible argument whereby they may be entitled to a share. The operation of the workmen's compensation act has developed a deal of malingering and actual fraud and deceit, and has created a predatory class quite as demoralizing to the community as the professional tort lawyer and the ambulance chaser. This particular type of compulsory insurance involves a field that has already been well and thoroughly exploited. Fraud and perjury in automobile cases are by no means unknown; and it may fairly be expected that the initiation of a compulsory compensation scheme would merely extend the field. Mr. Smith's opinion that "the danger of fraud appears to the writer more imaginary than real" will hardly be shared by those who have participated in loss settlements.

Likewise the element of cost, which Mr. Smith appears to consider as material only in so far as it may provoke opposition, has a deal more significance. What is a fair measure of social

justice is a matter purely of opinion. There is no definite place where one can say with any assurance, indemnities below this figure are just, indemnities above this figure are extravagant. In dealing with workmen's compensation, the legislatures have shown a vast liberality. The original scheme of an indemnity reflecting actual loss of earning power has yielded to a scheme of indemnity based on what earning power would be under highly hypothetical conditions. A minor is very commonly indemnified on the basis of an assured increase in earning power. A person temporarily employed is often indemnified with reference to the earning power of a person regularly employed: a person working part-time on the basis of full-time employment. It no longer suffices to compensate a widow during the time she requires support: she must have a dower allowance on remarriage. And the laws have been interpreted and facts found by industrial commissions with a splendid liberality. All this has made for a steadily mounting cost which in these times of depression shows ominous signs of becoming a crushing burden. That the same would be the case with the type of insurance in question may be confidently anticipated. Mr. Smith's own criticisms of the plan suggested by the committee indicate some of the points at which the cost may be vastly expanded. Whatever the cost, somebody has to pay for it: and those who might conceivably be willing to pay for a moderate measure designed to secure social justice, might as conceivably revolt against being burdened by an unwise liberality of legislatures and profuse generosity of administrative commissions. It might not prove possible to cast off the load. In that event, the levy through rates and through taxes would effect a social levelling with a vengeance, quite after the ideas of Senator Long.

At the two extremes of the scale of social evolution stand the Superman of Nietzsche and the Marxian State. Both are monstrosities, and it seems incredible that either could long endure. The device of compulsory insurance, widely accepted, seems a facile means of realizing the latter ideal. It is for this reason that even a single essay in that field may be looked upon with some suspicion. It is to be hoped we shall not have to dig out time-honored old "Locksley Hall" and re-edit its conclusion to meet our changed social outlook, say as follows:

"Till men's shoulders bend and falter 'neath the burden of the nation;
Unemployment, old age pensions, auto, workmen's compensation:
Paying for the eager many, rate and tax beyond endurance;
And the bankrupt world lies palsied 'neath compulsory insurance."

Clarence W. Hobbs.

Mathematics of Finance. H. L. Rietz, A. R. Crathorne and J. Charles Rietz. Revised Edition. Henry Holt & Company, New York, 1932. Pp. xv, 346.

The first edition of this well-known textbook appeared in 1921, and since that date has been one of the most widely used and most valued textbooks on the subject. The appearance of this revised edition is welcomed by all.

Several important changes are incorporated in the new edition. Much more elaborate tables appear at the end of the book. The range of the tables has been extended, and values of the functions for rates at smaller intervals than were formerly shown are included. This enables better results to be obtained by interpolation in the solution of many problems. Many well selected and well graded problems have been added to the long list previously included.

One of the most valuable additions to the text is the inclusion, in Chapter XII, of the sections on Valuation of Insurance Policies by the Illinois Standard Method, the New Jersey Standard Method, and the Select and Ultimate Method. Many students heretofore have had considerable difficulty in translating into mathematical form the statements of such values as are found in the insurance laws of the various states. It would, however, have been fitting if the authors had included here at least a brief reference to the revised Canadian Standard of Valuation.

There is a danger in a textbook on this subject of introducing cumbersome formulae which no student or examination candidate should be expected to memorize, as for example, formula 9 page 99, and formula 27 on page 118. In such cases as that on page 99 it is far better, in the opinion of the reviewer, to set down, in the form of an algebraic series, the present value of the

various payments to be made, and to proceed to sum the series. In most cases, after one or two steps, the result will appear in such a form that the values of the various parts of it will be obtainable directly from the tables.

The authors are to be commended for adhering to the standard notation and symbolism. Too many authors apparently feel that it is incumbent on them to introduce something new in the line of symbolism, without thought of the confusion it will cause the student when he attempts to read some other text.

L. A. H. Warren.

The Purchase of Medical Care Through Fixed Periodic Payment. Pierce Williams and Isabel C. Chamberlain. National Bureau of Economic Research, Inc., New York. Pp. xvi, 301.

Considering the relatively slight financial resources available for the pursuit of this study, it may be said that the authors have developed and classified an extraordinary volume of information on existing plans for the provision of medical service and nursing care in accordance with what may be regarded as an insurance principle. The authors were rightly puzzled at the outset by the lack of any uniform or acceptable definition of insurance in the United States; they must have been confused also on the diverse rulings of Attorney-General and of Departments of Insurance of the States as to whether existing plans of pre-payment for contingent medical care were or were not insurance. There is no hope, at the present time, of reconciling these divergences of definition, and it may be said that in the face of this and of many other practical difficulties the authors have made a most effective and comprehensive survey. Practical information is to be found on the following major topics: (1) a review of the campaign for compulsory sickness insurance in the United States; (2) provision on the "state" plan and "contract" plan of fixed pre-payment medical service in the lumber and mining industries of the Pacific Coast; (3) medical services in the metal mining industry of the Rocky Mountain States, the coal mining industry of the Rocky Mountain States and in the coal and metal mining industries of the Central States; (4) a

summary of medical service in the coal mining industry in the Appalachian and southern West Virginia coal fields; (5) railway employee, particularly hospital associations of 27 trunk-line systems; (6) fixed pre-payment medical service offered by group clinics, community health associations, community hospitals and medical benefit corporations; (7) medical and hospital benefits provided under commercial accident and health policies; (8) medical and hospital provisions maintained by mutual benefit associations in the industrial and trade union field.

In view of the recent, sudden and country-wide emergence of hospital benefit associations, it may seem desirable to urge a continuation of the Williams-Chamberlain study. The field has just been scratched. It is quite possible that if the legal, statistical, actuarial and financial foundation is not securely laid for the medical and surgical benefit arrangements now being urged, there will sooner or later be a most unfortunate financial experience, both for the patrons of these new pre-payment systems and for the hospitals themselves. Private hospitals erected during the boom period anticipated a generous patronage from the well-to-do elements of the community. Today, they are faced with a great falling off in business and hospital managers in very many sections of the country have thought of the hospital benefit association plan as one way of regularizing the income of hospitals. It was thought that the collection of prepayments from persons or families in good health against the time when they would need hospital services would set up adequate funds for maintaining the equipment and personnel needed to take care of any illnesses that might arise among the subscribing members of these hospital associations. It has seemed to this reviewer that the fees charged were grossly inadequate and that sooner or later the hospitals will find themselves wholly unable to provide the service which they think they can offer to persons in their respective communities. The authors of the volume under review did not have the financial resources to inquire into the statistical and financial experience of the institutions whose general record they present. It seems to be desirable to secure some statement of experience from the organizations which have entered this field over the past two or three years. In fact, if as many new hospital associations on the insur-

ance plan are organized over the next year as have been organized during the past six months, there may shortly arise a new field for the consulting actuary, both when these benefit plans are inaugurated and after they are well under way.

Edwin W. Kopf.

Accidental Means, Martin P. Cornelius. R. M. Chandor, 222 East Ohio Street, Indianapolis, Indiana, 1932. Pp. 159.

This is the latest and most complete attempt to determine "the precise liability of accident companies under the insuring clause of their policies". Originally prepared about twenty years ago as a practical guide in settling claims, it has been revised and enlarged from time to time and now includes the citation and discussion of many significant court decisions of the last seventy years.

The various cases are classified according to eighteen propositions each of which is intended as a guide in determining liability.

"Accidental Means" is broader in its scope than its title might imply. It is not confined merely to clauses using the phrase "accidental means" but treats of insuring clauses of all types. The authors point out that a policy insuring only against death through accidental means is more restricted in its coverage than a policy which insures against accidental death. Apparently they do not, however, place as much reliance on the efficacy of the words "accidental means" as does the Honorable William Marshall Bullitt in his paper on "Accidental Means" read before the Association of Life Insurance Counsel in 1927.

The distinction between "accidental result" and "accidental means" is more important in determining liability for death than in deciding whether to pay for disability caused by accidental injuries, but this volume covers both death and disability.

Some claim men now feel that in denying liability, the absence of accidental means is of little practical value unless accompanied by other defenses. A few accident companies have gone so far as to insure against "accidental death" rather than "death through accidental means" but most companies still adhere to the expression "accidental means" which has been used for so many years and has been interpreted by so many courts.

Although "Accidental Means" is, according to its authors, "a brief on the insuring clauses of personal accident policies", it is also helpful in determining the extent of the coverage under the accidental death benefit frequently granted with life insurance in the name of "double indemnity". This brief is a valuable textbook for the Legal and Claim Departments but it is also of interest to anyone who has occasion to draft or interpret the insuring clause of an accident policy or of the accidental death benefit in a life insurance policy.

John M. Laird.

Insuring the Essentials. Barbara Nachtrieb Armstrong. Macmillan Company, New York. Pp. xvii, 717.

This encyclopedic survey volume of Mrs. Armstrong's is not primarily intended for the professional insurance man, but it should be of absorbing interest to him nevertheless. Men of every station are inquiring anxiously into principles they have always considered first (for many a unique experience); they are questioning premises, in general wondering about things. By pressure of brute circumstance the search for security has become the concern of almost literally everybody. "Insuring the Essentials" tells how, almost everywhere but in the United States, a degree of security has been achieved for great masses of the people. As Americans we may or may not like the social philosophy involved in this achievement. We may criticize the technique of administration, shudder at the ultimate consequences. The solid present fact remains: life *is* easier now for millions of men and women the world over because social insurance institutions have made it so.

Mrs. Armstrong has here a volume that collects, collates, brings to date and comments on a truly tremendous mass of materials on minimum wage and social insurance. For the specialist it is priceless. It has, in its systematic comprehension of developments in all countries, in rich historical detail, not even a distant competitor. It is a book nobly planned and generously executed.

But entirely apart from his concern in this subject and book as a citizen of the world—and we now suspect that depression and unemployment, if not prosperity, are general phenomena—

the insurance man will find this book interesting and provocative for another reason. It is based on and speaks for a point of view that becomes increasingly important for the institution of insurance. Sociological in viewpoint and historical in approach (Mrs. Armstrong is deeply sympathetic with all social insurance) her references to insurance as the members of this society understand the term, are infrequent, incidental and even misinformed. The point of view in such matters is everything:

> Security, goes the argument as one gathers from these infrequent refernces, is to be accomplished. One way certainly is to allow private corporations to carry the risk, but this way is one of many; we are not at all certain that way is the best. After all, this question of the insurance carrier is one simply of machinery. The important thing is to secure social insurance legislation. After that the details.

Nowhere in the book is this attitude toward private insurance put quite this baldly, but Mrs. Armstrong no doubt would hasten to admit the—to her—soft impeachment. We may, moreover, not criticize her for a logical cleaving to the main issue as she sees it. We may even forgive her her casual discussions on what she calls commercial insurance. But for the *ex cathedra* asides, flung out carelessly, perhaps thoughtlessly, in full pursuit of the main idea, one may not be so charitable. For example, on page 516 in connection with British unemployment insurance she admits "an element of uncertainty . . . which is foreign to the basic principles of commercial insurance as propounded by certain theorists". It would be hard to find a sentence anywhere that betrays less knowledge of the principles of insurance as a science. The merits of the particular situation under discussion entirely apart, what is the point of charging "commercial insurance" with striving to be safe? Is any true insurance uncertain? If it is not certain, is it insurance? And finally, how must it make a hard headed life or casualty insurance executive feel to be labeled a theorist? *This* allegation one recalls has always been flung in the other direction. Notice, with her main point we are not quarreling. There is no logical or legal reason that we can think of why taxes cannot be used to guarantee security for the social insurance beneficiary. But if this works at all it is precisely the back log of taxation that makes the social insur-

ance scheme, not uncertain, but certain. Insurers, as far as certainty goes, will hesitate not a moment to underwrite *any* risk provided it is reinsured *ad infinitum* by government. Insurance in this sense is not a business but a science; no authority, public or private, violates its laws with impunity. "Commercial" carriers achieve security in many ways: by large scale business, by actuarial carefulness, by underwriting precaution, by cooperative arrangements with each other. A social insurance scheme may conceivably achieve security by expending its funds as far as they will go, and calling on the Treasury for the rest. Both results are insurance. The reference we have cited to "commercial" insurance is not only entirely mistaken. It is entirely gratuitous.

On page 354 one runs across another off-hand detracting commentary on private insurance carriers. Private carriers are declared disqualified for the health insurance risk because, *inter alia*, "commercial profit would run the expense up to a prohibitive figure". The inference is plainly in favor of government insurance. But the statistical little that students know about comparative insurance costs makes them very suspicious of any hard and fast conclusions as to the relative rank of carriers, and a comparison of carriers based on cost only is moreover incomplete. Hookstadt tried a comparison in workmen's compensation and was mercilessly castigated for his efforts. While the contract in this insurance is standard, the all-important and mutually dependent elements of cost, security and service remain non-standard and even non-standardizable. What is a true unit of loss ratio? Does the present unit take into account different levels of service and security? Are they expressive of results on similar risks? How express safety? What is the unit of service? Particularly as applied to the quoted phrase, do the figures of government carriers include all the items of cost, service and security (or lack of them) necessary to make a proper comparison with private companies?

One more item. Necessarily one who is so intent on ends, on security for example, has scant attention for the financial or underwriting problems involved. These are ignored or glanced over. The reviewer can find no mention anywhere of the recent serious increases in workmen's compensation medical costs and

not covered by premiums, nor of the ominous direction of underwriting results. There is no attempt at calculating the cost of full occupational disease coverage. With most of the proposals for liberalizing workmen's compensation this reviewer is in hearty sympathy; but—this vital question of ways and means, of machinery if you like, cannot be ignored. Someone must consider them, weigh their pros and cons; and with all respect to their hearts and heads, it cannot be left solely to social workers.

Great changes are taking place in our thinking and will continue to take place, very possibly our attitude on social insurance with the rest. We Americans are not exempt from all the rules that appear to be valid elsewhere; but we do have, in the opinion of the reviewer, so many special conditions and problems that generalization from foreign experience is extremely hazardous. Perforce Mrs. Armstrong has had to lean on foreign experience, because we have had so little of our own. At the same time, it is true that continental experience with state insurance has been much more favorable than ours and that—as in health insurance —there may be developed American alternatives not yet contemplated in any other country. These special conditions of ours, it is superfluous to say, are not an alibi for inaction, but a challenge to our ingenuity. On one side we are beset by enthusiasts, on the other by reactionaries. In one form or another, under one name or another, we will have more not less social insurance in the future. Mrs. Armstrong's book, even if we cannot use it as a manual of instructions, will provide a rich factual background for our experiments.

Clarence A. Kulp.

Business Statistics, Joseph L. Snider. Second Edition, McGraw-Hill Book Co., New York, 1932. Pp. xi, 498.

The first edition of this book was reviewed in our *Proceedings* for November, 1929 (Vol. XVI, pp. 208-9), by Mr. Ginsburgh. His emphasis was upon its purpose and use as a means of leading the student of business to develop for himself the principles and technique of interpretative criticism of statistical data relating to business. He noted especially the absence of effort to enter the province of analytical statistics.

That aim is still evident and more emphatic in this edition.

In the first edition Chapter IV dealt with "Seasonal Variation, Secular Trend and Adjusted Relatives", and Chapter XIV with "Construction of Index Numbers", each a phase of statistical analysis. In the present edition both these chapters have been eliminated, but among the appendices added is Appendix C, "Statistical Methods", which contains the same subject matter under similar treatment. Since most of the reports presented in the body were time series studies, some outline of methods used in analyzing such series is advisable, but a simple treatment of these subjects seems to have been considered all that is required. There is perhaps some question whether in the absence of some such general study as is given in Mills' "Statistical Methods" as a background, this is sufficient guidance in the underlying technique of statistical analysis to safeguard the student trained with this book against errors in method of compiling data he may endeavor to interpret. For the future executive who needs to make the interpretation and has that fundamental training this book may well form the basis for a second course.

The author has developed somewhat further his idea of the grouping of the statistical data in the light of which the business executive must make his decisions, and has rearranged the material accordingly. His thesis now is

> "The external developments which so profoundly affect individual businesses may be grouped under three main headings:
> 1. Developments in commodity markets, in particular, changes in the prices of individual commodities.
> 2. Developments in the industry with which each business is most closely identified.
> 3. General business developments."

Recognizing that conditions in all three fields are largely beyond the control of the individual executive, he points out that critical appraisal of those conditions constitutes the best preparation to meet them and has brought together his material according as it bears on one or other of these.

The book is now arranged with an Introduction, four major divisions or parts, and three appendices.

The introduction, adapted from the booklet "How to Use Current Business Statistics", issued by the United States Depart-

ment of Commerce in 1928, lays the foundation for what follows by pointing out the wealth of statistical material that is becoming available and its value.

Part I, the briefest, presents material dealing with the statistical position of a commodity and the effort to forecast its price.

Part II is concerned with the Statistical Position of an Industry, five industries being represented, Iron and Steel, Construction, Automobiles and Tires, Railroads, and Agriculture.

Part III takes up Measures of General Business Conditions, and Part IV General Business Forecasting.

In Appendix A are gathered together the numerical data for the post-war period for the more important business series referred to and frequently graphed in the articles in the text. Appendix B calls attention to the most important sources of Current Business Statistics.

Some of the material presented in the first edition has been retained, but much of it is new. It is drawn from many sources and is generally the work of statisticians prepared for executives or comments of executives on such statistical material. The selection seems to have been carefully made and is well adapted to its purpose.

In the first edition there were series of questions following the material presented on each topic designed to awaken the student's critical faculty. In this edition there is less of this. Such questions are probably not needed when the book is used as a classroom text under an able leader. When this is not possible the student working by himself will need to keep constantly in mind the idea that the studies are not presented as models for him blindly to follow, but are intended to receive his most critical scrutiny and that only by such study of them will he gain his objective.

Albert H. Mowbray.

Unemployment Insurance in Belgium. Constance A. Kiehel. Industrial Relations Counselors, Inc., New York, April, 1932. Pp. xiv, 509.

This volume is the fourth in a series on unemployment insurance, the first three volumes of which dealt, respectively, with

unemployment insurance in the United States, Great Britain and Switzerland. The Belgian study maintains the high standards as to thoroughness and appraisal set by the earlier volumes of the series, and contributes an experience which has had an important effect on modern theories and practices relating to the problems of unemployment.

The system of unemployment insurance and relief now in effect in Belgium is essentially a development of the Ghent Plan under which voluntary contributions of workers are liberally subsidized by the communal, provincial, and national governments. There are practically no contributions by employers. The direct administration of the system is in the hands of unemployment insurance societies which are for the most part identified with local trade unions. To a considerable extent, each of these societies is free to fix the terms of the plan under which it operates and, as might be expected in these circumstances, there is great variation in the rates of contributions, benefits, and other provisions of the plans in effect throughout the nation. In recent years, the national government has succeeded, by means of its subsidy, in introducing some standardization of administrative procedures but this has been confined mainly to such broad matters as segregation of funds, definition of unemployment, preliminary qualifying period, and a few other similar items. Approximately 50 per cent. of all industrial employees who are within the age limits which would enable them to qualify for employment benefits are covered by the system. The coverage of trade unionists is much higher, however, 80 per cent. of these individuals being in approved societies.

An interesting feature of the Belgian experience is the early recognition by the national government that local funds supported in large part by the contributions of workers could not withstand the financial strain involved in long continued unemployment of the cyclical or depression variety. To meet this problem, the National Emergency Fund was established in 1920 for the purpose of taking up the burden of unemployment relief at the point where the local funds leave off. Payments from this fund are somewhat similar to the "extended benefits" of the English system and the "emergency benefits" of the German system. The national government assumes 75 per cent. of the total cost

of such benefits and the remaining 25 per cent. is assessed against the societies and communes whose members and residents receive this form of assistance.

The full review and discussion of the Belgian experience covers 300 pages of text. An abbreviated presentation of this material, which is probably sufficiently comprehensive to satisfy many readers, is provided, however, by excellent chapter summaries totalling about 30 pages. A still briefer summary of the experience, together with an appraisal of the present system, is provided by the final chapter of the text. The last 200 pages of the book comprise a number of appendices which present statistical data regarding the detailed experience of various units of the system, illustrative of rules and regulations under which the societies operate, the text of Royal Orders concerning the system, and other information of a similar character.

Otto C. Richter.

Earthquake Damage and Earthquake Insurance, John Ripley Freeman. McGraw-Hill Book Company, New York, 1932. Pp. 907.

This work is likely to prove of outstanding importance to all insurance companies interested in the underwriting of earthquake damage and related events. It is a volume of about nine hundred pages, dealing with practically every point of view demanding consideration. It is the work of an outstanding authority with much experience in engineering practice and earthquake proof construction. The work contains a wealth of historical material, although in this respect much remains to be done to make the actual earthquake experience useful for insurance purposes. The earthquake division of the United States Coast and Geodetic Survey has of recent years attempted efforts in this direction which will prove of great value in course of time. Unfortunately the ascertainment of earthquake damage is often an extremely difficult matter if the data are to serve a really useful purpose.

By way of introduction it is pointed out that the treatise in question "is presented chiefly from the viewpoint of earthquake insurance, as the most hopeful means of making early progress,

rather than in a more logical order of earthquake study." The general principles of the treatise are summed up in five sections as follows:

1. The great infrequency of destructive earthquakes.
2. The remarkably small territory over which violence has been sufficient to destroy structures in any one earthquake.
3. The facts regarding successful resistance of hundreds of ordinary buildings standing in close proximity to the injured buildings.
4. The small average proportion of damage in relation to the sound value of the property, found within the areas of greatest earthquake intensity.
5. Proof that earthquake-resisting buildings, even up to 100 feet in height, can be built at remarkably small increase in cost over unsafe buildings.

These five objectives are considered in detail in twenty-two chapters, a few of which may be mentioned:

1. The Present Situation and the Scope of the Present Study.
2. Earthquake Motion and Causes of Earthquakes.
4. Frequency and Violence of Earthquakes in Various Parts of the United States and Canada.
5. The Narrow Zone of Destruction by Earthquakes.
6. Structural Lessons and Loss Ratios from the San Francisco and Charleston Earthquakes.
8. Structural Lessons and Loss Ratios from Other Important American Earthquakes.
9. Lessons about Earthquake-Resisting Buildings from the Japanese Earthquake of 1923.
12. Prediction of Time, Place of Occurrence and Damage of Future Earthquakes.
13. Some Tentative Figures on Probable Average Earthquake Loss Ratio for Various Localities and Various Types of Buildings.
14. Recent Rates of Premium for Earthquake Insurance by Stock Insurance Companies.
15. Affiliation of Earthquake Insurance with Fire Insurance.
22. Suggestions for a Program of Earthquake Research.

As regards the latter, it is obviously of the first importance that the matter be treated at greater length. The author points out twenty-two lines of study, all of which are essential towards a better practical understanding of seismological problems and consequences. The author is evidently quite familiar with most of the leading authorities on seismology. A reference is made to

the admirable bibliography of current seismological publications prepared by Mr. E. A. Hodgson, Director of the Canadian Government's Seismological Observatory at Ottawa. It would improve the value of the work for reference purposes if the author had given at least a brief list of essential publications on earthquake theory and earthquake damage.

I agree with his conclusion that "there is now extant a body of information sufficient for drawing many reliable conclusions about each of the four chief factors which measure the risks in earthquake insurance". He summarizes six factors in earthquake insurance and two fundamental principles:

(a) Spreading the risk over many communities so widely separated that only a small part of the insurance company's assets can be involved in a single disaster.

(b) Determining a rate of premium properly proportioned to cover the following factors:

1. The probable frequency of destructive earthquakes in any particular region.
2. The relative rigidity or mobility of the ground beneath the site of a particular structure.
3. The probable ratio to sound value of the damage likely to be caused on the particular building to be insured, by severe earthquake shock, having due regard to the rigidity and strength of the structure.
4. The probable limits in geographic area of the zone of serious wreckage in a single earthquake.
5. A factor of safety for the insurance company, to cover unknown elements and lack of precision in the best data now available.
6. An estimate, summing up the preceding factors according to the laws of probability and average, that will show the probable total cost, exclusive of overhead and profit, in cents per year per $100 of sound value of structure, over a long term of years and over a wide extent of territory, involved in covering the above elements of hazard.

To these elementary factors he adds three additional factors as follows:

7. A proper allowance for the cost of doing business, which actually is much larger than would be supposed by those not familiar with details of underwriting.
8. A reasonable profit for distribution to the members of the insurance company, if a stock company.

9. The building up of a reserve; recognizing that earthquake insurance, unlike well-distributed fire insurance, meets its severe loss only once in a quarter-century or half-century, with many intervening years without noteworthy loss, and that funds well into the millions of dollars must at all times be kept in readiness to meet this rare emergency.

It is difficult to summarize this extensive, as well as exhaustive work in full justice to the efforts of the author to present a complete case. The author realizes that much remains yet to be done before earthquake insurance can be said to rest upon a strictly scientific, as well as practical basis. The great difficulty lies in convincing the affected population of the earthquake risk however remote but nevertheless real, and that earthquake premiums require to be accumulated over a long period of years to be available in substantial amounts in the event of a shock of major proportions. Mr. Freeman points out that while Californian policyholders paid earthquake insurance premiums of nearly $14,000,000 for the period 1921-1930, the actual earthquake losses incurred by the insured during that time amounted to only $1,302,253, and this period included the Santa Barbara earthquake of 1925.

No one can take exception to Mr. Freeman's conclusion that the earthquake hazard should be covered under standard fire policies with a small addition to the fire insurance rate. I have made a similar recommendation in my own treatise on "Earthquake Hazards and Insurance".

The treatise by Mr. Freeman should be in the library of every insurance company including the life branches, for the latter, though interested in a slight degree, will yet find much of value in any work bearing on life hazards in their relation to seismic shocks. The work reflects the scholarship and technical qualifications of an authority of the first importance, and the book, therefore, is deserving of being read by insurance students who will find it of absorbing interest in particular phases of a problem demanding much more extended scientific and practical consideration than it has heretofore received.

Frederick L. Hoffman.

Other publications which have been received are:

Bases Techniques pour L'Assurance de Groups. Bureau Federal des Assurances (Switzerland). Berne, 1931. Pp. 259.

Financial Aftermath of War. Sir Josiah Stamp. New York: Scribners, 1932. Pp. 149.

Einfuhring in die Theorie der Feuerversicherung (Zweite Auflage). Ing N. Sergowskij. Prague: Erste Bohmische Ruckversicherungsbank, 1931. Pp. 214.

Wages and Wealth. Roy Dickinson. Princeton University Press, 1931. Pp. 158.

Economic Theory of Reinsurance. F. L. Tuma. London: H. J. Fearnley and Co., no date. Pp. 29.

Alcohol and Man. The Effects of Alcohol on Man in Health and Disease. Haven Emerson, Editor. New York: Macmillan Company, 1932. Pp. xi, 451.

Reviews of the following books appear in *Transactions* of the Actuarial Society of America, Vol. XXXIII, Part Two*:

Life Insurance. Third Edition. Joseph B. Maclean. McGraw-Hill Book Company, New York, 1932. Pp. 550.

The Way of Health Insurance. (Publications of the Committee on the Study of Dental Practice of the American Dental Association: No. 6) A. M. Simons and Nathan Sinai, University of Chicago Press, Chicago, 1932. Pp. 215.

British Experience with Unemployment Insurance; a Summary of Evidence taken by the Royal Commission on Unemployment Insurance. Part I: Economic and Historical Background of Unemployment Insurance. Monograph Seven in a Series on Social Insurance, prepared and published by the Metropolitan Life Insurance Company, New York, 1932. Pp. 41, including personnel of the Commission (9) and a list of witnesses (120).

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* Arrangements have been made with the Actuarial Society of America and the American Institute of Actuaries for exchange of book reviews. Reviews appearing in the *Transactions* or the *Record* may occasionally be reprinted in the *Proceedings* but it is believed that reference to the former publications will, in most cases, be sufficient.—BOOK REVIEW EDITOR.

Reviews of the following books appear in *The Record* of the American Institute of Actuaries, Vol. XXI, Part II:

Alcohol and Man. The Effects of Alcohol on Man in Health and Disease. Haven Emerson, Editor. New York: Macmillan Company, 1932. Pp. xi, 451.

International Congress of Mathematicians, Zurich, 1932. Summary of Proceedings.

The Bible of Life Insurance. American Conservation Company. Chicago: Recording and Statistical Corporation, 1932. Pp. 90, iv, 382.

The Way of Health Insurance. A. M. Simons and Nathan Sinai. Chicago: The University of Chicago Press, 1932. Pp. ix, 215.

National Health Insurance. G. F. McCleary, M. D. London: H. K. Lewis and Co., Ltd., 1932. Pp. X, 185.

The Purchase of Medical Care Through Fixed Periodic Payment. Pierce Williams, assisted by Isabel C. Chamberlain, New York: National Bureau of Economic Research, Inc., 1932, Pp. xvi, 308.

British Experience with Unemployment Insurance. A Summary of Evidence Taken by the Royal Commission on Unemployment Insurance. Part Two. Extent and Character of the British Unemployment Problem. Monograph Eight. Metropolitan Life Insurance Co., New York City. Pp. 50. Sept., 1932.

CURRENT NOTES

A. N. MATTHEWS, CURRENT NOTES EDITOR

Report of Ohio Unemployment Insurance Commission

The Unemployment Insurance Commission appointed by Governor White of Ohio in November, 1931, has presented Part I of its report containing its conclusions and a draft of a bill for an unemployment insurance law suitable to conditions in the state of Ohio. Part II of the report, which is to follow, will contain the detailed results and researches of the Commission. The majority report was signed by William M. Leiserson, Chairman, T. J. Donnelly, E. S. Burdell, Gordon Hayes, Amy G. Maher, S. B. Mathewson, I. M. Rubinow, A. H. Silver, and S. M. Young. Minority reports were submitted by W. F. Kirk and J. F. Lincoln.

The report is in eleven sections, the titles of some of which are as follows:

Extent of Unemployment in Ohio.
Unemployment Is Insurable.
The Cost of Unemployment Insurance.
The Cost of Unemployment Without Insurance.
If Ohio Had Acted Ten Years Ago.
A Program for Preventing Distress from Unemployment.
The Provisions of the Proposed Bill.
The Unemployment Insurance Bill (Complete Text).

The unemployment insurance bill proposes that payment of premiums into the fund shall begin on January 1, 1934, but that the law itself shall become effective immediately on its adoption. Employers are to be charged 2 per cent. of the wages paid to their insured workers and the eligible employees are to be charged 1 per cent. of earnings. After January 1, 1937, a system of merit rating is to become effective to lessen the contributions of employers in industries which furnish the most regular employment and to increase the contributions of employers whose industries furnish the most unsteady work. The employers' contributions, after this plan becomes effective, will vary between 1 per cent.

and 3½ per cent. of total wages paid to insured workers. No contributions are to be made by the state.

The benefits to totally unemployed workers will be 50 per cent. of normal weekly wages, though not in excess of $15.00 per week, and the maximum period for which benefits will be paid will be sixteen weeks in any one year. A schedule is also included in the bill varying the amounts to be paid in benefits to those partially unemployed, so that they may always receive more than the wholly unemployed and thus be stimulated to accept part-time work whenever it is available. In order to qualify for benefits, an insured employee must have been at work and paid premiums for at least twenty-six weeks during the twelve months preceding his application or for a period of forty weeks in the two preceding years. A waiting period of three weeks is provided during which no insurance benefits are to be paid. In the interest of proper discipline and as a deterrent to thoughtless quitting of jobs it is provided that the waiting period shall be six weeks for those who are discharged for just cause and for those who leave their employment without jusf cause.

Provision is made in the bill for an Unemployment Insurance Commission of three members appointed by the Governor with the advice and consent of the Senate. There is to be a system of public employment offices where the unemployed must register and their unemployment must date from the date of registration. Payment of benefits would also be made at these offices.

The compulsory insurance law will not apply to employers and employees engaged in interstate commerce, nor to farmers, farm laborers and domestic servants. The Commission also recommends that teachers and government employees, as well as non-manual workers with annual salaries of $2,000 or more, and all workers in small establishments of less than three employees should be excluded from the provisions of the act. Special provision is to be made for short-time casual laborers, whose unemployment is of such a character that it cannot be covered by a general law.

The report as a whole is very interesting, but lack of space forbids extended quotation from it. Of especial interest at this time, however, when only one state has passed an unemployment insurance act, is the Commission's method of dealing with the

argument that compulsory unemployment insurance in one state would put the employers in that state at a competitive disadvantage with employers in other states which had not adopted such insurance. In answering this objection the Commission says in part, "It would be desirable to extend compulsory insurance to cover all industries and all employees in all the states so that interstate competition might be equalized. But the American system of government makes it necessary that such matters as labor conditions and workers' insurance be governed and regulated by the separate states. The difficulties of interstate competition, however, are much exaggerated. Workmen's compensation, child labor laws, compulsory education, regulation of women's work, mining legislation, safety laws and laws limiting hours of labor were all strenuously opposed on the ground that they would handicap the states which first adopted them or which were most thorough in providing adequate protection in these respects. Nevertheless, although Ohio has more adequate and liberal legislation of this kind than most other states, it has not only suffered no handicap in competing with other states, it has actually outstripped them in this competition".

West Virginia Rate Decision

A decision handed down by the Supreme Court of Appeals of West Virginia gives casualty companies, members of the National Bureau of Casualty and Surety Underwriters, the right to use rates for automobile insurance based on their own experience. The decision upheld the decree handed down by the Circuit Court last summer when that court refused to dissolve an injunction against State Auditor Edgar C. Lawson enjoining him from revoking the licenses of 37 companies now using new automobile rates.

The controversy arose over the power of the state auditor to regulate casualty insurance rates early last spring when the new automobile schedules were put into effect. Mr. Lawson contended that he had the power to pass on rates under a law generally supposed to refer exclusively to fire companies.

In the decision handed down by Judge Woods of the Supreme Court it was said: "Rate making could not possibly have been

adopted to indemnity companies prior to the act of 1927. By virtue of the very nature of that act, the adopting statute of 1919 did not operate to confer rate making authority in the auditor over indemnity companies. As long as competition is sanctioned in any business, those engaging therein are permitted to establish their own rates. And when in the opinion of the legislature, regulation thereof becomes necessary, such businesses are by legislative enactment placed under designated regulatory bodies. The fact that fire insurance has been subject to such regulation, does not show legislative intent to regulate indemnity companies. The terms of the adopting statute are 'examination and supervision'. Those terms, as the legislative history will reveal, have heretofore had a definite meaning. The auditor, by reason thereof, still supervises indemnity companies by reason thereof. Rate making, according to the majority of the court, stands in another category".

Changes in Bank Robbery Rules and Rates

A new schedule of rules and rates for bank robbery insurance has been adopted by the National Bureau of Casualty and Surety Underwriters because of rapidly increasing losses on this line. The changes from the old schedule are four in number:

(1) A graded scale of premium rates, higher for the first $10,000 of insurance, but dropping to a lower level thereafter, has been adopted. This replaces the old flat premium charge levied on any and all amounts of insurance.

(2) Bank robbery policies hereafter will be written for a one-year period only. In the past it was possible to purchase policies covering a three-year period.

(3) The new schedule provides for four rating territories instead of three. A rating territory is a group of states which have approximately the same loss ratio.

(4) A new policy form has been adopted permitting lower rates of premium provided the assured agrees to stand the first $10,000 of loss. This so-called deductible provision never before appeared in bank robbery insurance.

The experience indicated that bank robberies were more numerous in the southern and middle western states than in other

sections of the country. Furthermore, in all territories small banks contributed the greater part of the losses. The new rules and rates were designed to recognize these aspects of the situation and to provide the greatest premium where the losses were expected to be heaviest.

In territory No. (1), for example, under the new schedule all banks now pay $2.00 for each thousand dollars of coverage up to $10,000, and $1.00 for each thousand over $10,000. In territory No. (4), which carries the highest rate, a bank in a town of less than 10,000 population pays $20.00 for each thousand up to $10,000 and $10.00 for each thousand over that figure. For towns of between 10,000 and 25,000 population in territory (4) the rate for coverage in excess of $10,000 is reduced to $8.00 per thousand, and for larger towns a further reduction to $6.00 a thousand for this excess coverage is made.

There is thus a great difference in the cost of insurance between the different territories and it is hoped that the new territorial divisions will enable the companies to develop fair rates for every section. The deductible policy provisions enable large banks to benefit by lower rates if they so desire.

Liability Insurance Manual Revised

After six months of preparation a new manual for liability insurance has been issued by the National Bureau of Casualty and Surety Underwriters. It is the first completely revised and rewritten manual to be issued since 1925, and represents more than two years of study and research on the part of company and Bureau experts under the direction of Manager Milton Acker of the Compensation and Liability Department of the Bureau. The new manual became effective August 15th.

Smaller both in page and type size, the new manual contains scores of new and revised underwriting rules and classifications, and some new rate schedules for the several lines of miscellaneous liability coverage other than automobile which come under the jurisdiction of the National Bureau. Since no reprints of the old manual have been issued for two years, it embodies all of the important changes and additions which have developed during that period.

Every effort to clarify, simplify and abbreviate the text has been made for the convenience of agents, brokers and underwriters. Repetition which occurred in the old manual does not appear in the new, and this is strikingly apparent in the general rules section. This chapter, the first in the new manual, includes such explanations for all lines of liability insurance as scope of coverages, exclusions, additional interests, length of policy periods, minimum premiums and cancellations. This information is presented in one complete chapter, and is not repeated for the various lines as it was formerly. Skillful editing and choice of headings for the subdivisions of this part of the manual make all the data more convenient to find and easier to understand than in the previous edition. Both the general rules section and the special rules section have received this treatment.

Several new classifications of various lines have been established, particularly in the Elevator and Owners', Landlords' and Tenants' sections of the manual.

In the past there have been no classifications or rates for Contractual Liability insurance. In the new manual these classifications have been established, and rates have been included for coverage in connection with railroad side track agreements involving the National Industrial Traffic League liability clause.

Among the more important changes in the Elevator section of the new manual are the clarification of the definitions of various types of elevators and the inclusion of definitions for double-decked and dual elevators. For the first time special classifications and rates have been set up for double-decked elevators operating in office and bank buildings. The list of approved elevator interlocking devices previously included in the manual has been discontinued. It was felt that this information is of particular importance to company engineers and inspectors, and a new list bringing this information up to date is being prepared for distribution in separate pamphlet form.

An important addition has been made to the Manufacturers' and Contractors' section in the establishment of a general rule which clearly defines the coverage contemplated by the payroll rates for the transportation of contractors' equipment and appliances from one location to the other.

Several important developments have been made in the Own-

ers', Landlords' and Tenants' chapter of the manual. A new type of coverage known as "Personal Liability" which was developed some time ago is described. This insurance provides an individual with coverage for his liability for his personal acts or activities resulting in bodily injuries or property damage suffered by any person or persons other than employees. It protects the assured against liability arising out of the ownership of a private residence or estate, against liability arising out of participation in sports or for various other personal acts.

However, it excludes all liability arising out of the assured's business or occupation, all liability specifically excluded under the Residence and Estate and Sports coverages, and liability with respect to any dog owned by the assured. The policy covers the liability of both husband and wife living in the same household with respect to all coverage written in the policy and also covers their liability arising out of accidents caused by their minor children, so far as such accident would be covered under the policy if caused by the husband or wife. Optional coverages under this policy include Dog Liability, Saddle Animal Liability, Liability of Minor Children, Residences, Private Garages or Stables at locations other than the principal residence, Employers' Liability or Voluntary Compensation.

The rating of the premises hazard for Automobile Garages, Repair Shop and Sales and Service Agencies will in the future be written on a payroll basis instead of on area and frontage.

There has also been an important change in the rating of Restaurant risks. The premises hazard exclusive of the food consumption hazard will be rated on an area and frontage basis. The coverage for the food consumption hazard, both on and away from the premises, will be rated on a gross receipts basis. Previously area and frontage was the basis used for the entire risk.

Occupation Hazards

Announcement has been made by the National Council on Compensation Insurance that after December 31 occupational disease hazards are to become part of the rating structure in workmen's compensation. Never before has a nation-wide rating for such diseases been attempted. There are such ratings, however, in about seven states where law or the courts have so

ordained. In twenty-eight states there is no such provision by law or court interpretation. Four states provide for a partial coverage of this character. For a number of years occupational diseases have been carefully studied by state authorities and underwriting bodies, and the underlying idea in the present movement is to work out some insurance scheme whereby damage suits brought against employers can be disposed of without litigation. Thousands of cases have been studied in order to collect statistical data for classification of disease hazards from an actuarial standpoint. This work has resulted in the definite rating of a number of the more common diseases that have developed in 134 separate occupations or classifications. A "hazard weight" is to be employed for each of these classifications in determining the cost of coverage. The frequency and severity of a particular disease to which each occupation is exposed form the basis for this weight. The hazard begins with the arbitrary 2 and runs to 100, the insurance rates increasing with the numbers. As regards rates, there is a provision that every manual classification is to include a minimum loading of one cent to provide for occupational disease cases. A loading of one cent for each hazard weight will be added to the manual rate for classifications with special occupational disease hazards, provided that where the hazard weight is less than 48 this loading shall not exceed 10 per cent. of the manual rate.

Activities of the National Council During 1932

The following account of the work of the National Council on Compensation Insurance has been taken from the report of its General Manager, William F. Roeber.

During the past year the National Council, in addition to performing its usual functions, was primarily concerned with subjects which may be classified under one or the other of the captions:

(a) Reduction in Compensation Insurance Cost, and
(b) Collection of Proper Premiums

The following individual items relating to the first general subject warrant special mention.

1. *Medical and Hospital Costs.*

For many years medical losses in workmen's compensation insurance have been increasing at an alarming rate. A Special Committee appointed to investigate this subject has made an extensive survey of the medical and hospital situation in eight typical centers. The reports thus accumulated are now being reviewed by the Committee.

2. *Standardization of Claim Forms.*

A Special Committee has completed its investigation of the field of claim forms. During the course of its study it was shown that in handling countrywide business nearly 400 different forms printed on paper of seventeen different colors or shades are now required by the various Industrial Boards and Commissions. The Committee found that all the necessary information required by the several Boards and Commissions could be concentrated on five forms. These five forms were prepared in consultation with the Forms Committee of the International Association of Industrial Accident Boards and Commissions. The Convention of the International Association held in September, 1932, adopted a resolution recognizing the principle of standardized forms and also approved, with only a few minor changes, the five forms which had been submitted by the Council. A Special Committee is now developing a program to get the several Accident Boards and Commissions to adopt these standardized forms.

3. *Occupational Disease.*

It is expected that the Occupational Disease Program developed by a Special Committee working continuously during the past year will curb the ever-increasing number and cost of occupational disease claims. This program will provide for the collection of a definite premium to cover occupational disease losses. However, the amount of additional premium collected for this purpose will in all probability be insufficient to meet these losses. From a premium standpoint the program might not be justified but when consideration is given to those features of the program which will enable the carriers to underwrite this business better and to eliminate fraudulent claims, there remains little doubt that the detailed program is entirely justified.

4. *Merit Rating.*

Important changes were made in the Merit Rating Plans during the past year. The approved changes involve, first, an increase in the eligibility requirements for schedule and experience rating and, second, the complete elimination of interstate experience rating. These changes will result in a reduced cost of doing business without in any way affecting the value of the schedule and experience rating plans to the carriers and insuring public.

In relation to the second general heading, the following items justify individual mention:

1. *Emergency Rate Revision.*

The results of the 1932 emergency rate revision reviewed in the light of approved rate increases are disappointing. Due primarily to differences of opinion among the carriers as respects important features of the program, most state supervisory officials did not give the program the same sympathetic consideration which was afforded to the 1931 emergency program. Some states approved substantial increases in rates although, in general, the increases approved were not so large as requested. In other states the entire program was disapproved.

2. *Mechanization of Industry.*

The effect of mechanization of industry has been the subject of special consideration during the year. In recognition of the increasingly adverse effect on experience resulting from the use of automobiles, specific judgment loadings have been adopted as applicable to classifications covering salesmen, real estate agents and clerical office employees. In adopting these special loadings it was recognized that the available experience does not reflect the true automobile hazard of today. A permanent procedure has been introduced by means of which the appropriate committees of the Council will give special consideration to any classifications in which it appears that mechanization is playing an important part in the trend of the experience.

3. *General Revision of Basic Manual.*

Appropriate Council Committees have undertaken a review of all classifications in the Basic Manual for the primary purpose

of increasing efficiency in underwriting and of eliminating wherever possible, without doing an injustice to industry, those classifications which are most readily susceptible to misinterpretation. This review is well under way and will probably be completed in the spring or early summer of 1933. It is interesting to note that if the recommendations of the Council Staff are followed approximately 150 classification codes will be eliminated from the Basic Manual.

Personal Notes

Edward Olifiers, formerly Consulting Actuary in Rio de Janeiro, is Actuary and Managing Director of the Previdencia do Sul in Porto Alegre, Brazil.

F. Stuart Conrod is Secretary and Actuary of the Western Empire Life Assurance Company in Winnipeg.

L. Leroy Fitz is a Consulting Actuary in Boston.

Hartwell L. Hall is now Associate Actuary with the Connecticut Insurance Department in Hartford.

Dorothy M. Jamison is Associate Actuary of the George Washington Life Insurance Company in Charleston, West Virginia.

John J. Taheny is Vice-President and Counsel of the Associated Indemnity Corporation in San Francisco.

James M. Woolery is now Assistant Actuary of the Kentucky Home Life Insurance Company in Louisville.

S. S. Huebner has been elected President of the newly formed American Association of University Teachers of Insurance. Ralph H. Blanchard has been elected Vice-President and Albert H. Mowbray has been elected to the Executive Committee of this Association.

LEGAL NOTES

BY

SAUL B. ACKERMAN

(OF THE NEW YORK BAR)

ACCIDENT

Coverage: [Dorsey *vs.* Fidelity Union Casualty Co., 52 S. W. 2777.]

An accident policy contained a provision protecting the insured against injuries resulting from the "operation, driving of, riding in or on an automobile". The insured and a companion had gone duck hunting and were about to return to the city. In the process of emptying the guns of their cartridges, the insured's companion accidently shot the insured. At the time, the insured was sitting in the automobile. Was the insured covered by the above-mentioned clause?

The court decided that the insured was entitled to recover. In order for an injury to be the result of operating or riding in an automobile, it is not necessary that the automobile be the force which sets in motion the act which causes the injury. It is sufficient if the use of the automobile reasonably exposes the driver or occupant in it to the danger of being so injured as a consequence of such use. The insured by operating the car for the purpose of transporting the men and their guns was brought into close relationship to the guns and exposed to the danger of being injured thereby while the guns were being emptied before loading them into the car. Such danger was incidental to the use of the car for the purpose for which it was then being used and the injury was one of the consequences of such use.

AUTOMOBILE

"Immediate Notice" of Loss: [Independence Indemnity Co. *vs.* Sanderson, 57 F. (2) 125.]

An automobile liability policy provided that upon the happening of an accident, the insured shall give "immediate written notice" to the company. An accident occurred and the insured notified the state automobile association through whom

the policy was obtained. This organization in turn notified the insurance company of the accident about five days later. The insurance company denied liability claiming that the expression "immediate notice" required the insured to inform the company immediately after the accident. Is the company liable?

The court held that the company was liable. The word "immediate" when relating to time is defined as follows: "Without any time intervening, without any delay". It is evident that the word was not used in its literal sense. It would generally be impossible to give notice in writing of a fact the instant it occurred. One cannot presume that the parties intended to introduce into the contract a provision that would destroy the value of the contract. As "immediate" was understood by them it allowed for a period of time between the accident and the notice more or less lengthy depending upon the circumstances. The object of the notice is a circumstance to be considered. Here the object was to permit the insurance company to gather evidence for the purposes of defending any suit against the insured. Surely the company was not prejudiced by a delay of a few days.

BURGLARY

"Forcible Entry": [Blacknall *vs.* Maryland Casualty Co., 52 S. W. (2) 288.]

A burglary policy covering a safe contained a provision to the effect that no recovery could be had unless there was a "forcible opening upon the premises of the safe . . . of which opening there remain visible marks upon the exterior of the safe". A loss occurred through the forcible opening of the safe which was proved by visible marks upon the door to the interior locked compartments of the safe. Is the company liable for the loss?

The court held that the company had to pay the loss. The provision as to "visible marks upon the exterior of the safe" is in the nature of a technical clause which is often found in burglary policies. It is obviously placed in such contracts to give the insurance company a highly technical means of escape from liability. It will, therefore, be construed most strongly against the insurance company and liberally in favor of the plain purpose of the contract which was to protect the insured against loss

through burglary or robbery by force. Since there were visible marks upon the exterior of the locked compartments in which the stolen articles were stored the loss was therefore substantially covered by the clause. Recovery cannot be defeated by the immaterial fact that marks of violence, although present upon the exterior of the inner safe where the articles were stored, were not visible upon the extreme outer surface of the safe.

Compensation

Subrogation: [Aetna Life Insurance Co. *vs.* Raper, 50 S. W. (2d) 8.]

An employee was injured through the negligence of a fellow employee. An action was commenced against the employer and the negligent fellow employee and a judgment recovered against both. The employer paid the judgment with money furnished by the negligent fellow employee. The employer in turn assigned to the fellow employee the benefits of any recovery which might be had on the insurance policy which the employer held. The employer then sued the company. Must the fellow employee be made a party to the action?

The court decided that the fellow employee must be joined as a party to the action. It is a general rule that where a third party's negligence causes a loss covered by an insurance policy, the insurance company upon paying the loss becomes subrogated by operation of law to whatever right the assured may have against the wrongdoer. If the insurance company should be compelled to pay the employer, then by virtue of its subrogation right it would seem to be entitled to the extent of its payment to a recovery over against the fellow employee. But the fellow employee could not be required to pay the judgment again and by the terms of the assignment given him by the employer, he is entitled to the benefit of any recovery from the insurance company. Thus the insurer, if it should pay the employer and then seek reimbursement from the fellow employee, would be met with the defense that the fellow employee had satisfied the judgment. This shows that the fellow employee is vitally interested in this litigation and that it cannot be determined without possible prejudice to his rights. Therefore he must be joined as a party to this action.

Liability

Accidental Injury: [Sontag *vs.* Galer, 181 N. E. 182.]

A tenant was injured when a landlord wilfully struck him over the head with a cooking utensil. The tenant recovered judgment against the landlord, but when he found the latter financially irresponsible, he tried to recover against the landlord's insurer which had issued a policy to the landlord for the benefit of third persons who suffer accidental injury through the negligence of the landlord. Was the company liable?

The important question to decide is whether the policy covered an injury caused by the deliberate act of the assured. "Accidental means" is used in the contract of insurance in its common significance. It would mean happening unexpectedly without deliberation or design. The word "accident" has been defined as "an event without the concurrence of the will of the person by whose agency it was caused". An injury cannot be deemed accidentally sustained because it may be an accident from the injured party's viewpoint. It is the state of mind of the person who caused the injury which determines whether an injury was accidental. Here the state of mind of the landlord was to deliberately and wilfully injure the tenant; therefore no recovery could be had on the policy.

Surety

Agent's Authority: [Barnet Co. *vs.* Globe Indemnity Co., 159 A. 708.]

A surety bond in the sum of $20,000 was issued by an agent to a contractor. The bond was signed by the agent as "Attorney in Fact" of the company in whose name the bond was issued. No power of attorney was annexed to the bond but it was proven that the agent had a power of attorney to issue bonds of this nature to the extent of $15,000. Was the company liable to anyone who has an interest in the contractor's performance?

It is a recognized rule of law that one may rely upon the apparent authority of an agent. Further, one who entrusts authority to another is bound by all the acts of the agent within the scope of his apparent authority and cannot save himself from

the consequences thereof upon the ground that no authority was given to do the particular act.

It is an equally well settled rule of law that if a third person dealing with a general agent has actual or constructive notice of a limitation upon the agent's authority, he is put upon inquiry as to the scope of the authority. Those dealing with the agent of the company here were bound as a matter of law to notice that the purported bond was signed by him as "Attorney in Fact", and a reading of the contract and the signature with the words "Attorney in Fact" following it, was sufficient to put those dealing with the agent and all parties connected with the transaction upon notice that they were dealing with a special agent. Therefore they were under a duty to discover his actual authority and were no longer justified in acting upon his apparent authority.

OBITUARY

ROY A. WHEELER

1889 - 1932

The untimely death of Roy A. Wheeler, a Vice-President of this Society, removes one of its most interested and active members. His end came on August 26, after a short illness from blood-poisoning following a small injury to one of his fingers.

He was born in Springfield, Massachusetts, on December 22, 1889, and at the time of his death was in his 43rd year in the vigor and maturity of his powers. These were of a high order as a birthright and were enhanced and trained by a liberal education in school and college, where he was an apt and brilliant pupil. At Harvard College he received in his junior year membership in Phi Beta Kappa and a year later, 1912, the degree of A. B. with "Magna cum laude" in mathematics.

He returned to Springfield after graduation and joined the actuarial force of the Massachusetts Mutual Life Insurance Company, where he remained until 1917. He then accepted the position of Assistant Actuary in the Massachusetts Insurance Department, where he remained until 1920, meanwhile having a leave of absence continuing for six months for service in the artillery department of the United States Army.

Upon his discharge from this service he returned to the Massachusetts Insurance Department and was made its Actuary. He remained in this position, however, only a short time, for in 1920 he was elected Associate Actuary of the Liberty Mutual Insurance Company. This opened up for him a notable business career. He was made Actuary of the company in 1922 and in 1924 the office of Vice-President of the company was added to his official duties.

A part of his duty was to meet at conferences on important insurance questions with representatives of other insurance companies and he came to be a most influential member of those gatherings for discussion, deliberation and action. He was an active member of committees of the National Council on Compensation Insurance, and of other Workmen's Compensation and Automobile Rating Bureaus having to do with rating matters.

He had long been a representative of mutual casualty insurance in matters which affected the interest of the mutual insurance companies, but he had come to be recognized as a powerful influence in the promotion of sound insurance practices among all classes of insurance companies.

Mr. Wheeler became an Associate member of this Society by examination in 1921 and in 1926 was elected a Fellow. He was a member of the Committee on Compensation and Liability Loss Reserves from its inception in 1924 until its discharge in 1931 and in recent years he was also a member of the Committee on Remarriage Table and the Educational Committee. For three years prior to becoming Vice-President he was a member of the Council. He contributed many written discussions and several papers to the *Proceedings* and was a frequent participant in the informal discussions.

His death removes from the field of casualty insurance one whose talents earned for him the position of leadership which was accorded to him, and from the circle in which he moved a genial friend it was a pleasure to greet.

CASUALTY ACTUARIAL SOCIETY

NOVEMBER 18, 1932

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ABSTRACT FROM THE MINUTES OF THE NINETEENTH ANNUAL MEETING

NOVEMBER 18, 1932

The nineteenth annual (thirty-ninth regular) meeting of the Casualty Actuarial Society was held at the Hotel Pennsylvania, New York, on Friday, November 18, 1932.

President Tarbell called the meeting to order at 9:40 A. M. The roll was called showing the following thirty-nine Fellows and seventeen Associates present:

FELLOWS

AINLEY	GOULD	MICHELBACHER
AULT	GRAHAM, C. M.	MOORE, G. D.
BARBER	GREENE	ORR
BLANCHARD	HOBBS	PERRYMAN
BROWN, F. S.	HULL	RICHARDSON, FRED'K
CAMERON	JONES, F. ROBERTSON	SENIOR
CARLSON	KELTON	SILVERMAN
COMSTOCK	LESLIE	SKELDING
CORCORAN	LINDER	SMICK
CRANE	MARSHALL	SMITH, C. G.
DORWEILER	MATTHEWS	TARBELL
FONDILLER	MAYCRINK	VALERIUS
GODDARD	MCMANUS	YOUNG, C. N.

ASSOCIATES

ARCHIBALD	FURNIVALL	OBERHAUS
BUFFLER	GETMAN	PIPER, K. B.
CONSTABLE	GIBSON	SINNOTT
EDWARDS	HIPP	SMITH, A. G.
FITZGERALD	JONES, H. L.	ST. JOHN
	KORMES	UHL

Mr. Tarbell read his presidential address.

The minutes of the meeting held May 20, 1932, 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. In respect of the 1932 examinations, these resulted as follows:

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

JOHN L. BARTER
CHARLES H. BURHANS
FREELAND R. CAMERON
E. ALFRED DAVIES
J. J. SMICK

The following candidates had passed the necessary examinations and had been enrolled as Associates:

E. A. COOK
JOSEPH B. CRIMMINS
RICHARD A. GETMAN
HOWARD A. LEWIS
J. A. ROBERTS
JOHN B. ST. JOHN
M. S. WEINSTEIN

The following candidates had been successful in completing examinations for Associates but have not yet been enrolled by reason of the terms of Examination Rule 4:

GEORGE C. CAMPBELL
LESLIE A. CANNON
G. ROBERT MULLANS
MAURICE WOLFMAN

Diplomas were then presented by the President to John L. Barter, Charles H. Burhans, Freeland R. Cameron, E. Alfred Davies and J. J. Smick, who had been admitted as Fellows under the 1932 examinations.

The President announced the death since the last meeting of the Society of Roy A. Wheeler, Fellow, and the memorial notice appearing in this Number was thereupon read.

The Council selected S. S. Huebner, Professor of Insurance, University of Pennsylvania, Philadelphia, Pa., and recommended that he be admitted as a Fellow without examination under the terms of Article III of the Constitution. After balloting this nominee was declared a duly elected Fellow.

The reports of the Secretary-Treasurer (Richard Fondiller) and of the Librarian (William Breiby) were read and accepted. The annual report of finances follows:

CASUALTY ACTUARIAL SOCIETY

ANNUAL REPORT OF FINANCES

Cash receipts and disbursements from October 1, 1931 to September 30, 1932

INCOME

On deposit on October 1, 1931 in Marine Midland Trust Company		$ 744.78
Members' Dues	$2,645.00	
Sale of Proceedings	1,395.87	
Examination Fees	395.00	
Luncheons	142.50	
Interest and Miscellaneous	51.82	
Michelbacher Fund	162.94	$4,793.13
Total		$5,537.91

DISBURSEMENTS

Printing and Stationery	$3,456.98
Postage, Telegrams and Express	126.62
Stenographic Services	360.00
Library Fund	4.14
Luncheons	164.00
Examination Expense	250.75
Miscellaneous	148.75
Total	$4,511.24
On deposit on September 30, 1932 in Marine Midland Trust Company	$1,026.67
Total	$5,537.91

Income	$4,793.13	
Disbursements	4,511.24	
Excess Income over Disbursements	281.89	
1931 Bank Balance	744.78	
1932 Bank Balance	$1,026.67	

ASSETS

Cash in Bank	$1,026.67	
Investments	1,000.00	
Total	$2,026.67	

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

The report of the Educational Committee (E. W. Kopf, Chairman) was read and accepted.

The Examination Committee (Harold J. Ginsburgh, Chairman) submitted a report of which the following is a summary:

1932 EXAMINATIONS—SUCCESSFUL CANDIDATES

The following is a list of those who passed the examinations held by the Society on May 25 and 26, 1932:

ASSOCIATESHIP—PART I

George C. Campbell	Gordon R. Rosecrans
Leslie A. Cannon	M. S. Weinstein
Howard A. Lewis	Harry V. Williams, Jr.
George R. Mullans	Maurice Wolfman

R. Graham Wood

ASSOCIATESHIP—PART II

George C. Campbell	George R. Mullans
Leslie A. Cannon	Raymond F. Prinz
Edward F. Carroll, Jr.	M. S. Weinstein
Howard A. Lewis	Maurice Wolfman

FELLOWSHIP—PART I

Charles H. Burhans	Richard Getman
F. R. Cameron	J. A. Roberts
E. A. Cook	Robert V. Sinnott
L. Leroy Fitz	John B. St. John

FELLOWSHIP—PART II

John L. Barter	F. R. Cameron
Charles H. Burhans	E. Alfred Davies

J. J. Smick

The report of the Committee on Remarriage Table (W. F. Roeber, Chairman) was read and accepted.

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

President	Paul Dorweiler
Vice-President	William F. Roeber
Vice-President	Leon S. Senior
Secretary-Treasurer	Richard Fondiller
Editor	Robert J. McManus
Librarian	William Breiby

Members of Council (Terms expire in 1935):

WILLIAM M. CORCORAN HAROLD J. GINSBURGH
CLARENCE W. HOBBS

The proposed amendment to the last sentence of Article IV of the Constitution was put to a vote and the amendment was lost.

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

Recess was taken for lunch at the Hotel until 2:15 P. M.

The discussion of the papers read at the last meeting of the Society was then concluded.

The new papers printed in this Number were read or presented.

The following topics for which speakers had been selected were then discussed:

I. Comparison of the practicability and desirability of the present payroll basis for compensation premiums with other possible premium bases such as: per capita, work-hours, units of production, value of product, etc.

II. Shall compensation for automobile personal injury accidents follow the basic principles of workmen's compensation laws of requiring no proof of negligence and compulsory acceptance of fixed schedules of indemnity for injuries?

Upon motion the meeting adjourned at 5:00 P. M.

VOL. XIX, PART II NO. 40

PROCEEDINGS

MAY 26, 1933

REFLECTIONS ON SOME FUNDAMENTALS OF CASUALTY INSURANCE

PRESIDENTIAL ADDRESS, PAUL DORWEILER

The purpose of these remarks is to direct consideration to some of the fundamentals underlying casualty insurance. Recently there has been a tendency to reconsider and revalue the basic concepts in science generally, recognizing them as of highest importance. A general reconsideration of the basic concepts of casualty insurance by even a few members of this Society would result in a more exact comprehension of the problems of casualty insurance and a better understanding of the relation of casualty insurance to the economic world, particularly to the other forms of insurance—fire and marine, and life.

FUNCTION OF INSURANCE

In the story of man, the primeval act of storing food during days of plenty against days of adversity marks a new epoch in his march of progress. This same concern to overcome adversity, through planning, manifests itself repeatedly in later periods. In the age of capitalism, man's desire to overcome adversity in the form of loss of his property through fortuitous events, either directly as by fire, or indirectly as by seizure to satisfy claims against the owner on account of events involving his responsibility, gave rise to the institution of insurance to protect the individual against the actual or potential loss of his property, by distributing that loss over society as a whole. When our eco-

nomic development reached the stage where injuries of any kind were valued in terms of money, insurance came to man's aid against loss from nearly all injuries and all forms of adversity.

The benefits that may be credited to the institution of insurance extend beyond the replacement of loss to individuals. Insurance, from its compensatory and guaranteeing quality, tends to increase the stability of the whole economic system. It is an important factor in banishing the fear of untoward events and thus brings about contentment and peace of mind. Insurance, too, is a dominant force in conservation efforts directed against the enormous loss resulting from events largely preventable by initiating extensive studies of the causes of accidents and developing measures for their prevention.

Scope of Casualty Insurance

Casualty insurance is the most recent of the main divisions of insurance to receive official recognition. Its limits are as yet somewhat indefinite. It has been construed generally to include any insurance that does not fall into the older divisions, fire and marine, and life. As constituted at present it is aptly described by a classification found in many lines of casualty insurance and designated by the abbreviation N.O.C.—not otherwise classified. From its genesis it would be expected that under casualty insurance there is a greater diversity in the components involved than in the other divisions. This diversity brings into relief the basic problems common to many lines which might otherwise pass unnoticed. The very vastness and almost endless variety of the casualty insurance field has contributed much to make it interesting and stimulating.

Instruments of the Casualty Insurance Actuary

To a far greater extent than is generally realized, the progress made in any joint endeavor depends on the instruments used in the interchange of information. Insurance, like all other institutions, is indebted to many past ages for the development of oral and written language for the expression of general ideas, and for the development of mathematics, statistics, maps, and charts, for the expression of relationships of quantity, of position and

order, and of form. It is obvious that, if we had to resort to primitive unwritten or pictorial language to convey our ideas, the stage of development in which insurance was evolved would never have been reached. Similarly, if we did not have arabic numerals to use in our calculations, or algebraic functions to express tersely quantitative relationships, or graphs, charts and maps to show relationships of relative quantity and order, or form, it would have been impossible to attain the present state.

It is not so obvious how the improvements and adaptations of these instruments of language and mathematics are directly related to the further progress of casualty insurance. We now frequently use cumbersome phrases to describe concepts for which we should have either a simple or compound word or a short phrase. We have in common usage in insurance many simple terms which in their technical meaning are wholly at variance with their general or etymological meaning. It might be advantageous to adopt the method of some of the natural sciences and resort to the older languages to develop new terms for our use rather than impose new technical meanings on words or phrases already burdened with several meanings. There are many terms used so frequently in calculations that we might well profit by the practice of life insurance and bring standardized symbols into more general usage.

It is recognized that many of these terms are not strictly actuarial or statistical, that they originate outside of the actuarial domain of casualty insurance, and that they already have acquired considerable prestige through precedent when they come to us. Many such terms we should probably be obliged to accept or else bring about even greater diversity in meanings than exists now. The development and the general usage of standard terms and symbols would facilitate casualty actuarial and statistical work. In the past this Society has had a committee (Committee on Notation—1921) appointed for the development and standardization of terms and symbols. I believe that this Committee should have been maintained in existence. There is need for such a committee now and throughout the formative period of casualty insurance. Perhaps too much was expected during its short existence, for language and symbols are the products of centuries of development in human thinking.

Fundamental Concepts

What are the elements of the subject matter on which the casualty insurance actuary and statistician work? For lack of a better system, I have classified these rather arbitrarily on a previous occasion into "critical conditions", "injurable objects", and "evaluation standards". These might be considered the agencies which, operating for a given time at a given place, produce the material—experience—which the actuary uses.

"Critical conditions" is a term used to convey the idea sometimes partially covered by the word *hazard* in the sense that we speak of a physical hazard on the golf course. However, this term is much broader for it covers not only objective but subjective things. It covers the presence or absence of things, traits, qualities, or whatever tends to produce the events insured against which shall be called *accidents,* or to increase the frequency or severity of these. The critical condition may be external to or quite within the injurable object, or it may even be inherent to some extent in the evaluation standard. It may consist in the presence of something under certain environments and in the absence of that something under other environments. It may, in brief, be anything which affects the accident cost.

"Injurable objects" is used to designate a wide range of objects that are subject to injuries when coming into contact or existing along with critical conditions. These objects may be human beings, animals, inanimate objects, and non-material things. When critical conditions and injurable objects exist together, accidents and injuries may result. These injuries are of great variety and it is necessary to bring them to some common basis. The selected basis is the usual commercial monetary basis. Injuries, when so expressed in monetary units, are known as losses. In translating injuries to the common basis, a new variable is introduced in the standard selected for evaluating the injuries. This new variable has been called "evaluation standard". Two injuries identical in nature usually would be considered of different values in money if adjusted in accordance with different standards. The evaluation standard may be very definite, giving specific amounts for various injuries as in life insurance, accident insurance, or workmen's compensation insur-

ance, or it may be somewhat indefinite, as in settlements based on private agreements or jury verdicts in courts.

Time and Place

Another component that enters into the production of injuries is time, or the period during which the injurable object and critical conditions exist together. Time, *per se,* has no causal effect on losses. Such variations in accident incidence by time as do occur, e.g. variations within the year and the day, are not causal relations but rather the results of causal factors which bring about these variations. Seasons, with their accompanying climatic changes causing tornadoes, floods, fogs, hail, droughts, blizzards, and extremes in heat and cold, are accompanied by variations of losses caused by these agencies which are of different intensities during the period. During the week there is a variation in the habits of the people which produces variations in accidents, not because of the relation to time, but because of the relation to the habits which vary during the time. Even within the day there is a variation because of such factors as light and darkness, and congestion during rush hours, which are causal factors related to the time of the day.

There are other ways in which time enters indirectly into the casualty insurance problems. This dynamic world is in an eternal state of change. There are changes extending over long terms presumably tending in a more or less fixed direction. There are also in nature relatively short term, possibly periodic, changes. These changes in the natural world are combined with business cycles of various durations and all are reflected in insurance loss costs. But here again time has no causal relationship. Such relationships with time as may exist are due to the presence of causal factors which vary with time.

Place has a somewhat different relation to accidents than time, for while it is somewhat independent of losses it is not as completely so. There are certain factors which may be considered inherent in place, as altitude above sea level and latitude, which are inseparably associated with climatic factors that may be considered to have a causal relation to some accidents. The surface contour of the place, which is not removable, also has a relation to some types of accidents. There are, however, other factors

often associated with place, with respect to which the variation is in no sense causal but merely coincidental. The variation in losses by place may be due to such agencies as police and traffic regulation, sanitary conditions, schools, racial stock, religious customs, industry, and civic consciousness. These factors or agencies differ from the former in that they may be controlled or removed.

Problem of Casualty Insurance

The coming together of critical conditions and injurable objects results in accidents of varying frequency and severity, which are measured in money by different evaluation standards, and for which individuals and legal entities have different degrees of responsibility. The problem before casualty insurance men is to break up this heterogeneous mass somehow so as to bring about approximate homogeneity within the subdivisions, and then to determine proper rates. The agencies available for classifying and systematizing are lines of insurance, classifications, geographical territories, and terms of duration. There is a weakness inherent in the use of these agencies, since an attempt is made to recognize the results produced by factors which change only gradually by a system of divisions which have sharp demarcations.

If this problem had to be solved in its entirety by an immediate analytic method it would appear well nigh hopeless. But fortunately the solution lies in a process of synthesis rather than analysis. As our economic progress unfolds, new critical conditions, new injurable objects, new responsibilities for injuries, and new evaluation standards appear. When any of these factors or a combination of them attain sufficient magnitude, a new line of insurance is established to cover those particular items. By the slow process of addition of new lines, the field is being gradually extended in all directions. The problem in casualty insurance is the same as in other insurance fields except that different combinations of critical conditions, injurable objects, evaluation standards, and responsibilities are concerned.

Coverage

Coverage is a term used herein to denote the form of insurance extended to the assured. There are certain hazards and perils that are like by-products of our economic and social development

and there are others of natural origin. It is desirable to transfer these unknown hazards to a carrier for a cost which is either definitely known or known within a limited range. The devising of coverages to meet the various hazards as they appear in our economic and social organization is primarily a problem for the underwriter. He is responsible to society for having offered it all the necessary coverages in their proper relation to each other. After the coverage has been outlined, it is the actuary's function to evaluate and systematize the hazards, to help in the classification of them, and to develop the proper rates.

Line of Insurance

Lines of insurance are closely related to coverages. The history of casualty insurance reveals that, as new hazards arose in our civilization and there was need of new or enlarged coverages, new lines of insurance were established. There is no general principle on which the formation of a new line of insurance can be said to be definitely based. It is difficult to define a line of insurance, or to establish criteria for distinguishing existing lines or forming new lines. There are, however, some broad differences which may be used as: source of injury, kind of injurable object, method of evaluating losses, and location and degree of responsibility.

Lines of insurance have been formed according to source of injuries, as whether injuries arose from industry, from automobiles, or from teams. The kind of injurable object, whether a human being or some form of property, has been used as a basis for establishing a line. The method of evaluating injuries in money has served as a basis for forming lines of insurance; compensation, employers' liability, and workmen's collective may be differentiated on this basis. The responsibility or the degree of responsibility for injuries has also been used as a basis; lines of insurance covering industrial injuries to employees and to the public are largely based on this difference. Generally, a line of insurance is not based on any one of these distinctions. Rather, each one of these enters in some degree into its formation.

Within a line there is presumably but little variation in the kind of injurable object, the method of evaluating losses, or the location of responsibility. The variations within a line arise

primarily from the critical conditions involved and from the type of injuries. These statements are only true in a general way and cannot be maintained for each specific line.

Classifications

After a new line of insurance has been established, there is still much diversity among the risks covered and it is necessary to make further divisions to bring about approximate homogeneity. The critical conditions involved are the primary basis for this further division. Usually these critical conditions are not of such a nature that the risks may be sorted according to some common trait into one or the other of two categories. Rather, the individual risks possess a common trait in various degrees according to which they may be arrayed from one extreme to the other. Somewhat arbitrary divisions must be made in such arrays to reduce the range of variation within a group so that each new group may be approximately represented by a single index. There are other divisions than those based on variations in the critical conditions. Such other divisions may be based on the exposure mediums selected in order to bring greater responsiveness between losses and exposure. They may also be for convenience in practical application, for the classifications of insurance must be such as to fit in with the industrial and social organization.

The erecting of proper classifications for a given line requires a range of knowledge wider than may be expected of the actuary or any other specialist in casualty insurance work. The actuary, safety engineer, and underwriter must combine their efforts to evaluate properly the underlying conditions, and even then they must frequently call on technical experts in the particular industry or field in which they are working. The object of classifications is to bring all risks within the class into approximate homogeneity.

Territories

Geographical districts or territories, in addition to serving as a convenience in administration, are used as a means of bringing about greater homogeneity within the ultimate divisions. These territorial divisions are also known as premium states. Generally it is not practical to erect territorial divisions differing from

existing states and their political subdivisions: counties, cities, towns and townships. If the limits of the existing divisions are not observed, it is necessary to obtain new maps and reference records for identifying locations. There are agencies like police and traffic regulations, school systems, and court procedure that may be considered co-terminous with existing political subdivisions. Any variation in losses associated with these may be roughly recognized by territorial divisions along existing lines. There are other agencies affecting losses, like surface contours and meteorological conditions, that cannot be associated with existing territorial divisions.

Terms of Duration

Variations with time may be offset in part by regulating the term or the duration for which the coverage is extended. Daily, weekly, seasonal, or short term variations, may be brought to an average basis by extending coverage for a term sufficiently long to embrace one or more cycles of these changes. For longer variations, whether these are consistently in one direction or whether they are cyclical, other recourses are necessary. Variations consisting of constant trends may be recognized by projection factors. Long term cycles also may be recognized, if sufficiently understood, by projecting to the particular phase of the cycle, or by striking an average covering the cycle as a whole.

Exposure Medium

An appropriate exposure medium is fundamental to a practical system for collecting proper premiums. Too little attention has been directed to this phase of the casualty actuarial field in the past. The exposure basis affects not only the experience and practical operation of an insurance system but it also has social repercussions that are as yet little known and need extended attention. The selection of the exposure medium may have a marked effect in procuring the necessary data for accident prevention or other information desirable for sociological studies. The proper measure of exposure is one of the most fundamental problems confronting the casualty actuary. The total premium volume, the premium per class, and the premium per risk are strongly affected by the exposure medium selected. The ques-

tion of exposure medium also has its practical aspect. There may be and often is a conflict between the exposure medium which will produce a premium volume most responsive to the losses and one which will readily adapt itself to a system practical in operation.

The relative standing of individual risks within a classification, when ranked according to merit, may depend at least in part on the exposure medium selected, rather than inherent meritorious qualities like low accident frequency or severity. Such anomalies may appear in an array of risks in a given classification according to loss ratios where these have been raised or depressed by some peculiar combination of the exposure medium and the evaluation standard. The individual risks, when arrayed by loss ratios under different exposure media, might show marked variations in order. The underwriter's judgment of a particular risk cannot be separated entirely from the underlying exposure basis. The safety engineer, also, must take into consideration the effect of the exposure basis when studying experience from his viewpoint.

Adequacy of Data Criteria

A fundamental question confronting the casualty actuary in rate making consists in the credence to be given to the indications of the data. This question is common in some degree to all statistical procedure. It is greatly emphasized in casualty insurance because of its recent origin, the multiplicity of lines, and the scarcity of data. Many lines of casualty insurance are, by their nature, closely connected with and very responsive to industrial and commercial conditions, and hence may be expected to possess a fluctuating character. This close relationship of many lines of casualty insurance with economic conditions, with their seasonal and cyclic variations, brings up the question of what weight, if any, should be given to an experience developed over a longer period as compared with an equal magnitude of experience developed over a shorter period.

It remains a delicate mathematical problem to devise sound practical rules for weighting data which recognize volume, recency, and the variation of the component elements. This problem, while not peculiar to casualty insurance, certainly

assumes far greater importance here because of the multiplicity of lines and also because of the heterogeneity within lines.

The Rate Problem

The crux in casualty actuarial work is the rate problem. The division of insurance into lines, and into classifications within lines, is necessary to a proper rating system. It is made as much for this purpose as for the practical operation of insurance. The solution of the rate problem demands proper rates for the classification and for the individual risk.

The ideal in the classification rates has been attained when the rates for all classifications combined reproduce the permissible loss ratio and when the rates make it *a priori* equally probable that every class* will reproduce the permissible loss ratio. Viewing the classifications solely from the standpoint of loss ratios, this means that all classifications should be equally desirable. The ideal in rates for individual risks has been attained when the classification rates, together with any merit rating, make it *a priori* equally probable that each risk* will reproduce the permissible loss ratio. Judging solely from the loss ratio viewpoint, this means that all risks should be equally desirable. Another important qualification demanded of rates is that they be reasonably consistent from year to year both for the individual classification and the individual risk. These two ideals of reasonable consistency in consecutive rates and rates that make individual classifications and individual risks equally desirable are somewhat incompatible. The proper relative weight of each should receive further serious consideration. Should such relative weights be uniform for all classifications and risks, should they be dependent on the size, or should they depend on some other quality?

A practical test for ascertaining whether the ideal of *a priori* equally probable reproduction of permissible loss ratios has been reached consists in the underwriter's judgment ranking of classifications and risks. If the underwriter, considering the loss phase

* This implies that the classifications and the risks have equal credibility. If this condition is not fulfilled allowance must be made for variations in credibility. The statement does hold for two classifications or two risks of equal credibility.

only, prefers one class over another, this is evidence that in his judgment the proper classification rates have not been attained. The rate for his preferred classification ranks relatively higher than the rate for the classification considered less favorably. Similarly, if the underwriter prefers one risk over another in the same classification, again considering the loss phase only, this is evidence that in his opinion the correct risk rates have not been attained. The rate for the preferred risk is relatively higher in his judgment than the rate for other risks.

If it were possible for the rate maker to attain this ideal in determining all classification rates and all risk rates so as to make it *a priori* equally probable that each will develop the permissible loss ratio, then the problem of underwriting would diminish to the mere mechanical routine work of issuing policies, for every risk would be accepted provided the rate level were adequate; otherwise all would be rejected. There are, however, certain factors like morale in classifications and risks, for which no adequate method of measuring has been formulated and incorporated into the rating structure. There are various factors bringing about changes in conditions between the period represented by the experience and the period for which the new rates are to be effective, which affect individual classifications and individual risks differently. The only practical method of measuring them is the underwriter's judgment. All the preceding statements pertain to the loss phase only.

The principle underlying these criteria for passing judgment on the correctness of individual risk rates may be used for the empirical determination of the proper swing of an experience rating plan in which credibility varies with the size of the risk. If the risks of an experience rated line of insurance are sorted by size groups into groups based on the effective experience modification, there should be under adequate exposure equal loss ratios produced by the credit risks and debit risks when viewed as a whole or in size groups having adequate volume. The credibility or "swing" of the plan used would be too small, if the credit risks generally produce lower loss ratios than the debit risks, and too large if the credit risks produce higher loss ratios than the debit risks.

The rate problem may be approached in two ways more or less combined in practice. One is to view the losses of a classification

in the aggregate and to set up a rate on this aggregate giving little attention to details. This is the simpler way, for it reduces to a minimum the question of adequacy of data and the practical detail. The other method is to direct attention to the component parts of the rate. It builds up a rate by addition of charges. It has advantages in the by-products that may come from the close study of the component parts; for example, information of value in prevention work. The latter method gives critical conditions, injurable objects, and evaluation standards individual attention and attempts to determine the importance of each item, whereas the first method has little interest in the individual effects but considers only the result as a whole. It may develop that in the formative period of rate making for a specific line the first method will prevail when the experience is first available, due to the scarcity of experience and the lack of information with respect to individual factors. Later, as more information becomes available, it may be found desirable to give more attention to the individual parts. At the beginning, when judgment necessarily enters to a large degree, the first method appeals more strongly.

Casualty Insurance Actuarial Science?

Recently a scientist of more than national eminence expressed doubt as to the applicability of the term "science" to economics and other social sciences on the ground that these do not possess a sufficiently large body of facts and doctrine universally accepted. From the viewpoint of this more rigid definition we can hardly claim at present to have a casualty actuarial science. We do, however, have a constantly expanding body of information which is shaping itself into definite form. May I submit for your consideration certain suggestions that may aid us in perfecting a casualty insurance technique, and that may help in bringing about a systematization of the underlying principles to secure the general acceptance and permanency necessary to establish a casualty actuarial science?

We should establish a nomenclature that is brief, direct and unambiguous. The meaning of the terms should be in reasonable accord with their general usage. It may be necessary that new words, for example, compounded words or words derived

from other languages, be used to express ideas which might otherwise be expressed in ambiguous terms or extended phrases.

A symbolism should be developed along with the nomenclature to abbreviate expressions for processes and ideas, and to reduce them to simple forms of unique meaning. There should be no hesitancy to resort to mathematical formulas, statistical theory, graphical representations, or pictorial exhibits, when these add to clarity.

The critical conditions should be subjected to a searching analysis when viewed *en masse,* when viewed in groups pertaining to a selected line of insurance, and when viewed as individual items. The object should be to systematize them so as to make them subject to statistical treatment. At the present time these critical conditions seem the most chaotic portion of the casualty field. They challenge our attention most, not only because of our desire to bring order out of chaos, but also because the erection of proper classifications within the line of insurance and effective work in conservation demand definite knowledge of these conditions.

A similar consideration should be given to the injurable objects and to the evaluation standards, though these do not present so intricate nor so important problems as the critical conditions. A knowledge of the relationship of the same injuries evaluated under different standards is necessary for developing rates for all forms of deductible average and excess insurance.

The whole insurance field should be surveyed at times with the idea of developing a better understanding of the relationships and a better schematic representation of these relationships in order to comprehend the position of casualty insurance, and its relations to, its limitations by, and its dependence on, the other divisions of insurance.

Casualty insurance, because of its very heterogeneity, permits a greater variation in the solution of its problems. We should make a comparative study of the methods of dealing with these problems used by our contemporaries in other lands in order that we may have available to us the results of their efforts. It would interest and benefit us to know just how lines of insurance, classifications, coverages, and exposure systems are being treated there.

I have attempted primarily to bring before you and to direct your attention to some of the fundamental concepts and prin-

ciples underlying all casualty insurance. A greater concentration on fundamentals would lead, I believe, to more generalized concepts under which the inter-relationships of the many lines would become more apparent. The Society should have in view these two objectives: to consolidate and organize the fund of information already acquired, and to continue the search for new information. The casualty insurance problems of first order demanding attention are many and various. Members filled with the spirit of investigation and adventure could serve the Society and casualty insurance by selecting a problem in accordance with some coordinated plan and giving it concentrated study. These problems are so varied that they could be selected to give ample opportunity for special bents or talents that members have in mathematics, statistics, accounting, economics, chemistry, engineering, or law. Should members undertake such investigations, there would result a distinct advance in building up a casualty insurance actuarial science.

IS THE RATE MAKING PLAN THE CHIEF TROUBLE WITH COMPENSATION INSURANCE?

BY

WINFIELD W. GREENE

It is hard to realize that compensation insurance, now regarded as the "black sheep" of the casualty family, was once considered an attractive and promising class of business. Nevertheless, a satisfactory underwriting profit accrued from the compensation business in its first years before employees generally became claim conscious. True, this initial prosperity soon waned, and black figures, changing to pink, then to red, prompted the substantial rate increases of 1917; but America entered the war, employment and wage rates were simultaneously augmented, and overnight, compensation insurance became once more a breadwinner, and, indeed, the chief support of the casualty group.

Alas, the memory of those brighter days but intensifies the present gloom! In the fateful year 1920, rate making authorities reached the conclusion that employers were paying too much for their compensation coverage, and sizeable rate reductions were accordingly effected. Since 1920, compensation pure premium cost has been progressively increased, first by the shrinkage of payrolls in 1921-22; then by the mechanization of industry, the liberalization in the letter and in the interpretation of compensation laws, and the rise in medical costs which went on quite steadily during the ensuing years; and, lastly, by the drastic payroll deflation and the increase in industrial disease claims which have taken place since 1929. Premium rates in terms of payroll have been increased at frequent intervals, but these rate increases have generally lagged behind the rise in pure premium cost, and, as a consequence, throughout the past ten or twelve years the compensation business has shown a substantial underwriting loss for the stock companies. The following figures, taken from Table IX, Part III, New York Insurance Reports, epitomize the underwriting results for the years 1923-31 in respect of compensation business for participating and non-participating carriers respectively:

TABLE I

Workmen's Compensation Insurance

Comparison of Countrywide Results for Participating and Non-Participating Carriers 1923-31

Year	Premiums Earned	Losses Incurred	Loss Ratio	Acquisition Cost Ratio	Other Expense Ratio	Total Expenses Incurred	Total Expense Ratio	Underwriting Gain	Underwriting Gain Ratio
Non-Participating Carriers:									
1923	$ 97,464,028	$ 65,845,066	67.6%	18.0%	24.0%	$ 40,976,678	42.0%	$ − 9,357,716	− 9.6%
1924	110,158,840	78,799,661	71.5%	17.9%	24.2%	46,328,110	42.1%	− 14,968,931	−13.6%
1925	121,856,029	82,212,068	67.5%	17.8%	23.8%	50,715,499	41.6%	− 11,071,538	− 9.1%
1926	138,129,997	93,150,364	67.4%	17.4%	23.1%	55,871,967	40.5%	− 10,892,334	− 7.9%
1927	144,236,109	94,194,808	65.3%	17.8%	24.0%	60,161,026	41.8%	− 10,119,725	− 7.1%
1928	142,467,027	90,612,507	63.6%	18.1%	23.8%	59,728,600	41.9%	− 7,874,080	− 5.5%
1929	152,414,449	103,806,536	68.1%	18.3%	24.2%	64,718,200	42.5%	− 16,110,287	−10.6%
1930	150,222,959	103,392,278	68.8%	18.2%	25.3%	65,376,695	43.5%	− 18,546,014	−12.3%
1931	125,802,969	91,329,610	72.6%	18.6%	26.9%	57,292,085	45.5%	− 22,818,726	−18.1%
Total	$1,182,752,407	$803,342,898	67.9%	18.0%	24.4%	$501,168,860	42.4%	$−121,759,351	−10.3%
Participating Carriers:									
1923	$ 28,071,846	$ 18,721,488	66.7%	4.4%	18.9%	$ 6,529,418	23.3%	$ 2,820,940	10.0%
1924	32,139,814	20,416,047	63.5%	4.1%	18.5%	7,251,925	22.6%	4,471,842	13.9%
1925	34,206,818	21,126,111	61.7%	4.0%	18.0%	7,508,866	22.0%	5,571,841	16.3%
1926	39,658,451	24,726,474	62.3%	4.0%	17.6%	8,585,801	21.6%	6,346,176	16.1%
1927	42,784,173	26,564,333	62.1%	3.9%	16.9%	8,916,282	20.8%	7,303,558	17.1%
1928	46,342,793	30,268,065	65.3%	4.0%	17.3%	9,868,369	21.3%	6,206,359	13.4%
1929	49,833,307	34,678,537	69.6%	3.9%	17.5%	10,649,971	21.4%	4,504,799	9.0%
1930	46,136,057	29,136,198	63.2%	3.9%	18.8%	10,483,203	22.7%	6,516,656	14.1%
1931	37,745,496	24,897,705	66.0%	4.3%	20.9%	9,521,540	25.2%	3,326,251	8.8%
Total	$ 356,918,755	$230,534,958	64.6%	4.0%	18.2%	$ 79,315,375	22.2%	$ 47,068,422	13.2%

Above figures are from Part 2 of Table IX, New York Insurance Reports, Part III.

THE PRESENT COMPENSATION SITUATION

The above indicated underwriting results for the non-participating group, are in themselves sufficient evidence of the gravity of the present situation. In spite of the considerably more favorable results for the participating group, it is not too much to say that compensation insurance in the United States is at this time organically unsound; for no business is healthy when the major part of it is conducted at a loss. This comment might not be justified if a temporary period of unfavorable underwriting was the only untoward symptom. Such, however, is far from being the case.

The stock carriers, as a group, have never profited from their compensation business except during the early years of the Acts when the rates *happened* to be pitched too high, and again, during the war and immediate post-war periods, when payrolls were abnormally (and unexpectedly) inflated. The untimeliness of the rate reductions of 1920 was soon recognized, and in 1923, and in each and every subsequent year, efforts have been made to correct the rate level, but never with more than partially favorable results. A sharp revival of industrial activity, plus other "inflationary" or "reflationary" phenomena, may improve compensation underwriting results before the close of the current year, may conceivably turn the red figures to black; but there can be no assurance of a permanently profitable future for the compensation business of the stock companies as long as it is conducted upon the very lines which have produced the calamitous results of the past decade.

Aside from devastating underwriting results, other signs of insecurity in the compensation business are not lacking. There is a truce between stock and non-stock carriers as to the proper system of rates and rating plans, but fundamentally the two groups are at loggerheads as to what this system should be. Rate making bodies and the various state authorities having jurisdiction over premium rates have frequently been in disagreement, and time and again rate increases requested by the carriers' organizations have been denied in whole or in part. The business is subject to an abnormally high turn-over, a factor which is disturbing to both parties to the insurance contract, and productive of undue expense to the carrier. The expense ratio of the

business (generally greater for stock carriers than is the allowance for this item in the premium dollar) is so high as to be regarded by certain assured and certain supervising authorities, as unreasonable. Many of the more responsible assured have become "self-insurers", and thereby recorded their dissatisfaction with the value of full coverage as compared with its cost. The threat of monopolistic state insurance looms constantly, nor is this menace lessened by the dissatisfaction with the compensation business often voiced by insurance executives.

Some Solutions Hitherto Suggested

In discussions of the "compensation problem", the theme of *abandonment* is lately to be discerned with increasing frequency. As Sir Walter Raleigh is reported to have remarked of the headsman's axe, "This is a sharp medicine, but it cures all diseases!" Companies taking this step would assuredly end their compensation troubles; but there is reason to fear that such a "remedy", if generally applied, would not be beneficial to the casualty business.

1. Coverage of the compensation and the other liability hazards of any given risk *by the same carrier* is generally the most economical arrangement from standpoints of assured and company alike. If the stock companies as a group abandon the compensation business, they will be paving the way for loss of a large part of the related lines (automobile and other public liability and property damage) to the carriers that take over the compensation business.
2. Agitation for monopolistic state funds is perennially persistent and is not confined to compensation insurance. The demand for compulsory automobile liability insurance, coupled with a compensation scheme for automobile accidents and a monopolistic state fund, is equally strong. Relinquishment of the compensation business by the stock companies will add great impetus to this monopolistic movement in the automobile liability field.
3. It is hazardous to argue that because of the public's peculiar interest in the workmen's compensation system, com-

> pensation insurance is any less an appropriate field for private enterprise than are the other casualty lines. It is true that the public has expressed its concrete interest in the compensation plan through the enactment of the compensation laws, but, on the other hand, legislative bodies are constantly giving equally concrete expression to the increasingly active interest of the public in other lines of casualty insurance. The dividing line between those kinds of insurance which are strongly tinged with the public interest, and those kinds which are not, is rapidly shifting, if not fading out altogether; and any attempt to delimit the field of private insurance upon basis of such an uncertain distinction is bound to result unhappily.

Compensation insurance is a member which cannot be amputated without impairing the vitality of the entire casualty organism.

* * *

Another widely advocated "solution", which might be termed the "doctrine of necessary evil", runs to the effect that compensation business is bad, that little can be done to make it better, but that the stock companies can endure the situation by limiting the ratio of their compensation volume to their other writings.

Compensation insurance results will have to improve greatly before the application of this theory will ever produce satisfactory results. During the years 1926 to 1932 inclusive, stock companies entered in New York suffered an underwriting loss, countrywide, of $105,241,107 on their compensation business, according to the summary of the New York Casualty Experience Exhibit compiled by the National Bureau of Casualty & Surety Underwriters. This sum represented 11.4% of the same companies' net compensation premiums earned, and 4.8% of the net premiums earned by these companies in the other casualty (a) lines during the same period. Accordingly, in order to "break even" on underwriting, these companies would have had to make an underwriting profit of 4.8% on such other casualty lines. As a matter of fact, the stock companies' underwriting result on

these other lines was a gain amounting to only 1.2% of the net premiums earned for such lines.

During this same period, compensation premiums represented 42.3% of other casualty (a) premiums for the companies in question. If a company with an average compensation experience was able to hold this ratio down to half the average, or 21.2%, the percentage of profit required on its residual casualty lines in order to absorb the compensation underwriting loss was correspondingly cut in two, i. e. reduced to 2.4%, which is still double the profit which was actually made on these lines. However, it is obvious that all companies cannot write less than the average quota of compensation; and it is equally clear that the stock companies cannot afford a 2.4% handicap in their general casualty underwriting.

The "necessary evil" theory, like the "abandonment" theory, is no solution, but is rather a confession of inability to overcome the difficulties of the compensation business.

* * *

It has been contended that the solution lies in the establishment of *"one big carrier"* to handle the compensation business for the stock companies.

This very plan was tried for certain extra-hazardous classes of compensation risk, and it is a matter of record that the experiment was not a success. It is to be doubted that enough companies could be interested to warrant the launching of this project.

The plan has none of the virtues of private enterprise as normally conducted. To the extent of its adoption, the scheme would eliminate inter-company competition. The officials administering the carrier would be responsible to no single unit of invested capital, and thereby the chief safeguard to the well being of any corporate venture would be removed. Incidentally, the adoption of this plan upon any broad scale would constitute a strong argument for state-managed monopoly; for if competition,

(a) Excluding fidelity and surety, accident and health, and credit.

and thereby the incentive for efficient operation, is once eliminated from the business, what service will then be rendered by the companies, which, in theory at least, cannot be rendered equally well by a state bureau?

* * *

Certain distinguished casualty executives have expressed the opinion that if the *compensation rate making plan* had been all that it should have been, the heavy underwriting loss, or at least the greater part of it, would have been avoided; and that hope for the future lies in the direction of improvement in rate making methods.

Like other man-made instruments, the rate making plan has been, is, and doubtless always will be imperfect; but it is fair to ask whether, in view of certain fundamentals which are beyond the control of the rate making bureaus, these bodies have not been presented with an impossible task.

Until comparatively recently, the stock carriers as a group opposed any substantial margin of safety in the rates because of the tendency on the part of the better risks to save such margin by switching to participating insurance, or to self-insurance. At the same time, stock company representatives insisted upon "adequate" rates. The resultant of these divergent desires was the doctrine of "right rates".

"Right rates", as understood by this writer, are rates so low that the difference in net cost to the assured between stock and participating insurance is inconsiderable, and yet so high that the stock carriers will make an underwriting profit. Since the combined loss and expense ratio of the participating carriers in the nine years ended with 1931 averaged 23.5 points lower than that of the non-participating companies, any rate maker who hits this target may rightfully claim his niche beside William Tell, Daniel Boone, and the other great marksmen of history! As long as the total loss and expense cost of the stock companies substantially exceeds that of the participating carriers, the former must either write at rates below their demonstrated costs, or subject themselves to further adverse selection, which again tends to increase costs; and this dilemma is one for which the rate makers are not responsible.

Is There a Better Pattern for the Compensation Business?

There is reason to believe that a study of life insurance practice might suggest helpful improvements in the compensation field. The compensation risk is a human one, not a property risk. Furthermore, the compensation insurance contract, even though undertaken nominally for a one-year term, creates a long-term relationship somewhat analogous to that of group life insurance, because the settlement of long-term claims protracts the company's contact with the employer and his employees over a considerable period.

The life companies as a group do not lack serious problems, but they are presently in a happier position than are the casualty companies. They have consistently enjoyed an underwriting profit (a). The life business is free from serious controversy, either with state authority or between companies, as to scale of premium rates. Life companies suffer a minimum of credit difficulties because they adhere to the policy of requiring payment of premiums in advance. The expense ratio of the life companies is low enough to avoid serious criticism; unlike the stock casualty companies, they compete openly in the matter of net premium cost; and, perhaps for these two reasons, they are not subject to the threat of state insurance.

Since the position of the life business is evidently more secure than that of the casualty business, it would seem worthwhile to present the attached comparison of certain of the conditions prevailing respectively in the two fields (see Table II). On the casualty side, this comparison is confined to conditions surrounding compensation insurance.

The comparison made in Table II brings out many points of difference between the conditions surrounding compensation insurance and those prevailing in the life field.

It is clear that whereas any given stock casualty company has virtually no control over the net amounts charged to its policyholders for compensation coverage, the individual life company enjoys considerable latitude in this respect.

(a) *i. e.*, total "margins" (expense loadings plus mortality gain) have consistently exceeded total insurance expenses. Gain from surrendered, lapsed, and changed policies is an additional source of underwriting profit.

TABLE II

COMPARISON OF CERTAIN OPERATING CONDITIONS — COMPENSATION INSURANCE AND LIFE INSURANCE

	COMPENSATION INSURANCE	LIFE INSURANCE
Rate Levels	Level of *gross* premium rates pitched with intention of reproducing loss and expense costs of stock carriers (small emergency loading included in formula beginning 1931). In practice, inadequate to cover such costs.	Net pure premium rate level pitched in theory to correspond exactly to mortality to be expected. Practically, these net premiums provide substantial margin over normal mortality. Expense loading varies by companies, and is abundantly adequate if mortality margins are taken into account.
Uniformity of Rates	In "regulated" states, uniform for all carriers whether stock or participating (with a few exceptions). In non-regulated states, about the same situation in theory.	Participating carriers charge considerably higher gross rates than do the non-participating.
Commission Scale ("Acquisition and Field Supervision Cost".)	Stock companies are generally committed to a uniform scale of commissions, which is the same for both new and renewal business. Some of the non-participating carriers do not pay "Commissions" as such, but, instead, employ salaried solicitors. In general, the acquisition cost of the participating carriers is much lower than that of the stock companies.	Percentage-wise, there is little if any difference between the commission cost of the participating and the non-participating carriers.
Dividends to Policyholders	The greater part of the business is written by stock companies operating on the non-participating plan. The remainder of the business is written by various classes of participating carriers, including mutual companies, state-managed insurance funds, reciprocal associations, and a few participating stock carriers.	By far the greater part of the business is written upon the participating plan. Most, but by no means all, of the participating carriers are mutual companies.
Monetary Advantage to Policyholder in Continuing Policy Contract Beyond Anniversary Date	No such advantage.	Premium rates, dividend scales, and surrender values are so fixed that generally speaking, some equity is sacrificed where business is "switched" to another company.

TABLE II (Continued)

COMPARISON OF CERTAIN OPERATING CONDITIONS — COMPENSATION INSURANCE AND LIFE INSURANCE

	COMPENSATION INSURANCE	LIFE INSURANCE
State Supervision of Premium Rates	Premium rates subject to state approval in a great many states, including preponderant majority of states where there is substantial premium volume. With few exceptions, this means state requirement that there be a single set of rates for all carriers.	No direct state approval of gross premium rates, though companies charging less than a certain minimum scale are required to set up special premium deficiency reserves. This situation permits the difference in premium scales above referred to.
State Supervision of Reserves	Premium and loss reserves are both subject to theoretically rigid state requirements, but violation of the spirit of these requirements is hard to detect except upon examination of the records of the company, largely because compliance with the letter of the state requirements will not produce adequate reserves if the premium scale is not adhered to, or is inadequate for the business of a given company.	The loss reserve is a relatively minor quantity and so simple of determination that failure to set it up in full would involve outright dishonesty. The premium reserve, although elaborate in principle, is, in practice, simple of computation and easy of verification.

A stock life company may first make its choice between the participating and the non-participating plans. It exercises still further control over the assured's net cost through selection of (1) the basis of net premiums (pure premiums), (2) the expense loading formula, and (3) the dividend formula (if the participating plan is adopted). Accordingly, there is open competition among the life companies in the matter of the assured's net cost as contrasted with the condition prevailing in the compensation business where neither the individual (stock) company's loss cost nor its expense cost may under prevailing practice be reflected in the net amount which the assured pays for his coverage.

The compensation business is operating in a vicious circle. Relatively high cost to the assured brings about adverse selection against the stock carriers. This diversion of the better risks increases not only the loss ratio, but, through the thinning of volume, the expense ratio as well. The resulting high loss and expense costs are reflected in demands for rate increases, and, to the extent to which these demands are realized, the selection against the stock companies is intensified. The example of life insurance strongly suggests that this dangerous situation may be due to error in the concepts which have hitherto governed the conduct of the casualty business.

A More Elastic Operating Code

There is reason to believe that the stock compensation business needs not so much a new rate making plan as somewhat more elasticity in its fundamental operating code. Particularly, the following articles of this code seem to require modification:

I. *There shall be no competition between stock companies in respect of the assured's net premium cost.*

There always has been, and there is bound to be, competition in the matter of premium cost. If the avowed method of operation does not recognize this competition, it will still take place through such illegitimate devices as distortion of the rating plans, misclassification, failure to report full payroll, switching of payrolls from higher rated to lower rated classifications, and so on.

II. *A stock company shall not pay dividends to policyholders.*

Payment of dividends to policyholders upon the part of a stock company may run counter to classical capitalistic theory, but on the other hand, numerous American stock life insurance companies have been paying dividends to policyholders for many decades past with no apparent damage to their financial well being or to their status as members of the life insurance group in good standing.

The writer is of the opinion that the "repeal" or "nullification" of these two "noble experiments" would greatly facilitate the rehabilitation of the compensation insurance business.

It is hardly debatable that compensation insurance can never achieve well being as long as there exists the present wide divergence between the net cost (to the assured) of stock insurance and that of participating insurance. Doubtless such a difference may obtain in some degree without harm to the business, but the present differential is so great as to bring about the progressive selection against the stock carriers which has made the situation so unstable, and so unprofitable to the stock companies. Attempts have been made to bring this differential down to a reasonable point through modification of the rate making and rating plans but such attempts have accomplished little and it seems evident that all efforts of this kind can achieve but slight success as long as the expense ratio of the stock companies continues to be substantially greater than that of the participating companies.

Can the stock companies hope to reduce their compensation expense ratio to a figure approaching that of the participating carriers? There is no inherent reason why this could not be accomplished within a reasonable time, but evidently it would require the following steps:

1. *A substantial reduction in acquisition costs on compensation business and possibly on related liability lines.*

   Present stock acquisition costs on compensation business constitute a bar to even approximate parity in expense ratios as between the stock and non-stock groups. (See Table I).
2. *Withdrawal by any given company from territories where such company has no reasonable prospect of a compensation volume sufficient to support an adequate service organization.*

Compensation insurance is a class of business which cannot be conducted successfully as a side line. No matter what operating plan is adopted, there is only trouble ahead for any carrier which enters or continues in this field without an adequate service organization, which must include competent specialists in the fields of underwriting and rating, safety engineering, medical service, claims handling and auditing. Such a well-rounded organization cannot be maintained profitably in any territory where a given company has less than a reasonably substantial volume of compensation business.

Up to this time, there have been undoubtedly too many companies in the compensation field and to an even greater extent too many compensation carriers in any given area. The result has been not enough trained personnel to go around. A reduction in the number of carriers operating in each territory would enable the companies which continue in the business to improve their operating standards and at the same time reduce their overhead expense ratios.

Doubtless it would be better for some companies now writing a small or scattered compensation volume to withdraw from the line altogether. Agency pressure may be holding such companies in the compensation field, but if this line once becomes a paying proposition to the companies that are fully equipped to write it, the other companies will be able to cut it out without serious effect upon agency plant.

3. *The adoption of some plan whereby stock company assured will over a period benefit in some degree from economies in the loss and expense costs of the carrier.*

Two logical alternatives are here presented:

A. Adherence by carriers of all classes to a single rate level with the stock companies operating on the participating plan.

B. A lower rate level for non-participating companies than that charged by participating companies. Any given stock company could then choose between the participating plan on the one hand and the non-participating plan with its lower rates on the other.

The adoption of all three of these measures could hardly be expected to bring about the millenium immediately, but the reduction of acquisition costs, coupled with the withdrawal from territories where the service lines of the individual companies are now too widely extended, would yield tangible savings at the outset and the achievement of a normal loss ratio might reasonably be expected to follow, once the present selection against the stock carriers is arrested.

It is likely that the changes in policy just discussed might pave the way for the elimination of rate level controversies from the compensation business. If the stock companies are pledged to the policy of granting to the assured through dividends or through rate differentials a fair proportion of savings in operating costs, why should state authorities oppose the adoption of abundantly adequate premium rates? If rate controversies could be done away with, as they have in life insurance, the resulting benefits to the business would be many. Since the level of cost to the assured would be determined through competition, the operating expense of rate making bodies could doubtless be reduced and these organizations could still do more and better work upon the constructive task of evolving equitable rates and rating plans. At the same time, state supervising authorities would find themselves in position to devote more intensive effort to their most important function, namely, the protection of the insurance public in respect of the adequacy of reserves and the general financial soundness of the carriers.

As regards the matter of reserves, it may be well to point out the importance of a single uniform standard, even if uniformity in premium rates is not required. The mechanics of uniform premium and loss reserve requirements would not be difficult, provided that any scale of non-participating rates bears a known percentage relation to the standard participating rate scale. It should go without saying that the approval of a rate scale lower than the standard participating scale should be conditioned upon statistical proof that the total costs (loss ratio plus expense ratio) of the applicant company warrants such lower rates.

Further Suggestions from the Life Field

Life insurance practice suggests two other reforms which might profitably be considered by the casualty business, not only with

regard to compensation insurance, but with respect to other lines as well.

1. *The Credit Problem.*

   Credit difficulties have been a serious handicap to the casualty companies during the past few years. The total credit loss is not a matter of public record, since it is not confined to "Agents' Balances Charged Off", but includes the cost of "free insurance" which is concealed in "premiums on policies not taken" and "return premiums on policies cancelled". Aside from the direct monetary loss to the companies, the unsound credit situation has subjected home office, branch office and agency staffs to untold wear and tear, and has been seriously destructive of the morale of the business. In the life business, the credit problem is not a difficult one. The assured may pay his premium for a year, for half a year, or for only three months, but in any event either the premium is paid in advance of the term to which it relates (or within the period of grace permitted by the policy), or the policy automatically lapses. Why should the lapse principle not be adopted in the casualty field? True, its application might require a broader use of the installment plan of premium collection, but it would seem better to get the premium in installments than to extend coverage for which no premium is received.

2. *Tenure of the Policy Contract.*

   It is now the practice in the casualty field to write an entirely new policy contract upon each yearly anniversary date. This practice is not only expensive, but it is disturbing to the insurance relationship, and the labor of preparing and delivering the new policy constitutes only part of the waste involved in this plan. The issuance of a brand-new contract encourages the assured to feel that the anniversary date is an appropriate time to "shop around". On the other hand, the issuance of a contract of indefinite term with appropriate cancellation provisions, endorsed from time to time to reflect changes in rates and policy conditions, would promote a sense of continuity in the contractual relation which would be of real value to both parties. Further than this, would it

not be worth while to consider ways and means of making "switching" unprofitable to the assured? Companies operating on the participating plan might properly require that the dividend to the policyholder shall be in part contingent upon continuance of the contract beyond the anniversary. A similar device could be employed in the case of non-participating contracts in the form of a cancellation fee equivalent to some portion of one year's difference between the standard participating rates and the scale of non-participating rates charged under the contract.

* * *

The writer has done his best to demonstrate that the root of the troubles in the compensation business lies not in the rate making method but in the fundamental operating plan of the business; that both internal analysis and a comparison with life insurance conditions indicate that no permanent betterment can be accomplished without cutting acquisition cost, reducing the number of carriers in any given territory to a point where there is enough business to go around, and sharing the resulting economies with the assured; and that if open competition as to net premium cost were to take the place of the present rate level controversies, there might be anticipated a greater degree of stability and with it the opportunity for more efficient, economic and constructive operation.

Throughout the recent depression, industry has been engaged intensively in the endeavor to discover operating methods which will produce a profit even under unfavorable economic conditions. Action has crowded on the heels of research and outworn methods and obsolete machinery have both been ruthlessly scrapped. The business of casualty insurance cannot afford to ignore this heartening example. The present is no time for rigid adherence to the tenets of the past, save to the extent to which they have proved their merit in foul weather as well as fair.

Nor should we defer forthright dealing with the compensation problem because of the hope, or even the expectation, that better general business conditions are just ahead.

AVIATION CASUALTY INSURANCE

BY

W. P. COMSTOCK

Judged by the amount of premiums written, aviation insurance comprises a very small portion of the total volume of casualty insurance. However, many of us can remember when the aggregate automobile premiums written by stock companies were small and relatively inconsequential. Automobile insurance grew in volume and importance concurrently with the enormous growth of the automobile industry. It is not unreasonable to expect that when and if the number of aircraft increases there will be a corresponding increase in the volume of aviation insurance written. If there is an increase in air transportation, there will be an increase in the need for insurance protection which will very likely be provided by aviation insurance writing companies. The aircraft industry has now reached adolescence and has proved itself to be very robust during a period when many industries have been waging a bitter fight for existence. Air travel furnishes the most rapid transportation known to man and speed in transportation will always be favored by busy people. According to a survey made by one of the large trans-continental airlines, 80 per cent. of its passengers are business executives, buyers, salesmen and engineers who fly because they wish to save time. Safety in air transportation is rapidly approaching equality with safety by automobile travel. Increased safety is still to be desired in both modes of transportation. Casualty companies can exert considerable influence in this direction if they are alive to their opportunities.

COVERAGES

Complete aviation coverage is written jointly by casualty and fire companies. Casualty companies provide the following three coverages:

(a) Public Liability Excluding Passengers.
(b) Passenger Liability, and
(c) Property Damage.

Public Liability Excluding Passengers is the primary casualty coverage and is written singly or concurrently with either or both of the other two coverages. Passenger Liability and Property

Damage are never written singly but either or both must be written with concurrent Public Liability Excluding Passengers.

Fire (and Marine) companies provide the following six coverages:—

(a) Fire
(b) Crash
(c) Wind Damage
(d) Theft
(e) Land Damage
(f) Mooring Damage.

Fire is the primary coverage and is written singly or concurrently with one or more of the other coverages. The other coverages, however, are written only with concurrent fire insurance. Fire coverage is sold on two bases (1) fire under all circumstances, excluding fire after crash, and (2) fire except in flight. Crash is descriptive but is sometimes referred to as Accidental Damage and other times as Perils of the Air. Wind Damage includes coverage against tornadoes, cyclones and windstorms. Theft includes robbery and pilferage. Land Damage applies to land aircraft and Mooring Damage applies to seaplanes; both of these coverages are analogous to collision insurance for automobiles.

The coverages listed below are usually written on the deductible basis shown opposite the coverage:

Coverage	*Amount Deductible*
Crash	10%
Windstorm	5%
Theft	$25
Land Damage	2½%
Mooring Damage	5%

In addition to the coverages heretofore mentioned, casualty companies provide workmen's compensation insurance for employers of pilots and mechanics, and personal accident coverage for pilots and passengers. As these latter coverages present no new problems for casualty companies, there is little need for discussing them in this paper.

Casualty companies also provide airport public liability and property damage insurance which is a specialized form of Owners', Landlords' and Tenants' coverage. This coverage will be given further consideration later.

Carriers

At the present time most of the business is being written by three groups:

(1) Aero Insurance Underwriters
(2) Associated Aviation Underwriters
(3) United States Aircraft Insurance Group

Experience to date indicates that successful underwriting and adequate reinsurance are best effected by large groups of companies. The Aero Insurance Underwriters Group is composed of six casualty companies and twenty-seven fire companies; the Associated Aviation Underwriters Group is composed of five casualty companies and thirty-two fire companies and the United States Aircraft Group is composed of seven casualty companies and twenty-seven fire companies.

Growth of Flying

In this country the first scheduled air line began business in 1919 with ships flying from San Pedro to Catalina Island. The line was operated by the Chaplin Brothers, Sidney and Charles, the motion picture actors. There is no record of the amount of business done, but passengers were few and the line was abandoned after a trial of some 18 months. Since that time air travel has become a common mode of transportation.

During 1932 American air lines flew approximately 48 million miles, which was an increase of 14 per cent. over the 42 million miles flown in 1931. During 1932, American air lines carried 534 thousand passengers which was an increase of 14 per cent. over the 469 thousand carried during the previous year. During 1932 passenger traffic on American air lines totalled 145 million passenger miles. This was an increase of 21 per cent. over the previous year and indicates that individual trips by air were, on the average, longer in 1932 than in 1931. Air mail poundage increased each year from 1927 to 1931 inclusive, but the increase was arrested temporarily during 1932 due to the increase in postal rates in July 1932. For the first six months of 1932 air mail poundage showed an increase over the corresponding figures for 1931. The total for the year 1932, however, showed a decrease of 7 per cent. from the comparable total for 1931. Slightly more than 7 million pounds of air mail were carried in 1932. Last year 1,324,000 pounds of express matter were transported by airplane. This figure is triple the amount for 1930 and an increase of 68 per cent. over the amount for 1931 when 788 thousand pounds were carried. The increasing trends are continuing in 1933.

Aviation also shows favorable trends when compared with other forms of transportation. Using 1929 as a base we find during the four year period from 1929 to 1932 inclusive that traffic by bus

measured in passenger miles remained practically constant, by railroad it decreased 46 per cent., while traffic by air enjoyed an increase of 210 per cent.

While you are digesting statistics perhaps you will be interested in a comparison of aviation in the United States with the leading air-minded countries of Europe. Judged by appropriations, our army and navy planes make a sorry showing when compared to those of Great Britain and France. Using the fiscal year 1928-1929 as a base, Great Britain has made an appropriation available for its army and navy during the fiscal year 1932-1933 which is only slightly less, France's appropriation calls for an increased expenditure of 68 per cent., while the United States has curtailed its expenditures by 37.5 per cent. Furthermore, due to the very rapid improvement in design, approximately 80 per cent. of our war planes are now obsolete.

Our peace time transport planes present an altogether different picture. As stated above, United States transport planes flew 48 million miles in 1932. Transport planes of the combined countries of Great Britain, France, Germany, Russia, Italy and The Netherlands flew approximately two-thirds of that distance last year. Our planes averaged 87 thousand miles each while the greatest average for European countries was flown by the planes of Great Britain and The Netherlands which averaged slightly less than 50 thousand miles each.

Russia is making rapid strides in aviation. Russia has shown a greater percentage of increase during the last three years than any other country in the world. Some misinformed persons are of the opinion that Russia has already outdistanced the United States in civil aviation. Last year Russian planes carried slightly more than 27 thousand passengers, United States planes carried 534 thousand; Russian transport planes flew 3 million miles, United States planes flew 48 million miles; Russian planes carried 430 tons of mail, United States planes carried 3,500 tons.

Flying is becoming a recognized mode of transportation. There is nothing local about it. It is a world-wide phenomenon. The use of the airplane increased during 1932 and will probably continue to increase. There will be need for insurance coverage on more planes and passengers in the years to come. Aviation insurance is designed to meet this growing need of the flying public.

The Flying Hazard

Proponents of flying sometimes recall that in the early days of automobiling many people regarded the automobile with disfavor and would have none of the new fangled contraption. They state that many people now hold a similar antipathy toward the airplane but that in time the airplane will become as common a means of transportation and as safe as the automobile. Possibly the airplane will become the common vehicle for everyday people, but at present there is a fundamental difference in the hazard of travel by these two means. An automobile travels in two dimensions only, whereas an airplane navigates in three. If an automobile motor fails out on the road, the result is usually only an inconvenience to the passengers, but when an airplane motor or the plane itself fails during flight there is always a mortality hazard with human life in peril. Whether or not this difference in hazard can be eliminated or drastically minimized remains a question for the future.

A large proportion of the total number of accidents occurs while planes are preparing to take off or land. In the case of forced landings, accidents are due largely to rough ground. Accidents occurring while planes are landing or taking off at regular airports are due to loss of stability after planes have slowed to rates below their stalling speeds. The autogyro eliminates most of this hazard.

Each year additional safety factors are being built into orthodox planes. Pilots are being educated to recognize that safety is as much dependent upon careful flying as upon structural design. The landing hazard under adverse conditions is being reduced by the use of radio directional rays.

According to the records of the Department of Commerce there were 6 fatalities in 26,264,000 passenger miles of scheduled flying during the last 6 months of 1932. This makes one fatal accident for each 4,377,000 passenger miles flown. During the last six months of 1931 there was one fatal accident for each 3,022,000 passenger miles flown. However, during 1930 there was one fatality for each 4,300,000 miles flown. Hence we may conclude that at present expressed in round numbers there is one fatality for each 4 million passenger miles flown.

Messrs. H. R. Bassford, E. W. Marshall and J. E. Hoskins, who

compose the Committee on Aviation of the Actuarial Society of America have made a comprehensive study of pilot mortality. Their findings are published under the title of "Aviation Statistics" in the *Transactions* for May, 1931. On page 221 they make the following statement. "There seems to be a tendency for pilots, except those of very low flying time, to approach a common mortality rate of about 25 per thousand". This total includes the four classes of civilian pilots—private, industrial, limited commercial and transport—with total annual flying rates of 50 hours or more. In other words, of 1,000 pilots insured at the beginning of any given year, we may reasonably expect that approximately 25 will be killed during the year.

In spite of all the statistics and statements in regard to the increased safety in flying, there are some very definite hazards involved. There is a hazard due to possible failure of the motor, there is a hazard due to the possible failure of the plane itself; and there is a hazard due to the possible sudden approach of storms. Again, there is the hazard of bad judgment on the part of the pilot, who, incidentally, has already taken too much of the blame for accidents.

To an interested observer, it is a cause of regret that operators of air lines have steadfastly refused to equip their planes with the greatest potential safety appliance known. I refer to the parachute. It would seem that parachutes are as necessary to passengers in a transport plane as are lifeboats to passengers on an ocean liner. Parachutes would give passengers a chance for life which they do not now possess.

United States Army and Navy pilots have been prohibited since 1923 from going up in a plane or taking up a passenger not equipped with a parachute.

Using our hindsight on the Akron disaster, with a view to preventing or minimizing loss of life in future dirigible accidents, we suggest that dirigibles should be equipped with parachutes. Parachutes would have saved many of the lives lost in the Shenandoah disaster, which occurred over land. In addition to parachutes, the crew of the new dirigible Macon, for instance, should be equipped with kapok vests which will keep them afloat in water.

When the Akron crash was inevitable the ship was 800 feet

above the water. The order was given, "Stand by for crash." Had the men been equipped with parachutes and kapok vests, an order could have been given to this effect, "Don parachutes and kapok vests and abandon ship." Or, better still, the kapok vests and parachutes could have been donned when the ship felt the first effects of the storm and the final command would then have been merely, "Abandon ship."

Is there anyone who does not think that more than three lives would have been saved, if these safety precautions had been taken?

There are several objections to the use of parachutes in commercial transport planes. One is the cost. Another is that the weight of parachutes would decrease the number of passengers who could be carried. A third is that their use would scare off passengers, and a fourth is that passengers could not get out of the plane quickly enough and would not know how to use parachutes if they did.

The cost spread over a number of years would not be great. It would be partially offset in time by reduced insurance costs. In most cases planes are not filled to capacity, hence the decrease in pay load due to the weight of parachutes would be small. The use of parachutes might scare away some timid prospective passengers, but I think it likely that the number of courageous people who could be found would be greater than the timid persons scared away. To enable passengers to get out more quickly, planes should be redesigned with a sufficient number of exits. There is nothing sacred about the present design. None of these objections should take preference over human life.

There is still the objection that passengers would not know how to use parachutes if they were provided. Just how anyone has found out that passengers could not use parachutes is an unsolved mystery to the layman. Certain it is that this alleged fact has not been discovered by experiment. On March 31, 1931, with the plane at 4,000 feet, if passengers had been equipped with parachutes and if the plane had been provided with emergency exits, I think that Knute Rockne could have saved himself. Exactly two years later under similar conditions I do not think it would have been necessary for six of the members of a Canadian basketball team to die. Some of them might have saved themselves. At

least they should have been given the chance to try. If planes were equipped with parachutes, flying tactics would be different in many instances. Instead of nosing gingerly toward the ground at 90 miles an hour in some emergencies a plane could climb and passengers could be released one at a time.

Casualty companies may be able to accomplish something if they use their combined influence toward having transport planes equipped with parachutes. If they do not accept the challenge, it is hoped that legislation will eventually force the issue. Casualty companies should point the way to safety in aviation and when necessary should establish their own safety standards.

Insuring Clauses

Stripped of technicalities, which admittedly are necessary in every policy of insurance, the protection furnished by casualty companies is essentially as follows:—

Public Liability Excluding Passengers protects the named assured against his legal liability to persons other than passengers for accidental bodily injuries resulting from the ownership, maintenance or use of the described aircraft. Limits under this clause range from $10,000 and $20,000 to $25,000 and $50,000 in most cases.

Passenger Liability protects the named assured against his legal liability to passengers suffering accidental bodily injuries while in, on, entering or leaving the described aircraft. The carrier's liability is limited to a specified amount for any one person injured and for the total number of persons injured in any one accident. The limit for one person injured is generally set at from $10,000 to $20,000 and the upper limit is usually arrived at by multiplying the number of passenger seats by the lower limit. Thus, a plane with seats for eight passengers carrying $20,000 per seat would ordinarily carry a total of $160,000 total passenger liability insurance for any one accident.

Under the two foregoing coverages bodily injury is defined to include loss of services.

Property Damage protects the named assured against his legal liability for damage of property belonging to persons other than

the assured. Loss of use is included under this coverage, but coverage does not extend to property in the custody of the assured, property belonging to assured's employees or pupils or in their control. Further, no coverage is granted for damage to property carried by the insured aircraft nor for property which is leased or rented and for which the assured is legally responsible. The customary limits are $5,000 or $10,000.

The foregoing coverages may be studied in more detail by reference to the policy form included at the end of this article.

Airport Liability and Property Damage. In addition to the three coverages provided by the standard aviation policy, casualty companies have extended their regular Owners', Landlords' and Tenants' form to include public liability and property damage insurance for owners and lessees of airports. The liability coverage protects the named assured against his legal liability for accidental bodily injuries suffered by persons while on the airport grounds. Employees of the assured are, of course, excluded. There is apparently double coverage in some cases. The owner of a plane and the owner of an airport may be sued jointly. If it can be established that the airport was operated in a negligent manner, recovery may be had under the airport policy. Or, if it can be established that there was negligence in the operation of the plane, judgment may be secured against the insured named in the aviation policy. Both the aviation and airport policies contain subrogation clauses and in cases where these policies are sold by different carriers a claim may be settled by one carrier and then an adjustment made with the other on the basis of the facts established.

The property damage coverage protects the named assured against his liability for damage to property of third parties, including loss of use, when such damage occurs on the grounds of the described airport.

Airmeet Liability and Property Damage. This coverage is similar to that granted under the airport policy except that it applies to a specific airmeet. If the meet is held on an airport already insured for public liability and property damage, the airport policy is endorsed to cover the additional hazard of the airmeet and an additional premium is charged. In all other cases a special policy is issued.

Premium Bases and Rates

Single planes are insured in consideration of a flat annual premium charge. The exposure is one plane insured for one year similar to the exposure for a private passenger automobile which is one car year. Planes of this type may be insured for approximately one-half of the amount charged by stock companies for a private passenger automobile in the Metropolitan New York area.

Insurance of the planes of scheduled air lines presents a problem similar to the insurance of automobile fleets where premiums are made proportional to exposure. The unit of exposure for public liability excluding passengers and for property damage is the airplane mile. The unit of exposure for passenger liability is the passenger mile. Thus, in the case of a plane making a flight of 200 miles with 8 passengers, the total exposure for public liability and property damage would be 200 airplane miles while for passenger liability the exposure would be 1,600 passenger miles. These exposures cannot be determined in advance and must necessarily be reported later. As stated elsewhere in this article a very substantial deposit premium is charged and adjustments are made later. Basic rates are charged for 5/10,000 limits and increased by percentages for higher limits similar to the application of the excess limits tables for automobile insurance.

The Underwriter

To underwrite aviation insurance intelligently the underwriter should have a comprehensive knowledge of the various types of aircraft. Before offering to insure a plane he should know whether or not the plane in question is correctly designed for the work it is intended to do. He should be able to determine in advance the probable effect of the use of new designs and devices and whether additional hazards or increased safety will result from their adoption. In short, he should be thoroughly versed in the science of aeronautics.

It would be advantageous if he were an experienced flyer. Again, he should be familiar with the records of a great many pilots. Further, he should be a practical insurance man, familiar with casualty and fire insurance practices. And last, but very important, he should be something of a salesman.

From this sketchy outline of the qualifications of an aviation

insurance underwriter it will probably be conceded that such a man is indeed rare. This is precisely the condition which exists. There are very few qualified aviation insurance underwriters and this fact explains, in part at least, why substantially all of the business is being written by three offices.

Board of Aviation Underwriters

In June 1932, at the request of the New York Insurance Department the aviation underwriting groups formed an organization known as the Board of Aviation Underwriters. By September of the same year the Board had begun to function in a constructive manner.

This Board was formed for the purpose of stabilizing rates and standardizing practices in the aviation insurance business. Prior to the organization of the Board, brokers were wont to shop around with their risks in the attempt to get one pool to undercut a rate previously quoted by some other pool. Being only human, particularly in regard to renewals, the underwriters of each pool attempted to protect their renewals, with the result that destructive competition developed.

One of the accomplishments of the Board has been the development of a minimum rate on each risk below which no member will quote. Rates are based upon the combined experience of all the members of the Board. The organization is in reality a gentlemen's agreement which is being carried out in spirit as well as in letter. It has jurisdiction over the aviation writings, irrespective of location, of all its members. Its Rating Committee meets each morning and rates each risk individually. The formation of the Board should have a very wholesome effect upon the aviation insurance business.

Underwriting

The majority of underwriters do not look with favor upon dirigibles as good insurance risks. With the memory of the fate of the Akron fresh in mind this is not surprising. Commercial dirigibles have been used chiefly for advertising and sightseeing purposes. Theoretically it might be thought that a self-sustaining ship would be a better risk than aircraft of the heavier-than-air type. Practically this is not the case. Dirigibles present too big

a target for the wind. Ships of this type are safe in mild winds but winds are very changeable. Weather conditions may be ideal at the time a dirigible takes off, but the wind may become stronger while the ship is aloft and make landing extremely hazardous at the time it is desired to land again.

One example that comes to mind is the case of the Columbia. This ship at one time was obliged to remain aloft for thirty hours because it could not be safely landed in a ground wind which was reported to be blowing at the rate of thirty miles an hour. In February 1932, the Columbia crashed while attempting to land in a wind with a velocity of between 30 and 45 miles an hour. The ship was a total loss, one life was lost and substantial property damage caused. Commercial dirigibles of this type cost in the neighborhood of $75,000 each.

A 45-mile wind in itself presents no serious obstacle to the ordinary plane of the heavier-than-air type. If a plane of this type has a landing speed of 60 miles per hour in still air, it can land against a 45-mile wind with a ground speed of only 15 miles per hour.

Due to their unwieldiness dirigibles are subject also to minor accidents which prove costly. The most costly single item in minor bumps is the loss of helium. In ordinary flight the supports holding the gondola rub against the gas bag causing wear. Helium is lost and the result is a decrease in buoyancy.

Underwriters who favor the acceptance of insurance on commercial dirigibles hold the view that the operation of this type of ship does not involve hazards which are greater than normal to ordinary aircraft. These underwriters require that insured dirigibles be commanded by experienced officers and manned by well trained crews.

Airplane manufacturers sell their planes at an F.O.B. price, but will deliver them to the purchaser at the latter's risk. These planes are flown by experienced pilots in the employ of the manufacturer. The planes are new and have been thoroughly tested by factory pilots after having been tuned up by factory mechanics. Risks of this type are called "flyaways" and are regarded as good risks by aviation underwriters.

Sales demonstration flights are also considered good risks.

Passenger transport planes flying regular schedules are looked upon with favor by underwriters. These risks are the largest

single source of premium at the present time. The potential hazard is of course very great. Passenger transport planes flying regular schedules are hangared in airports with every known facility for servicing. All planes are carefully inspected and tested before each flight. They fly well defined air lanes. Their pilots are experienced, carefully chosen and must keep in excellent physical condition. Many planes carry relief pilots. Before flight, weather conditions are carefully studied and if there is a reasonable doubt about safe weather conditions ahead the flight is not undertaken. Considerably more than due care and diligence are exercised in the interest of safety. In spite of the number of flights cancelled, at least 95 per cent. of the scheduled flights are being completed.

Most passenger transport planes flying regular schedules carry some mail, but about 40 per cent. of the mail is flown at night. Night mail planes are considered good risks.

Aviation underwriters are confidently expecting the day to come when the majority of planes insured will be of the privately owned type. When conditions improve, as they are sure to do, private owners and individuals will probably use more aircraft for sports, pleasure, commuting and business. Industrial corporations, in the ordinary conduct of their business, will probably use more airplanes for the fast and convenient transportation of their officers, employees and guests. There will be an increase in the number of chartered flights, both for transportation and sightseeing purposes. When and if this condition is reached, there will be a better spread of the flying hazard and the loss of a single plane will not assume catastrophic proportions.

Endurance flights, refueling flights and non-stop long distance flights, as well as any other flights of a spectacular nature undertaken for personal glory by publicity seekers, are uninsurable.

Statistics are used to some extent in underwriting, but underwriters must rely largely upon their practical knowledge of aviation.

Underwriting Results

The New York Insurance Department requires each group and company transacting aviation insurance in New York to file its experience each year. The tables shown below are a summary of these filings, the figures represent premiums written and losses

paid for the calendar years indicated. These figures include most, but not all, of the aviation business written in the United States during the period under review.

TABLE I

TOTAL EXPERIENCE—ALL COVERAGES COMBINED

Calendar Year	Premiums Written	Losses Paid	%
1926	$29,826.	$	—
1927	118,035.	18,062.	15.3
1928	498,029.	144,855.	29.1
1929	4,017,619.	1,398,383.	34.8
1930	2,952,965.	2,398,046.	81.2
1931	2,296,652.	1,702,406.	74.1
Total	$9,913,126.	$5,661,752.	57.1

TABLE II

TOTAL EXPERIENCE—EACH COVERAGE SEPARATELY

CALENDAR YEAR 1929

Coverage	Premiums Written	Losses Paid	%
Casualty			
Public and Passenger Liability	$901,925.	$112,647.	12.5
Property Damage	175,006.	22,266.	12.7
Total Casualty	$1,076,931.	$134,913.	12.5
Hull			
Fire	$1,106,837.	$439,140.	39.7
Theft	83,707.	1,742.	2.1
Crash	1,750,144.	822,588.	47.0
Windstorm	—	—	—
Total Hull	$2,940,688.	$1,263,470.	43.0
Grand Total	$4,017,619.	$1,398,383.	34.8

CALENDAR YEAR 1930

Coverage			
Casualty			
Public and Passenger Liability	$674,598.	$191,552.	28.4
Property Damage	225,799.	107,956.	47.8
Total Casualty	$900,397.	$299,508.	33.3
Hull			
Fire	$831,539.	$848,353.	102.0
Theft	28,578.	517.	1.8
Crash	1,159,693.	1,220,508.	105.2
Windstorm	32,758.	29,160.	89.0
Total Hull	$2,052,568.	$2,098,538.	102.2
Grand Total	$2,952,965.	$2,398,046.	81.2

TABLE II (Continued)
TOTAL EXPERIENCE—EACH COVERAGE SEPARATELY
CALENDAR YEAR 1931

Coverage	Premiums Written	Losses Paid	%
Casualty			
Public and Passenger Liability	$633,104.	$114,493.	18.1
Property Damage	144,909.	44,231.	30.5
Total Casualty	$778,013.	$158,724.	20.4
Hull			
Fire	$614,275.	$361,122.	58.8
Theft	33,626.	34,906.	103.8
Crash	799,844.	1,062,048.	132.8
Windstorm	—	—	—
Total Hull	$1,447,745.	$1,458,076.	100.7
Unallocated	70,894.	85,606.	
Grand Total	$2,296,652.	$1,702,406.	74.1

From Table I may be obtained a good idea of the relative volumes of business written during the period from 1926 to 1931 inclusive. Figures for 1932 will not become available until after July 1, 1933. Calendar year 1929, which was the year of greatest production for the manufacturers, was likewise the year of the greatest premium volume for the insurance carriers. Percentages are shown for convenience in making comparisons, but of course they should not be considered as loss ratios. Probably the percentages for the hull coverages in Table II are closer to true loss ratios than are the percentages shown for the casualty coverages. Public Liability premiums written and losses paid have very little significance without the corresponding loss reserves. Experienced casualty underwriters know from bitter experience that unsettled suits have a tendency to grow and that an apparent early profit is very often wiped out after suits are finally liquidated. However, it appears that in the aggregate casualty companies have fared better than their fire running mates. There can be no question that fire companies have lost money on aviation insurance. As has been expected the most costly hazard is crash.

After the Board of Aviation Underwriters has been functioning for one complete year, we shall probably see their work reflected in the experience figures. In other words the experience for 1932 should show a slight improvement and the experience for 1933 a very marked improvement.

Reinsurance

Aviation insurance is in reality catastrophe insurance. There is a very great potential hazard in carrying passenger liability on a plane with a carrying capacity of 8 to 30 passengers. Minor mishaps may and do occur, but carriers must be prepared for major accidents. An accident serious enough to kill one passenger is very likely to be severe enough to kill every passenger. It is necessary to spread this hazard among enough companies so that a loss will not seriously impair the resources of any of them. Experience has shown that large groups of companies can handle aviation insurance risks better even than the strongest single company.

Reinsurance is handled in a manner similar to that employed by fire companies on large risks. Direct writing companies and reinsurance companies may both participate. Amounts up to an agreed primary limit are usually apportioned among all the direct writing and reinsurance companies on an equal share or fixed percentage basis. Excess amounts or amounts over the primary limits are generally apportioned so that direct writing companies carry a small proportion of the excess on an equal share basis, leaving the reinsurance companies to share equally on the remaining portion. The reinsurance companies may in turn retrocede portions of their participation to one or more outside reinsurers.

Collections

In their handling of collections, aviation underwriters have profited from the experience of casualty underwriters. On many aircraft risks the agent collects a substantial percentage (usually 20 per cent.) of the premium at the time the assured gives him the order for the policy. The balance of the premium is payable upon delivery. There is no such thing as a "not taken" policy. All policies and binders issued are subject to an earned premium charge which is collected. On account of the impossibility of determining the full annual premium on business written on a reporting basis, such as air line policies, a substantial minimum deposit premium is collected. And, to date, no difficulty has been experienced in collecting additional premiums as they become due.

POLICY FORM

AVIATION CASUALTY INSURANCE COMPANY
(A STOCK COMPANY herein called the Company)

IN CONSIDERATION OF

A the Premiums specified in, and the Declarations forming a part hereof, and warranted by the Insured to be true, the Company does hereby agree with the Insured named herein, that if, during the term of this Policy, the aircraft described herein, by reason of its ownership, maintenance or use shall cause by accident

BODILY INJURIES

whether resulting fatally or otherwise, to any person or persons, as are provided for in the Schedule of Coverage, and/or

DAMAGE TO PROPERTY

other than property belonging to, or property in the custody of, the Insured, or property belonging to or in the control of the Insured's employes and/or pupils, or property which is rented or leased and for which the Insured is legally responsible, or property carried in or upon the aircraft covered hereby, and further, provided specific premium charges are made and inserted in the Schedule of Coverage therefor:

Then the Company will insure the Insured against loss arising out of such liability up to the amounts set forth in the Schedule of Coverage,

And will in addition, in the name and on behalf of the Insured

(1) **Defend** all claims or suits for damages for such injuries and/or property damage, and for which damages the Insured is, or is alleged to be, liable;

(2) **Pay all costs and expenses** incurred with the written consent of the Company;

(3) **Pay all court costs** taxed against the Insured in any suit, including the premiums on attachments and/or appeal bonds required in any such proceedings;

(4) **Pay all interest** accruing upon any judgment in any suit up to the date of the payment or tender to the judgment creditor, or his attorney of record, of the amount for which the Company is liable;

(5) **Repay to the Insured** the expenses incurred in providing such **immediate surgical relief** as is imperative at the time of the accident;

B NAME OF INSURED.....

ADDRESS OF INSURED.....

C TERM OF POLICY: From.....19..... noon

To.....19..... noon,

Standard Time at place policy is issued.

D This insurance applies to only such and so many of the Coverages named in the Schedule below as are indicated by specific premium in writing set opposite thereto. The limit of this Company's liability under each coverage shall be as stated in the General Conditions of this policy, not exceeding, however, the amounts set forth in said Schedule.

Section	SCHEDULE OF COVERAGE	Premium Charge
1	**Public Liability Excluding Passengers**—Bodily Injuries, whether resulting fatally or otherwise (including loss of services) to persons other than passengers in the aircraft herein described. The Company's liability for damages in respect of any one accident or disaster arising out of Bodily Injuries, including loss of services, shall not exceed $_____ subject to a limit of $_____ as to all loss or damage arising out of Bodily Injuries sustained by any one person.	$_____
2	**Passenger Liability**—Bodily Injuries, whether resulting fatally or otherwise (including loss of services) to passengers while in, or entering, or leaving the aircraft herein described. The Company's liability for damages in respect of any one accident or disaster arising out of Bodily Injuries, including loss of services, shall not exceed $_____ subject to a limit of $_____ as to all loss or damage arising out of Bodily Injuries sustained by any one person.	$_____
3	**Damage to Property of Others**—The Company's liability for damages in respect of any one accident or disaster involving damage to or destruction of property, shall be limited to the actual value of the property damaged or the actual cost of its suitable repair, including loss of use thereof, but shall not in any event exceed $_____	$_____

TOTAL PREMIUM $_____

E The following is the description of the aircraft covered by this policy:

Landplane Seaplane Flying Boat Amphibian	Make and Type	D. of C. License No.	When Constructed Month Year	Hours Flown	Seating Capacity Excluding Crew	ENGINE				
						H. P. and Make	Type	Identification No. or Marks	When Constructed Month Year	Hours Run

F **This Insurance is and shall be subject to the Conditions hereinafter set forth and to the memoranda, if any, endorsed hereon in like manner as if the same were respectively repeated and incorporated herein, and compliance with such Conditions and memoranda, and each of them, shall be a condition precedent to the right of recovery hereunder.**

GENERAL CONDITIONS

G Limits

1. If more than one person and/or corporation is covered by this Policy, that fact shall not increase the Company's total liability hereunder, but such total liability as to all shall not exceed, in any event, the specified limits.

Exclusions

2. This Policy does not cover any liability: (a) Imposed upon or assumed by the Insured under any Workmen's Compensation Act, Plan or Law, or under any agreement, oral or written; (b) In respect of injuries sustained by employes or pupils of the Insured while carried upon or operating or caring for aircraft herein described, or while engaged in the usual course of the trade, business, profession or occupation of the Insured.

Unless otherwise provided by agreement in writing added hereto this Policy does not cover any liability in respect of injuries and/or damage caused in whole or in part by the ownership, maintenance or use of any aircraft insured hereunder during or in consequence of:

(i) Invasion, insurrection, riot, civil war or commotion, military, naval or usurped power, or by order of any civil authority; or

(ii) Running the engine(s) of the aircraft in the hangar or place of housing; or

(iii) The first flight (comprising a complete circuit in the air and alighting successfully made without accident) of an aircraft after construction or reconstruction (reconstruction meaning any material change or alteration in the construction or material of the aircraft or parts thereof or in the type of engines used therein) but this shall not be construed as prohibiting the substitution of engines of like make, power and airworthiness; or

(iv) Any Municipal, State or Government Regulation for Civil Aviation not being complied with or while the aircraft is being used for any unlawful purpose; or

(v) The use of the aircraft for purposes other than those specified in the Schedule of Declarations or while the aircraft is being flown or driven by any person other than the pilot(s) named or described in said Schedule or a pilot specifically approved by the Company by endorsement attached to this Policy; or while the license of named pilot(s) has been revoked, suspended, changed, or has expired and not been renewed at the time of loss; or

(vi) Water-alighting aircraft flying in shore beyond safe gliding distance of water suitable for a landing, or land-alighting aircraft flying off shore beyond safe gliding distance of land; or

(vii) The aircraft described herein being rented or leased.

(viii) The aircraft described herein being operated in any race or speed contest, or pacemaking, or in an attempt at record breaking, or during or in consequence of aerial acrobatics; or

(ix) The aircraft described herein being in flight between one hour after sunset and one hour before sunrise,

except in the event the pilot shall have started during daylight for a destination that he may reasonably have been expected to reach before one hour after sunset, but on account of adverse winds, errors in navigation and/or other conditions beyond his control, and safe intermediate landing being impracticable, shall reach his destination later than one hour after sunset, the coverage under this policy shall not be invalidated; or

(x) The starting up of engine(s) of the aircraft without the use of chocks or other safeguard against forward movement of the aircraft.

Prompt Notice of Claims

3. Upon the occurrence of any accident covered by this Policy, the Insured shall give immediate written notice thereof to the Company at its Home Office, and forward to the Company forthwith after receipt thereof every process, pleading and paper of any kind relating to any and all claims, suits and proceedings. Notice given by or on behalf of the Insured to any authorized Agent of the Company, with particulars sufficient to identify the Insured, shall be deemed to be notice to the Company. Failure to give notice as required to be given within the time specified in this policy shall not invalidate any claim made by the Insured if it shall be shown not to have been reasonably possible to give such notice within the prescribed time and that notice was given as soon as was reasonably possible.

Settlement of Claims

4. The Insured shall not make any admission of liability, either before or after an accident, nor shall he, except at his own cost, incur any expense, make any payment, or settle any claim, nor shall he interfere in any negotiations for settlement or in any legal proceeding in respect of any injury for which the Company may be liable under this Policy, without, in each case, the written authority of the Company; except only that the Insured may provide at the time of the accident (and at the cost of the Company) such immediate surgical relief to the injured person or persons as is imperative. The Company shall have the right to settle any claim or suit at its own cost at any time.

Insured to Assist with Evidence

5. Whenever required by the Company, the Insured shall aid in securing information and evidence and the attendance of witnesses, and shall co-operate with the Company (except in a pecuniary way) in all matters which the Company may deem necessary in the defense of any claim or suit or in the prosecution of any appeal.

Subrogation of Rights

6. The Company shall be subrogated to all rights which the Insured may have against any person or other entity, in respect to any claim or payment made under this Policy, and the Insured shall upon request of the Company execute all papers necessary or convenient to secure the Company such rights.

Action Against Company

7. No action shall lie against the Company to recover upon any claim or for any loss sustained by the Insured, until the amount of such claim or loss shall have been fixed and rendered certain either by judgment against the Insured after trial of the issue or by agreement between the parties with the written consent of the Company nor unless brought within two years thereafter. This condition shall not prejudice any defense to any action to which the Company may be entitled.

Other Insurance

8. If the Insured carries other Insurance against loss covered by this Policy, the Company shall not be liable for a larger proportion of the entire loss than the amount hereby insured bears to the total amount of the Insured's valid and collectible Insurance.

Assignment of Interest

9. Any assignment or change of interest hereunder, whether voluntary or involuntary, shall render the Policy void unless consented to by endorsement hereon, signed by some official thereunto authorized by the Company.

Inspection

10. The Company shall be permitted at all reasonable times during the policy period to inspect any of the aircraft covered hereby, and all log-books appertaining thereto.

Cancellation of Insurance

11. This Policy or any one or more of the coverages provided in the Schedule of Coverage or by endorsement hereto shall be cancelled at any time at request of the Insured, in which case the Company shall refund the excess of paid premium above the customary short rate premium for the expired term, subject to the prior surrender of this Policy by the Insured if all the coverages provided have been cancelled. This Policy or any one or more of the coverages provided herein or by endorsement hereto may be cancelled at any time by this Company by giving to the Insured a five (5) days' written notice of cancellation with or without tender of the excess of paid premium above the pro rata premium for the expired term, which excess if not tendered shall be refunded on demand. Notice of cancellation shall state that said excess premium (if not tendered) will be refunded on demand. Notice of cancellation mailed to the address of the Insured stated in the Policy shall be a sufficient notice. Where a special provision for cancellation and notice of such cancellation is required by statutory enactment, the requirements of the provision required by such statute shall be substituted in lieu of the foregoing provision.

Insolvency

12. The insolvency or bankruptcy of the Insured shall not release the Company from any payment otherwise due hereunder, and if, because of such insolvency or bankruptcy, an execution on a judgment against the Insured is returned unsatisfied, the judgment creditor shall have a right of action against the Company to recover the amount of said judgment to the same extent that the Insured would have had to recover against the Company had the Insured paid the judgment.

Definitions

13. The term "disaster," wherever it appears in this Policy, or in any endorsement attached thereto, shall be held to mean a series of accidents arising from one and the same cause. The term "Passenger" wherever it appears in this policy or in any endorsement attached hereto, shall be held to mean only a person or persons carried in any aircraft herein described, other than the pilot(s), co-pilot(s), pupil(s) and/or employe(s) of the Insured.

Alterations in Policy

14. No alterations in the terms of this Policy or its conditions shall be valid unless the same be signed by some official thereunto authorized by the Company.

Conflicting Statutory Provisions

15. If any condition of this Policy is at variance with any specific statutory provision relating to Insurance Policies, which is in operation prior to the issue of this Policy, and which would otherwise inure to the benefit of the Insured, such specific statutory provision shall be substituted for such condition.

SCHEDULE OF DECLARATIONS

1. Insured's occupation or business is _____
2. Insured is employed by _____ of _____
3. The uses to which the aircraft will be put are in detail as follows: (state whether tests, delivery of aircraft, passenger or cargo carrying, pleasure, racing, sales demonstrations, photography, forest survey, trick flying, public exhibitions, advertising, etc., specifying precise nature. Do not use general terms such as "commercial" or "business.") _____
4. The Insured estimates that the aircraft will be flown _____ hours during the term of insurance.
5. The aircraft will not be used to carry passengers, except as follows: _____
   (State whether for hire or reward)
6. The aircraft described will usually be kept in _____ hangar, (State construction)
   located at _____
   (State precise location)
7. The aircraft will be used only within the geographical limits of _____
   (The narrower the limits the lower the premium)
8. The aircraft does not contain any novel, experimental or untried features of design or material, except as follows: _____
9. The last complete overhaul of the aircraft was _____ (State date)
   and of engine _____ (State date)
10. PILOT(S)

NAME	Age	License			Solo Hours	
		No.	Date	Classification	Total	Last 90 Days

11. No claims have ever been made by the Insured in connection with an aircraft or otherwise, except as follows: _____
12. No company or underwriter has at any time
    (a) Ever declined an application for insurance on behalf of Insured, or
    (b) Cancelled or refused to renew insurance, or
    (c) Ever declined an application in respect of the pilot, except as follows: _____
13. The Insured agrees that in the event of a claim or claims arising and being paid under this Policy and endorsements thereon, in an amount in excess of the stipulated premiums, then the entire premiums specified in the said Policy and endorsements shall be considered as earned and no return premiums shall be made.

CALCULATION OF THE COST OF UNEMPLOYMENT BENEFITS

(With Particular Reference to Ohio and Pennsylvania)

BY

CLARENCE A. KULP.

The hardships of the current depression have inevitably revived in this country proposals to apply the principles of insurance or reserves to one of depression's most serious hazards: that of unemployment. In Wisconsin an unemployment reserve law, not yet operative, has been passed. Legislative and other commissions have approved the principle of unemployment indemnity in at least seven other states; and commissioners representing the Governors of the six largest Eastern industrial states have unanimously urged on their chiefs the desirability of uniform legislation on the reserve plan. The following paper, on the calculation of the cost of unemployment benefits, discusses one aspect of the question that—sooner or later—must be decided in any thorough-going investigation. It is an aspect that, particularly in the propagandist stage of argument and discussion, is of small general interest. The vast majority both of opponents and proponents are interested in broad results, not in what both sides consider details of administration. To the present group it is quite unnecessary to present a case for another point of view, nor to elaborate the fact that rate-making is the central and vital feature of any system of true insurance. On its structure of rates or contributions will depend not only the adequacy but the equities of the entire system.

A word of explanation is in order on the definition of the subject and its delimitation to the states of Ohio and Pennsylvania. The expression, unemployment benefits, is taken to include either a plan promising a contractual right (i.e., insurance) or any systematic provision against unemployment without the element of contractual obligation (i.e., reserves). In his capacity first as the Pennsylvania representative of his Governor on the Interstate Commission on Unemployment Insurance and later as

advisor to the Pennsylvania Commission of the same title, the approach of the writer has naturally been in terms of his own state. It is evident, however, that Pennsylvania represents in the present instance not special but general conditions. It is so truly typical of the industrial states of the north and east that its conditions and the deductions one draws from them, may be taken as generally applicable to the entire industrial community. For Pennsylvania it is perfectly legitimate to read the name of any other industrial state, and we shall refer to it from time to time, without further explanation, with that understanding. Direct comparison has also been made with Ohio, for reasons that will presently appear; done originally at the request of the Pennsylvania Commission, this comparison makes still more definite our examination of rate-making for unemployment insurance or reserves.

Any actuarial problem divides itself automatically into two parts. There is first and foremost the question of the underlying data, only second the validity of the calculations based on these data. The computation of the cost of a system of unemployment benefits is not a particularly difficult one, provided the actuary is satisfied of the dependability of his raw materials. It is on this ground of statistical inadequacy that most criticism of cost calculations is based. Obviously if the fundamental data are not reliable, mere refinement or ingenuity of method cannot overcome a basic defect.

1. The Underlying Statistical Materials

For the calculation of unemployment benefits Pennsylvania provides meager statistical resources. For even the very crudest computations, three series of data are absolutely essential: (1) on the number of persons employed, (2) on the number and quality of persons unemployed, and (3) (if weekly and maximum benefits are related to wages) on payroll classified by the proportion of workers in each wage-group. Where, for example, in 1929 Ohio can produce (through its Department of Industrial Relations) direct data covering 97 per cent. of the total number of workers employed in manufacturing industry in that state, (measured by the Federal Census of Manufactures) Pennsyl-

vania can show direct information for only 30 per cent.[1] The discrepancy between available and complete data on the number of persons employed is even greater if the comparison is made for the entire working population. The Federal population census of April, 1930, reports for Pennsylvania 3,722,104 persons 10 years and over gainfully employed. If we assume that only 53 per cent. of these will be eligible under a scheme of unemployment benefits in Pennsylvania (this is the Ohio percentage) because of the elimination of farmers, professional people, employers and self-employers, 1,972,715 persons are to be accounted for. Yet in April, 1930, the Pennsylvania Department of Labor and Industry could account directly for only 542,141, a sample of 27 per cent.[2]

The unusual completeness of Ohio figures on total employment (as distinguished from employment in manufacturing industry) is due to the fact that the selling of workmen's compensation insurance is a monopoly of the state. A state like Pennsylvania, which permits sale of this insurance by private carriers naturally is less likely to collect complete data on unemployment as a part of its regulation of compensation.

When one looks for appropriate data on the number of persons unemployed, the material available is even more deficient. Aside from the studies made annually for Philadelphia since April, 1929, by the Department of Industrial Research of the University of Pennsylvania, there is no continuous information

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[1] It should be noted that, because of differences in classification, the Pennsylvania official figures are reported as a 42 per cent. sample of manufacturing industry in that state. If on this assumption we step up the 302,259 workers directly accounted for, Pennsylvania data represent 71 per cent. of its manufacturing workers. A revised but as yet unpublished index of employment of the Philadelphia Federal Reserve bank raises the scope of direct employment information to 52 per cent. of the total number of workers; or 93 per cent. if we extend the sample on the assumption above.

[2] Again there is a discrepancy in the size of the sample as measured in this manner and as reported in the Pennsylvania statistics. Even if we step up this figure of 542,141 to include all the workers represented according to the Pennsylvania statement, the total is still only 80 per cent. of the estimated eligibles.

The propriety of this extension of the sample is not beyond question. For example, the sample for retail trade represents only 25 per cent. of the total for its class; for wholesale trade only 12 per cent.; for construction and contracting only 3 per cent. By interpolation on other Federal and State figures an even greater sample is possible, but the results are derived, not direct.

on the rate or duration of unemployment or the number of unemployed. Excellent as these studies are within their scope, they show conditions for a single city, they represent a sample only, and three years of the four covered fall within a singularly malignant depression. Pennsylvania, it may be noted, is by no means alone in this handicap. The actuary for the Ohio Commission on Unemployment Insurance was forced to use data from the Federal population censuses as a base on which to compute the number of the unemployed and the rate of unemployment. For duration of unemployment—information vital in benefit calculations—he has had to use the 1930 Federal population census exclusively.

There are available in Pennsylvania apparently no useful data on payroll as required. The Ohio actuary again has had to adapt and interpolate: in this case his original material apparently was merely classified wage rates.

In summary, it is evident that of three basic series of data needed to compute the cost of a system of unemployment benefits, Pennsylvania is vitally lacking in all three. By comparison, Ohio is comparatively well off. Her most serious lacks are in the number and per cent. of unemployed persons, and in the duration of unemployment. Even for these data (save for duration) it has been possible for the Ohio actuary in some degree to check locally collected against Federal data, and therefore to give to his computations an aspect of reality considerably greater than to any that could be made in Pennsylvania.

2. The Method of Calculation

One cannot of course decide finally on the usefulness of statistical or actuarial materials apart from their specific purpose. Even for the elementary discussion in Part 1 of this paper a number of *a priori* assumptions—though they are reasonable enough—have been introduced. Final decision requires intensive, detailed analysis. The most desirable way to make this analysis would be in terms of a specific plan, preferably one intended for Pennsylvania. There is at this time no such plan, and rather than present a theoretical discussion of the statistical pros and cons of unemployment benefit calculations, the Ohio plan and the calculations supporting it will be used as a tangible

background. This procedure has the immense advantage of definiteness: not only is the Ohio unemployment insurance proposal a definite plan; it applies to conditions very similar to those of Pennsylvania, and most important of all, the calculations of the actuary, Dr. I. M. Rubinow, have been published in considerable detail. Various estimates of the cost of an unemployment benefit scheme have now appeared, but none but Ohio's fits so closely Pennsylvania conditions, no other includes an exhibit of the statistical raw material used by the actuary and a detailed statement of how this material was used.

The Ohio formula for computation of the cost of unemployment benefits follows. In the formula as such, as its author Dr. Rubinow observes, there is nothing actuarially new or radical. Whatever the questions or the criticisms that may be raised, they turn without exception on the materials that are used to fill in the formula. (P. 224)[3]

$$\frac{U \times B \times (I - W - L) \times (I - M)}{E}$$

in which:

U = Rate of unemployment (per cent. unemployed workers of total working force)

B = Rate of benefit (per cent. of wage loss covered by the benefit schedule)

I = Total quantity of unemployment, or unity

W = Discount for reduction in cost due to the waiting period

L = Discount for reduction in cost due to the limitation in the number of benefit-weeks per year

M = Discount for reduction in cost due to the limitation in dollar benefits per week.

Comments on the application of this formula to Ohio statistics may be considered under three heads: (1) those bearing on sections of the formula about which there is no question or at least no important question; (2) those bearing on questionable sections in which the result of inaccuracy is toward redundancy or safety; finally (3) those on sections not only questionable but producing deficient premiums.

[3] All page references are in Part II, Report of the Ohio Commission on Unemployment Insurance, January, 1933.

(1) *Sections of the Ohio Formula which appear satisfactory.*— We can raise no serious question about these components of the Ohio formula:[4]

(a) *Number of Unemployed and Rate of Unemployment.* Dr. Rubinow has taken as his average rate of unemployment 13.5 per cent., based on Ohio and Federal data for the years 1923-1931. This includes a full business swing, and while no one may predict even the near future of this changing world, this estimate appears to be a fair one. (The Paul Douglas data, running from 1897 to 1926, show an average of only 8 per cent. for the entire country and there is apparently no up-trend against which the actuary must guard.) It may be noted in passing that while the materials out of which the rate of unemployment has been calculated are partly of Federal origin, and are also to a considerable degree derived by interpolation, the relatively high level of unemployment assumed would appear to meet any reasonable criticism of this part of the calculation.[5]

(b) *Rate of Benefit.* No question; 50 per cent. maximum is fixed in the plan.

(c) I. No question.

(d) M. Ohio is very fortunate in having available exceptionally complete payroll data, arranged by the number of

[4] The allowance for expense loading, though it is not strictly a part of the rate-formula, is a part of the question of cost. The Ohio allowance of approximately 4 per cent. of premium income is apparently reasonable. As Dr. Rubinow points out, Ohio's conditions will determine Ohio's cost; in the meantime the German and British Unemployment Insurance Funds and the Ohio Workmen's Compensation Fund must serve as bases by analogy.

[5] The estimate of the average number of unemployed is made by deducting from the estimated number of persons eligible for benefit the number of persons employed. This method is indirect, and of course much less satisfactory than a direct count. Even to arrive at this result, the actuary has had to insert no less than three interpolations in his computations. The steps are: (1) The base is taken as the annual population 10 years and over (interpolated between 1920 and 1930); (2) application of the annual percentages of the population 10 years and over gainfully employed (interpolated between 1920 and 1930); (3) the result equals the number of workers gainfully employed; (4) application of the percentage of eligible workers to workers gainfully employed (the 1930 Federal Census average assumed constant for all years); (5) the result equals the number of workers eligible for benefit; (6) deduction of the annual number of workers employed (Ohio data); (7) the result equals the estimated annual number of workers unemployed. (7) divided by (5) equals the annual rate of unemployment. (See Table IV, p. 211.)

workers in 11 wage-groups. Even so it appears that interpolations have been made since the basic data are "tabulations . . . showing the distribution of persons by *classified rates of wages.*" (p. 220, italics mine.) Given total payroll for the state, it is a simple operation to check the percentage relation between full benefits at ½ of wages and benefits paid at ½ of wages but subject to a $15 or $17.50 weekly maximum.

(2) *Sections of the Formula which appear to produce redundant results.*—The method of calculating the effect on cost of the waiting period and of the limitation on number of benefit-weeks may be questioned; as will appear this is not a serious question because the net effect of the calculations is apparently toward redundancy or excess premiums. The entire calculation of (I — W — L) is based on Table VI in the Ohio Commission's Report, that classifying unemployed persons by duration of unemployment in number of weeks. Passing over entirely the fact that these duration figures are for a single point in time (April, 1930) and do not represent a running record of Ohio's experience; that extensive interpolation has been necessary to convert the broad duration classes of the Federal census into weekly duration classes; and finally that the table includes duration data for occupations excluded from Ohio benefits, we note three considerable inaccuracies in calculation.

The first two (and the least important) arise from the fact that the duration statistics employed are from a census, an observation of the statistical scene *at a given time,* and do not show duration frequencies *over a period.* To take a snapshot on a given day in April, 1930, is useful but the picture lacks its third dimension: that of breadth. What is needed is an annual exhibit showing (1) the number of weeks lost over a year, by duration-groups, (2) the ratio between the number of persons out of work on any given day and the total number of persons claiming benefits during a year, and (3) the ratio between the number of persons out of work on any given day and the total number of different persons claiming such benefits.

To illustrate, Table VI (whose duration data are for a single day in 1930) when interpolated by the writer produces a total of only 2,985,443 weeks lost from unemployment. Even if we

assume the low average of 40 weeks employment for 1930, this gives over 55,000,000 weeks for which Ohio's workers were employed. That is, a true duration table should produce (for 1930, with 1,390,400 eligibles and a 17.3 per cent. unemployment rate) a total loss of 9,621,568 weeks. The duration-table made from a census has quite evidently left out over two-thirds of the weeks lost. What will be the average ratio between the number of claimants on a given day and the total number of claims for a year cannot be predicted. British experience shows as high as 6 times the number of claims on the annual as compared with the census basis; and an average of 2.3 to 3.4 annual spells of unemployment per insured person.

The net effect of this use of census data on duration is to render cost estimates deficient. The effect of introducing the additional claimants which Dr. Rubinow leaves out (as tested by sample checks), is almost certainly to make his estimates too low. This is because most of the remainder of the claims if included would fall comfortably within the shorter durations and would be covered by the plan. On the other hand, the effect of introducing the multiple claimants which also are left out is in the opposite direction. This is because Dr. Rubinow assumes no reductions in cost due to the annual limit on benefits per beneficiary. In the absence of annual data such as we have described, one cannot state precisely the net effect of using census data deficient in these opposite directions. The net result would appear to be a deficiency of unknown quantity. In any event, before coming to a final decision on the adequacy of the value $(I - W - L)$, one other very important factor must be weighed.

The calculations based on Table VI include a third factor, one more important than either we have discussed above, which tends greatly toward redundancy. Not forgetting the true nature of Table VI (no rationalizing can change the fact that it represents a simple count on a single day), and assuming for the moment that it is an annual record, its use in the Ohio calculations subjects it to another criticism. As we have seen, the heart of the Ohio formula is $(I - W - L)$, which represents that part of unemployment remaining to be compensated after the important factors of waiting period and the limitation on benefit-weeks have been deducted. It is precisely in this value that there

occurs a curious shift in reasoning from a concept of unemployment as a number of weeks (I) to one as the number of men unemployed (W, L). *The computations of W and L values are all made on the number of persons unemployed, not on the number of weeks lost.* The result is a considerable overstatement of compensable unemployment, because *from the total of all unemployment in weeks are deducted W and L values which are in number of workers.* Because most unemployment falls within the lesser durations, almost without exception the percentage of unemployed persons in a benefit period is greater than the percentage of total unemployment in weeks that falls within the same period. Taking this cause of redundancy alone, sample tests by the writer based on a computation of weeks lost instead of men unemployed indicate that Dr. Rubinow's calculations on W and L values are redundant by quantities ranging from zero to 21 per cent. This redundancy, it should be noted, is quite apart from his use of census data.

Precisely what the net effect of these three causes of inaccuracy will be it is not possible to say. It would appear safe to assume that the marked over-estimate in the W and L values resulting from the confusion of compensable men and compensable weeks will be more than ample to offset whatever underestimate will develop in these same values due to the use of census instead of annual duration data.

3. *Sections of the Formula which appear to produce deficient results.*—The single point at which the Ohio formula might be questioned as deficient is in the treatment of the cost of part-time unemployment. No separate calculations are made; it is simply stated (p. 214) that all partial unemployment figures are included in the basic calculations. As we have seen, the process of estimating the number of unemployed consists of deducting from eligible workers persons reported employed to the Ohio Department of Industrial Relations. If all persons on Ohio payrolls are reported as employed from time to time, even though actually on part-time, the inevitable result is an understatement of the number of unemployed entitled to benefit, and of the true rate of unemployment. Just what the relation will be between the rates for full-time and part-time unemployment is another part of benefit calculations that must wait upon actual experi-

ence. Sample tests made by the writer on other data indicate that part-time unemployment, depending on the degree of business depression, ranges (in percentage equivalents of full-time unemployment) from less than one-fifth of the full-time rate to actually more than the full-time rate itself. Omission of calculation of part-time unemployment will thus introduce a noticeable element of deficiency into the rate structure.

Summary

Even he who has run through this paper has, we hope, been able to notice quite clearly the obstacles to a sound computation of a system of unemployment benefits for Pennsylvania or any other state. The difficulty is not one of technique, but of material; and the actuarial-statistical field is distinctly not one in which all obstacles may be triumphantly borne down by brilliant improvisation. The very first step in the Ohio cost computation is the comparison of a known and direct quantity (Ohio's employed) with an inferred quantity (Federal census data on Ohio's total labor force, interpolated and improvised). This is not an ideal situation certainly, yet in Pennsylvania we are still more badly off: we could devise the second factor but the first simply is not. (Pennsylvania's workmen's compensation records are not complete; annual reports from the Pennsylvania Department of Internal Affairs pertain principally to manufacturing industries.) To compare a guess with an inference is not permissible. Still more important is the required information on duration, so vital and so universally unavailable. Even the required data on payroll are not available.

Given these hindrances one must conclude that an unqualified calculation of the cost of unemployment benefits in Pennsylvania is at present not feasible. It is significant to note that while the Ohio plan has been titled "insurance" (and perhaps is insurance, depending on definition), it lacks that quality of certainty that is the first characteristic of the modern insurance institution. The Ohio Commission recognizes this lack of certainty: it leaves open in its plan the possibility both of emergency borrowing and of downward revision of benefits. This gesture of discretion has for other states at least one important implication. It is quite evidently not possible to give a promise of contractual unemploy-

ment benefits even in the state in which the statistical background is most favorable.

It has been argued in certain quarters that in this lack of certainty unemployment insurance is not different from any other; that no risk, including that underwritten by the life companies, is an absolute certainty; that all insurance plans are subject to revision; that when costs are too high for current premiums to bear, premiums are increased. But this is to argue that all risks are equally uncertain. Even with the statistics and experience of 20 years of operation to guide their calculations, the making of rates for workmen's compensation remains the great unsolved problem of casualty actuaries. Even allowing for the competitive and political reasons that cause some of their troubles (the latter at least would be a part also of unemployment rate-making), how much greater would be the difficulties of rate-making for an insurance with neither precedent nor experience to guide it?

One final comment. To make a statement of obstacles is not at all to decide permanently against insurance, nor against the collection of adequate statistical facilities, cooperative action of various kinds against unemployment, or even compulsory reserves. Actuarially, the ideal approach to the problem would consist of a system of compulsory unemployment reserves, providing standard premiums, benefits and administration, and stopping short of insurance only by the omission of contractual obligation. Such a system would serve as the perfect basis for the collection of data under actual administration, and could, whenever and if ever it were considered desirable, be converted gradually or *en bloc* into a system of insurance. If there is ever to be a sound actuarial basis for unemployment benefits, these three factors, statistics, cooperation and reserves, particularly the last, are best calculated to produce it.

AN AMERICAN REMARRIAGE TABLE

BY

WILLIAM F. ROEBER AND RALPH M. MARSHALL

In many lines of casualty insurance the entire amount of the loss is due and payable immediately upon its determination. In workmen's compensation insurance, however, it is customary for the losses to be paid in installments over an extended period, and in certain instances the payment is contingent upon the beneficiary's remaining alive and in the same conjugal condition. This is especially true of benefits in fatal cases. The compensation laws of the majority of the states provide that in the case of a fatal accident arising out of and in the course of employment, the widow of the deceased employee shall be entitled to compensation, payable periodically over a number of years, usually varying from four to eight, and the payment of such compensation is contingent upon the widow remaining alive and unmarried during the period. In New York and certain other states, such payments continue during the unmarried life of the widow. In order to set up proper reserves, compute present values in case of commutation of future payments to a lump sum, and carry out other calculations in regard to incurred losses, it is necessary to have information regarding death and remarriage probabilities.

There are a number of mortality tables in use at the present time, the most important in the workmen's compensation insurance field being the American Experience Table and the United States Life Tables. The former is based upon the experience of a large life insurance company and was first published in 1868. In some states the use of this table in determining any lump sum settlements payable under the workmen's compensation law is required by statute. The United States Life Tables are based upon census returns and contain separate tabulations regarding male and female lives. The latest complete set are based upon the census of 1910. These tables, being derived from general population statistics, are perhaps more representative of conditions found among beneficiaries under the various workmen's compensation acts than any table based upon life insurance

statistics, the mortality rate of which would be influenced by selection of desirable risks through medical examination.

However, when we come to the question of the rate of remarriage, there has been, up to the present time, no information from American sources available upon this subject; due, no doubt, to the fact that until comparatively recent years, there was no necessity for such information. When the adoption of workmen's compensation legislation made such statistics desirable, it was necessary to resort to foreign sources. The Insurance Departments of New York and Missouri have issued tables for commuting compensation benefits to a present value basis in fatal cases. The remarriage contingency of these tables depends upon statistics of the Dutch State Insurance Fund which administers the Workmen's Compensation Laws of Holland, the fatal benefits of which are much the same as those provided by the Compensation Act of the State of New York. These remarriage data have been in general use in the United States in connection with compensation cases.

Although a comparison of the table based upon the Dutch data with a limited volume of early American remarriage experience showed approximately the same average results,* the continued use of this table is open to question. During recent years there has been a growing feeling that we should have a remarriage table based upon United States statistics. The Dutch Table is based upon European statistics; more extensive American data may yield different results. The period covered was the latter part of the 19th century; customs may have changed considerably since then. The remarriage rates given are ultimate rates depending upon the widow's age; during the early years of widowhood, the duration of widowhood may have a greater effect upon the remarriage rate than the widow's age. No account is taken of the number of dependent children; possibly the number of children will have an influence on the remarriage rate. The construction of an American Remarriage Table was considered at various times by the United States Department of Labor, by the New York Department of Labor, and also by the Casualty Actuarial Society. In 1929 the development of such a table was

* See—"Remarriage Experience of Pennsylvania Compensation Insurance Carriers Policy Years 1916-1919", by E. H. Downey, *Proceedings,* Vol. VIII, Page 201; and Written Discussion by Mr. M. M. Dawson, *Proceedings,* Vol. IX, Page 107.

undertaken by the Society and the project was placed in charge of a committee consisting of seven members.

In considering sources from which the basic data could be obtained, the Committee recognized two possibilities. The data might be obtained either from industrial commissions or other state departments charged with the administration of the compensation laws, or directly from the insurance carriers. Further investigation showed that available state department records were somewhat limited in geographical distribution and in most instances were kept in such manner that the information required was not readily available. Accordingly, it was decided to secure the information directly from the insurance carriers' records, supplementing these data with experience obtained where possible from state departments, rating bureaus and monopolistic state funds.

A rough survey was made of the volume of experience which had developed since the adoption of compensation acts in the United States and it was estimated that between 17,000 and 18,000 cases involving widows would be available.

Inasmuch as most insurance carriers are accustomed to report their workmen's compensation experience to the National Council on Compensation Insurance, it was considered desirable to have the Council serve as the collecting agency for the remarriage data. The National Council agreed to gather the data and to perform all the clerical work necessary in the construction of a remarriage table. On November 15, 1929, the Call for Remarriage Data was issued. This call was sent to all members of the National Council and was supplemented by letters to state compensation insurance funds in monopolistic states and to carriers not affiliated with the National Council, requesting their cooperation and assistance. A supply of blank forms for reporting the experience was furnished to each cooperating organization. A copy of the form with detailed instructions for preparation of the report is appended as Exhibit I.

Before issuing the Call for Remarriage Data, the compensation laws of the various states were examined for conditions which might affect the accuracy of the carriers' claim records regarding remarriage. In some states the rate of compensation is not affected by remarriage and in other states the compensation is unaffected by remarriage when there are dependent children. In

such jurisdictions the insurance carriers have no vital reason to accurately record changes in the marital status of the widow. Accordingly the call was limited to fatal cases coming under compensation laws which provide for a material change in the benefits upon the widow's remarriage. The data were requested for the following jurisdictions: with limitations as indicated:—

Jurisdiction	REPORTS LIMITED TO CASES	
	Resulting From Accidents Occurring On And After	Involving
Alabama		
Arizona	November 3, 1925	
Colorado		Widow with no other dependents
Connecticut		Widow with no other dependents
District of Columbia		
Georgia		
Hawaii		
Idaho		
Illinois	July 1, 1927	Widow with no other dependents
Indiana		
Iowa	July 1, 1917	Widow with no other dependents
Kansas	March 12, 1913	
Kentucky		
Louisiana		
Maine	July 8, 1921	Widow with no other dependents
Maryland		Widow with no other dependents
Massachusetts	August 10, 1922	
Michigan	September 5, 1927	Widow with no other dependents
Minnesota		Widow with no other dependents
Missouri		Widow with no other dependents
Montana		
New Jersey	April 1, 1913	
New Mexico		
New York		
Rhode Island	April 1, 1926	
South Dakota		Widow with no other dependents
Tennessee		Widow with no other dependents
Utah		Widow with no other dependents
U. S. Longshoremen's Act		
Vermont		
Virginia		Widow with no other dependents

Except as noted above a report was requested on each fatal case, involving a dependent widow, arising at any time since the inception date of the compensation act. In states where information was desired only on cases arising after specified dates, the compensation laws prior to those dates were of such nature that

benefits to the widow were not materially altered by her remarriage.

The reporting agencies were asked to advise the National Council of any period for which their files did not contain the records for all reportable cases arising during that period. The carriers were also requested to report every case, showing all available information, even though their files were incomplete with regard to one or more items called for.

It will be noted from the blank form provided for reporting these statistics that the following items are listed:

Reporting Carrier

1. Husband's Name
2. Widow's Name
3. Identification No.
4. Policy Year
5. State
6. Classification
7. Date of Husband's Death (Month, Day, Year)
8. Date of Widow's Birth (or age at husband's death)
9. Date of Widow's Death
10. Date of Widow's Remarriage
11. (I) Date of Termination of Widow's Benefit other than (9) or (10)
    (II) Mode of Termination
12. Date Status of Case was Last Observed—Open Cases
13. Number of Dependent Children at Date of Husband's Death.

The name of the Carrier and the first six items were requested primarily for identification purposes. Item 4—"Policy Year" allowed of a division of the cases by period of occurrence. Item 5—"State" was included to permit an analysis by geographical division, and Item 6—"Classification" to provide the basic information for a study by kind of industry.

The remaining items are the essential ones which were used in the calculation of the remarriage rates. In order to give a clearer idea of the nature and purpose of these items it is desirable to present a definition of a remarriage rate and to outline the general principles of calculation.

For the purposes of this investigation, the remarriage rate is

defined as the probability that any specific widow, considered at a definite date, will remarry within one year from that date. In determining the remarriage rate, the Committee decided that the influence of the widow's age, the period of widowhood, the number of dependent children, the geographical division, and the type of industry in which her husband was engaged at time of the fatal injury, would be studied.

In general the method employed in determining the remarriage rate was to study the remarriage history of a large group of widows of the same age under observation for a period of one year. The remarriage rate was taken as the ratio of the number of remarriages to the total number under observation. Actually each case was observed for as long a period as possible and adjustments were made for duration of widowhood, and for withdrawals from observation due to death, end of legal period, or other causes.

As an initial step in the calculation of remarriage rates it was necessary to ascertain from the reports the following facts:—

(1) the widow's age at husband's death,
(2) the cause of withdrawal from observation, and
(3) the period of observation.

The widow's age at husband's death was determined in many cases directly from Item 8, which provides that in the event the exact date of the widow's birth is unknown, her age at husband's death shall be reported. Where the date of widow's birth was given, it was necessary to calculate the widow's age by computing the time from the date of her birth to the date of husband's death. It is customary for a person in stating his age to give it as of his last birthday. In order to keep the data homogenous, the widow's age at her birthday immediately preceding the date of her husband's death was calculated in cases where the date of birth was given. It was realized that this procedure would result in a remarriage table in which the tabulated ages would be on the average one-half year under the actual ages. However, no error will result if in the use of the table the widow's age at last birthday is used to enter.

The date and cause of withdrawal from observation were determined from the information reported under Items 9 to 12 inclusive. If the status of the widow remained unchanged during the period of observation, this fact was indicated by an entry

for Item 12 with Items 9, 10 and 11 blank. The following code was adopted to indicate the cause of withdrawal:—

Case still open at end of period	0
Death of widow	1
Remarriage of widow	2
Lump sum settlement	3
End of legal period	4
Claim disallowed	5
Any other	6

The period of observation was determined by calculating the elapsed time between the date of husband's death and the date of the last observation. On closed cases the date of last observation would be the date of the widow's death or remarriage, or the date of the final compensation payment. On open cases the date of last observation was that entered under Item 12. The period of observation was calculated in years and nearest whole months.

As the reports were received at the National Council they were audited and the required calculations made. The widow's age, the cause of withdrawal and the period of observation were noted on each report.

In cases where there were conflicting notations or apparent errors in the information given, the carriers were communicated with to ascertain the required corrections; and, in cases where some of the essential data were lacking, an attempt was made to secure the missing information.

The basic data were obtained from the individual case reports of the insurance carriers. The Pennsylvania data for all carriers were prepared by the Pennsylvania Compensation Rating and Inspection Bureau and furnished to the National Council. The New Jersey Compensation Rating and Inspection Bureau assisted in securing the data for New Jersey from carriers which are not members of the National Council, and the North Dakota Workmen's Compensation Bureau reported the data for that state. For all other states the insurance carriers reported directly to the Council. Considerable work was required in obtaining the necessary information from the files, and not all carriers were able to give the matter their immediate attention. As a result there was some delay in filing these reports and the returns were not all received until early in 1931.

In the meantime consideration was given to methods of tabulating and compiling the data submitted. It was felt that the use of punch cards for recording these data would be of great advantage, as the mechanical sorting would permit the data to be quickly assembled in any order desired, and the printer tabulator would allow the presentation of figures in the order decided upon and would facilitate the obtaining of sub-totals. Accordingly, a punch card for recording the remarriage data was drawn up and approved by the Committee on Remarriage Table. This punch card was arranged to record all of the essential information given on the remarriage form report. A facsimile of the card is given on page 287.

It will be noted that the items recorded are:—

1. Carrier Code Number
2. Policy Year
3. State Code Number
4. Classification and Schedule Code Number
5. Date of Husband's Death
6. Widow's Age at Husband's Death
7. Period of Observation—Years and Months
8. Mode of Withdrawal Code Number
9. Number of Dependent Children
10. Counter (Always Punched "1")
11. Case Serial Number

Standard codes for "Carrier" and "State" already existed and were adapted to this recording by the necessary additions. The numerical code, which was used to indicate the reason for withdrawal from observation, has already been given. The remaining items were numerical items and could be transferred to the punch card directly. The "counter" column was included as an aid in the summary of tabulations and was punched "1" for each case. The last item, "Case Serial Number," was included as an aid in identification in case it should be found desirable to refer back to the original report from the punch card. This serial number was assigned to the original report at the National Council.

It will be noted that the items recorded on the punch cards permit studies of remarriage to be made by state, by industry schedule, and by period.

The reports filed covered the experience for policy years 1911 to 1929 inclusive. A preliminary review of the data revealed that

CARRIER	POLICY YEAR	STATE	MANUAL CLASS		DATE OF HUSBAND'S DEATH			WIDOWS AGE LAST BIRTH-DAY	PERIOD OF OBSERVATION		WITH-DRAWAL	NO. OF DEP. CHILD.	COUNTER	SERIAL NUMBER	
			CODE	SCHED.	MO.	DAY	YR.		YRS.	MOS.					
0 0 0	0 0	0 0	0 0 0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0	0 0	0	0	0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 1	1 1	1 1	1 1 1 1	1 1	1 1	1 1	1 1	1 1	1 1	1 1	1	1 1	1	1	1 1 1 1 1 1 1 1 1 1 1 1 1 1
2 2 2	2 2	2 2	2 2 2 2	2 2	2	2 2	2 2	2 2	2 2	2 2	2	2 2	2	2	2 2 2 2 2 2 2 2 2 2 2 2 2 2
3 3 3	3 3	3 3	3 3 3 3	3 3	3	3 3	3 3	3 3	3 3	3 3	3	3 3	3	3	3 3 3 3 3 3 3 3 3 3 3 3 3 3
4 4 4	4 4	4 4	4 4 4 4	4 4	4	4	4 4	4 4	4 4	4 4	4	4 4	4	4	4 4 4 4 4 4 4 4 4 4 4 4 4 4
5 5 5	5 5	5 5	5 5 5 5	5 5	5	5	5 5	5 5	5 5	5 5	5	5 5	5	5	5 5 5 5 5 5 5 5 5 5 5 5 5 5
6 6 6	6 6	6 6	6 6 6 6	6 6	6	6	6 6	6 6	6 6	6 6	6	6 6	6	6	6 6 6 6 6 6 6 6 6 6 6 6 6 6
7 7 7	7 7	7 7	7 7 7 7	7 7	7	7	7 7	7 7	7 7	7 7	7	7 7	7	7	7 7 7 7 7 7 7 7 7 7 7 7 7 7
8 8 8	8 8	8 8	8 8 8 8	8 8	8	8	8 8	8 8	8 8	8 8	8	8 8	8	8	8 8 8 8 8 8 8 8 8 8 8 8 8 8
9 9 9	9 9	9 9	9 9 9 9	9 9	9	9	9 9	9 9	9 9	9 9	9	9 9	9	9	9 9 9 9 9 9 9 9 9 9 9 9 9 9
1 2 3	4 5	6 7	8 9 10 11	12 13	14 15	16 17	18 19	20 21	22 23	24 25	26	27 28	29	30	31 32 33 34 35 36 37 38 39 40 41 42 43 44 45

in many companies, claim files on closed cases had been destroyed for the early policy years and the required data could only be reported on cases that were still open. Inclusion of such cases as were reported for the earlier period would give a false basis of exposure and tend to distort the results. Therefore, it was decided that the study would be confined to data reported for policy years 1921 to 1929 inclusive.

Exhibit II presents a summary of the volume of the data which serves as the basis for the calculated remarriage rates. The number of cases observed, number of remarriages, and total exposure are given by age groups. The completed tables are based on 10,699 cases representing a total exposure of 37,040 years.

A further review of the data indicated that the remarriage rate varied more with the year of widowhood during the first few years than with the age of the widow. It was decided to prepare a select table showing remarriage rates by age of widow for each of the first six years of widowhood, the values for the sixth year to be considered as ultimate.

It was evident that the data were too limited to give dependable remarriage rates when each year of widowhood was separated into individual ages. In order to obtain a more substantial volume of data, it was decided to calculate remarriage rates for each individual age by using, under each year of widowhood, a five year moving average centered at the mid-age of the five year age period. For example the average remarriage rates for ages 16 to 20 inclusive would be taken for age 18; the average rates for 21 to 25 inclusive would be taken for age 23, etc. Then by considering a different grouping of ages, for example 17 to 21, 22 to 26, etc., the average rates for ages 19, 24, 29, etc., would be obtained. By continuing this process under each year of widowhood for five different tabulations a moving average of the remarriage rates for each consecutive age would be obtained.

In order to carry out this project, the punch cards were sorted according to widow's age at husband's death and were assembled in five year age groups. The cards for each age group were then sorted by "period of observation," (i.e. "duration of widowhood"). Finally, the "withdrawals" from observation during each year of widowhood were arranged according to "cause of withdrawal." The cards so arranged were then run through the printer tabulator and sub-totals obtained for each age group showing the total

number of withdrawals from observation according to the year of widowhood and according to cause of withdrawal. The summation of the number of months each case was under observation during the year of withdrawal was also obtained.

As previously stated, it was necessary to make five tabulations in all, a different age grouping being adopted for each. The various age groupings were as follows:—

Tabulation I		Tabulation II		Tabulation III		Tabulation IV		Tabulation V	
Age Group	Ave. Age	Age Group	Ave. Age	Age Group	Ave. Age	Age Group	Ave. Age	Age Group	Ave. Age
16 to 20	18	17 to 21	19	18 to 22	20	19 to 23	21	20 to 24	22
21 to 25	23	22 to 26	24	23 to 27	25	24 to 28	26	25 to 29	27
26 to 30	28	27 to 31	29	28 to 32	30	29 to 33	31	30 to 34	32
31 to 35	33	32 to 36	34	33 to 37	35	34 to 38	36	35 to 39	37
etc.		etc.		etc.		etc.		etc.	

The results of the tabulations were posted to work sheets which had been designed to facilitate the calculation of the remarriage rates. The form of these work sheets is given in Exhibit III. The total number of withdrawals from observation during each year of widowhood are entered in column (3) of the work sheet. A period of observation of under 12 months is considered as a withdrawal during the first year of widowhood. A period of observation of 12 months or more but under 24 months is considered as a withdrawal during the second year of widowhood, etc. The figures in column (4) are calculated by upward summation of column (3) and, for any particular year of widowhood, give the number surviving that year of widowhood; i.e. passing through that year of observation unmarried and entering the next year of observation. The number of deaths and number of remarriages during the particular year of observation are entered in columns (5) and (6) respectively. Column (7) shows for each year of widowhood the total of the fractional years of exposure incurred during the year by each case passing out of observation during that particular year for causes other than death or remarriage. The rate of remarriage has already been defined as the probability that any specific widow, considered at a definite date, will remarry within one year from that date. It follows from the definition that in determining this probability from observation, any case which remains under observation for a full year, will be regarded as "one trial" because remarriage at any time within a year from the beginning of observation will be a "successful

trial." Since the definition establishes the requirement of a full year's observation, it is evident that any observation for a period of less than one year in which the ultimate disposition of the case is unknown cannot be regarded as a full unit of exposure, or a "complete trial." Therefore, in obtaining the total exposure it is necessary to count each withdrawal from observation, in any particular year of widowhood, where the facts regarding subsequent remarriage of the widow are unknown, as a fractional unit of exposure equal to the fractional portion of the year the case remained under observation, and it is necessary to sum these fractional parts to obtain the whole units of exposure represented by such cases. As previously stated, the period of observation was calculated in terms of years and nearest whole months. In running the cards through the machine, the tabulator was set to take off the sub-totals of the months of observation for all cases withdrawing during each year. The figures shown in column (7) were obtained by combining the number of months exposure for cases other than death or remarriage and converting these totals to years.

The use of the fractional unit of exposure does not apply in the case of a death or of a remarriage. In each of these cases the ultimate disposition of the case is known. Using the language of probability, each death is a definite "failure," as the death makes remarriage impossible; and each remarriage is a "success," as the subsequent history of the case after remarriage is of no importance for the present investigation. Therefore, each death and each remarriage must be counted as a full "trial," or a full unit of exposure.

Finally any case which remains under observation for a complete year is an "unsuccessful trial," and the total number of such cases must be included in the total exposure. The total exposure during any year of widowhood is the sum of the figures in columns (4) to (7) inclusive. The total is given in column (8).

Given a large number of "trials" the probability of the occurrence of an event in a single trial is expressed by the ratio of the number of "successful trials" to the total number of "trials." In this particular instance, the probability is determined from the ratio of the number of remarriages (column (6)) to the total units of exposure (column (8)).

Work sheets were filled in for each of the five tabulations, and

remarriage rates were calculated in the manner described. The complete set of these work sheets showing remarriage rates is given in Exhibit III. As the exposure after the sixth year of widowhood was too small to yield reliable results, the calculations were not carried beyond that point.

For convenience of study, the ungraduated remarriage rates by age for each year of widowhood have been brought together in the first seven columns of Exhibit IV.

An examination of these ungraduated remarriage rates reveals in general the same type of curve for each year of widowhood, that is a declining rate from the younger ages to the older ages. As a first approach to the problem of graduating these data, it was assumed that the rate by age for each year of widowhood would respond to the same general function. Some of the earlier efforts were directed toward attempts to fit curves of the same general type to the data for each year of widowhood. Several methods of fitting curves were tried, but, due to the inadequacy of the data when subdivided by year of widowhood, the variations in ungraduated remarriage rates by age were so large that none of the resulting curves gave a satisfactory fit to the original data. However, when the remarriage rates were plotted against the ages, the same characteristic type of curve was produced for each year of widowhood, and this led to an investigation of the effect of combining the data for the six years of widowhood.

Average yearly rates of remarriage by age, based upon the combined experience, were calculated. These average rates are given in column (8) of Exhibit IV. It will be noted that the same general type of curve as for each year is produced, but the fluctuations are greatly reduced due to the increased volume of exposure. Therefore, it was decided that better results would be obtained by graduating these average rates, and then reconstructing the values for each year of widowhood from the smoothed data.

A number of methods of graduating these average rates were tried, namely:—

(1) The method described by Mr. H. C. Carver ("On the Graduation of Frequency Distributions," *Proceedings*, Volume VI, page 52). Briefly this method sets up the formula $\frac{l_{x+1}}{l_x} = \frac{x^2 + c_1 x + c_2}{x^2 + c_3 x + c_4}$. Values of the constants are determined from the ungraduated data.

(2) The method described by Mr. E. Olifiers ("Graduation of Marriage and Remarriage Tables by Mathematical Formulas," *Transactions,* Actuarial Society of America, Volume XXXI, page 223). This method assumes a general formula, colog $(1-r'_x) = \alpha' \beta^x$, where "$r'_x$" is the probability of marrying within one year at age x, and α' and β are constants. Values of the constants were determined from the ungraduated values of "r'_x." (The notation has been changed from the original article to agree with the notation used in the other methods).

(3) A method which consisted of fitting a simple exponential curve of the type $\log r'_x = a + bx$, to the data from age 18 to age 50. The curve was extended to obtain rates at ages over 50.

(4) A method which consisted of fitting a second degree parabola of the type $r'_x = a + bx + cx^2$ to the first differences of the ungraduated remarriage rates, and then recalculating the rates by use of these graduated differences, assuming the rate for the age with the greatest exposure to be correct.

(5) A method which consisted of fitting a third degree parabola of the type $r'_x = a + bx + cx^2 + dx^3$ directly to the original data.

Values of the constants in methods (3), (4) and (5) were obtained from the ungraduated data by the principles of the method of least squares. In methods (2), (3) and (5) two graduations were obtained; the first depending upon the simple ungraduated remarriage rates and the second depending upon these same rates weighted by the exposure.

The closeness of fit obtained by the various methods was tested by observation of the deviations of the ungraduated rates from the graduated. The most satisfactory graduation was obtained by use of the third degree parabola of the type described in (5) above, using the total exposures as shown on Exhibit IV, column (9) as weights. The constants in this formula were obtained by the method of least squares. The essential details of the calculations are given in Exhibit V. The formula so determined is:—

$$r'_x = .0134313 - .0011977\, y + .000061384\, y^2 - .0000011336\, y^3$$

where r'_x is the yearly probability of remarriage or the remarriage rate per unit of exposure, x the widow's age at husband's death, and $y = x - 45$. The substitution of y for $x - 45$ is made for convenience in calculating the constants by the method of least squares.

Graduated remarriage rates were obtained by substitution in the above formula, y passing from –27 for age 18 to plus 28 for age 73. These rates are shown in Exhibit VI, which also gives a comparison of graduated and ungraduated average rates showing both the deviations and the cumulative deviations. It will be noted that the number of "plus" deviations is approximately equal to the number of "minus" deviations, and furthermore that these deviations are not large. It will also be observed that the accumulated deviations as given in column (5) are small, indicating a fairly good fit for the entire range of data. The Committee accepted these graduated average rates as satisfactory.

The next problem was to obtain rates by year of widowhood from these graduated average rates. The relationship between the ungraduated rates for each year of widowhood and the average ungraduated rates for the six year period was examined by age. The linear relationship was established by the method of least squares and it was found that an approximately constant ratio by age for each year of widowhood prevailed. Some trend was observed but for certain years of widowhood the trend was in one direction and for other years the trend was in the opposite direction. A graphical illustration of this is given in Exhibit VII in which these trends have been plotted by age. It will be noted that the second, third and sixth years of widowhood show an increase with age in the ratio of the actual rate for the particular year of widowhood to the average rate for all six years combined, whereas the first, fourth and fifth years show a decreasing tendency. In view of the apparent lack of any laws governing the trend, it was decided that these trends had no special significance, but were due entirely to chance, and no appreciable error would be introduced by assuming a constant ratio by age for each year of widowhood.

Accordingly, the data for all ages were combined, and average remarriage rates by year of widowhood and in total were calculated. Differentials to the average rate were then calculated for

each year of widowhood. The details of these calculations are given in the first five columns of Exhibit VIII.

These differentials were applied to the graduated average rates, thus giving graduated remarriage rates by age for each year of widowhood. These rates were tested by applying them to the original exposure and comparing the resulting number of expected remarriages with the observed number of actual remarriages. The results of this test are given in Exhibit IX.

It was found that the expected number of remarriages did not exactly reproduce the actual number. Therefore, it was decided to introduce a slight modification of the differentials so that the resulting remarriage rates would reproduce the actual number of remarriages for each year of widowhood when applied against the exposure. The necessary modifications for each year of widowhood were obtained by taking the ratios of the expected number of remarriages to the actual number from the first test. The actual calculations are shown at the bottom of Exhibit IX. Adjustment factors obtained in this manner are shown in Exhibit VIII, column (6) and the revised differentials are given in column (7).

These revised differentials were applied to the graduated average remarriage rates producing the final graduated rates by age and by year of widowhood given in Exhibit X. These final rates were tested in the manner described for Exhibit IX and it was found that the number of expected remarriages exactly reproduced the actual number for each year of widowhood.

Questions were raised as to the necessity of introducing some differentials for a possible variation in remarriage rates due to a difference in racial stock, economic and social conditions, or due to the influence of a lump sum allowance on remarriage as under the New York Compensation Law. The data were divided geographically into New York, Pennsylvania and All Other States. The data for Pennsylvania were subdivided into experience for Coal Mines and experience for All Other classifications. Average ungraduated remarriage rates for the first six years of widowhood were calculated for each division in accordance with the previous procedure. The results of this test, which are shown in Exhibit XI, indicate a substantial agreement. It was decided that any variations could be accounted for by chance fluctuations due to

small exposure, and that the remarriage rates as originally determined are satisfactory for all districts.

An investigation was also made of the effect of the number of dependent children upon remarriage. To accomplish this the punch cards were sorted into the following five subdivisions:—

(a) widows with no dependent children,
(b) widows with one dependent child,
(c) widows with two dependent children,
(d) widows with three dependent children, and
(e) widows with four or more dependent children.

The age grouping used was 19 to 23, 24 to 28, 29 to 33, etc.

The tabulations were then carried through in the same manner as previously described and remarriage rates by age and according to the number of dependent children were calculated. These rates are shown in Exhibit XII and represent the average yearly rates from the combined data for the first six years of widowhood. The exposure by year of widowhood, when subdivided according to the number of dependent children, is too small to give reliable results.

Examination of the remarriage rates shown in Exhibit XII does not reveal any definite law regarding the effect of the number of dependent children. Although there does appear to be a very slight tendency for the rate to vary inversely with the number of dependent children, yet this tendency is so slight and there is so much variation in the results obtained that no definite conclusions can be drawn. Therefore, it appears that the influence of the number of dependent children need not be considered in determining the remarriage rates and that the rates as determined and shown in Exhibit X are satisfactory, at least until such time as it is possible to obtain a broader exposure.

The period covered by the data represents a fairly typical or average condition. There is a range from the depression of 1921 to the peak of prosperity in 1929. Furthermore, by commencing with policy year 1921 data, the effect of the war time period is excluded. While it is quite possible that present economic conditions have a material effect upon remarriage rates, it is the thought that some of these influences are offsetting, that the present conditions are abnormal, and that the calculated rates are fairly representative for normal conditions.

These remarriage rates have been combined with mortality rates for white females as obtained from the United States Life Tables for 1910. A slight adjustment in these mortality rates was necessary. The rates as given in the United States Tables are pure death rates whereas the desired rate is the probability of dying unmarried. This adjustment was made in the following manner:—

Let l_x^r equal the number living unmarried at beginning of age x
m_x^r equal the number remarrying at age x
d_x equal the number dying during age x
d_x^r equal the number dying unmarried during age x
r_x^r equal the probability of remarriage during age x
q_x equal the probability of death during age x
and q_x^r equal the probability of dying unmarried during age x

$$\text{Now } l_{x+1}^r = l_x^r - m_x^r - d_x^r$$
$$m_x^r = l_x^r \cdot r_x^r$$
$$\text{And } d_x = l_x^r \cdot q_x$$

If we assume an even distribution of deaths and remarriages throughout the year, of the d_x people dying during the year

$\frac{1}{2} m_x^r \cdot q_x$ die subsequent to remarriage.

$$\text{Therefore } d_x^r = d_x - \tfrac{1}{2} m_x^r \cdot q_x$$
$$= \left(l_x^r - \tfrac{1}{2} m_x^r\right) q_x$$
$$= \left(l_x^r - \tfrac{1}{2} l_x^r \cdot r_x^r\right) q_x$$
$$= l_{x}^r \left(q_x - \tfrac{1}{2} r_x^r \cdot q_x\right)$$
$$\text{But } d_x^r = l_x^r \cdot q_x^r$$
$$\text{Therefore } q_x^r = q_x - \tfrac{1}{2} r_x^r \cdot q_x$$

A mortality and remarriage table has been calculated assuming a radix of 100,000 at age 18. Tables are appended giving the customary values. Commutation column values assuming 3½% interest are also exhibited. The values are given in the form of select tables, giving five years of select experience in addition to ultimate values for ages up to and including age at entry 73. Values beyond this age are "ultimate" depending only upon mortality rates, as there are no remarriages beyond age at entry 73.

The following values are presented:

		Symbol
Table I	Number Living Unmarried at beginning of age x	l'_x
Table II	Number Remarrying during age x	m'_x
Table III	Number Dying Unmarried during age x	d'_x
Table IV	Probability of Remarriage during age x	r'_x
Table V	Probability of Dying Unmarried during age x	q'_x
Table VI	Probability of Surviving Unmarried during age x	p'_x
Table VII	Complete Expectation of Unmarried Life at age x	$\mathring{e}'_x$
Table VIII	Commutation Columns, 3½%	D'_x
Table IX	Commutation Columns, 3½%	N'_x
Table X	Commutation Columns, 3½% (Payable continuously)	$\overline{N}'_x$
Table XI	Commutation Columns, 3½%	$\overline{M}'_x$
Table XII	Ultimate Values (beyond age at entry 73)	

The following relationship exists between these tables:

1. $m'_x = l'_x \cdot r'_x$
2. $d'_x = l'_x \cdot q'_x$
3. $p'_x = 1.0 - (r'_x + q'_x)$
4. $l'_{x+1} = l'_x \cdot p'_x = l'_x - m'_x - d'_x$
5. $\mathring{e}'_x = (\Sigma l'_{x+1} \div l'_x) + \frac{1}{2}$
6. $D'_x = v^x \cdot l'_x$
7. $N'_x = \Sigma D'_x$
8. $\overline{N}'_x = \frac{1}{2}(N'_x + N'_{x+1})$
9. $\overline{M}'_x = \Sigma\, V^{x+\frac{1}{2}} \cdot m'_x$

It is not possible to make a direct comparison of remarriage rates from the tables listed above with corresponding values from the Dutch and Danish Tables because of the additional factor of year of widowhood which has been introduced. However, a comparison can be made of the expectation of remarriage at corresponding ages of entry from the two tables. The expectation of remarriage is taken as the ratio of the number of persons remarry-

ing at age at entry x and higher ages to the number living unmarried at the beginning of the age interval x, $(\Sigma m'_x \div l''_x)$. Such a comparison is shown in Exhibit XIII, columns (2) and (3). It will be noted that the expectation of remarriage is lower at the younger ages for the American experience. Exhibit XIII also shows comparisons of yearly mortality rates and of complete expectation of unmarried life. It will be observed that the mortality rates for American experience are higher than the corresponding Danish survivorship rates for ages 30 and older. The rates given for the American experience are the adjusted "unmarried death rates" during the first year of widowhood. Finally it will be noted that the complete expectation of unmarried life is greater in the American experience at the younger ages and greater in the Dutch and Danish at the older ages. The transition point is in the neighborhood of age 34. Reserves set up according to the American Table will be greater than reserves depending upon the Dutch and Danish Tables for ages under 34 and less for ages over 34.

The American Remarriage Table based upon an adequate volume of American experience and constructed as outlined in the preceding paragraphs may with reasonable safety be adopted for countrywide use. At some future date when more experience becomes available it may be desirable to introduce added refinements which are not practical at the present time.

EXHIBIT I

NATIONAL COUNCIL ON COMPENSATION INSURANCE

On Behalf of The Casualty Actuarial Society

INVESTIGATION OF REMARRIAGE RATE—1929

Reported by.....

1. Husband's Name

..... 4. Policy Year.....

2. Widow's Name

..... 5. State.....

3. Identification..... 6. Classification.....

	Mo.	Day	Year	Leave this space blank
7. Date of Husband's Death	.....	.....	.....	
8. Date of Widow's Birth (if unknown give widow's age at husband's death)	.....	.....	.....	.....
9. Date of Widow's Death	.....	.....	.....	
10. Date of Widow's Remarriage	.....	.....	.....	.....
11. I—Date of Termination of Widow's Benefit other than (9) or (10).....				
II—Mode of Termination				.....
a Lump Sum Settlement.....				
b End of Legal Period.....				
c Any Other				
12. Date Status of Case Was Last Observed—Open Cases	.....	.....	.....	
13. Number of Dependent Children at Date of Husband's Death	.....			

Form NC 220

EXHIBIT I (Cont.)

NATIONAL COUNCIL ON COMPENSATION INSURANCE

November 15, 1929

CALL FOR REMARRIAGE DATA

Instructions for Preparation of Report

Item 1 and 2 call for the names of the husband and widow respectively. These should be given in full.

3. Identification—Each carrier should use its own index system so that it may later identify the case, if necessary.

4. Policy Year—Under item 4 the carrier should record the year of issue of the policy covering the case reported.

5. State—Record the state under whose law the case was adjusted.

6. Classification—Give the code number of the classification to which the death case was assigned.

7. Date of Husband's Death—Fill in the date of the death of the husband. The dates in items 7 to 12 inclusive should if possible give the month, the day of the month and the year.

8. Date of Widow's Birth—Fill in the date of the birth of the widow. If the file does not disclose this information give the age of the widow at the time of the death of the husband.

9. Date of Widow's Death—Fill in the date of the death of the widow providing she has not been remarried and that compensation payment had not ceased prior to her death.

10. Date of Widow's Remarriage—Fill in the date of the remarriage of the widow provided compensation payments had not ceased prior to her remarriage.

11. Date of Termination—Fill in the date on which compensation payments terminated providing the termination was not caused by the widow's death or remarriage.

    Under 11—II, a b c, the mode of termination should be indicated by checking a or b, or briefly indicating any other termination under c.

12. Date Status of Case Was Last Observed—The date of the latest record in the file giving definite information as to the widow's status should be shown under item 12, if the case is still open. Item 12 should be given for all cases in which items 9, 10 and 11 are left blank.

13. Number of Dependent Children—Under this item the number of dependent children at the date of the husband's death should be indicated.

EXHIBIT II

Remarriage Data

Summary of Volume of Exposure

Widow's Age At Husband's Death	Number Cases Observed	Experience During First Six Years of Widowhood		
		Number Remarriages	Exposure in Years	Average Yearly Probability of Remarriage
(1)	(2)	(3)	(4)	(5)
16 to 20	395	145	1231	.1178
21 to 25	1088	278	3619	.0768
26 to 30	1402	294	4669	.0630
31 to 35	1507	190	5102	.0372
36 to 40	1475	105	5174	.0203
41 to 45	1265	78	4518	.0173
46 to 50	1117	46	3923	.0117
51 to 55	910	22	3462	.0064
56 to 60	728	16	2594	.0062
61 to 65	448	8	1505	.0053
66 to 70	260	4	904	.0044
71 to 75	104	1	339	.0029
Total	10699	1187	37040	.0320

EXHIBIT III

Remarriage Data

Calculation of Ungraduated Remarriage Rates—Tabulation I

Age Husb. Death (1)	Yr. of W.H. (2)	Total With-draw. (3)	No. Surv. Year (4)	No. Dth. (5)	No. Re-mar. (6)	Other Exps. Yrs. (7)	Total Exps. (4) to (7) (8)	Rem. Rate (6) ÷ (8) (9)	Age Husb. Death (1)	Yr. of W.H. (2)	Total With-draw. (3)	No. Surv. Year (4)	No. Dth. (5)	No. Re-mar. (6)	Other Exps. Yrs. (7)	Total Exps. (4) to (7) (8)	Rem. Rate (6) ÷ (8) (9)
	1	61	334	1	32	16	383	.0836		1	196	1311	8	40	85	1444	.0277
16	2	98	236	1	58	17	312	.1859	31	2	262	1049	5	62	83	1199	.0517
to	3	65	171	3	23	14	211	.1090	to	3	255	794	4	41	92	931	.0440
20	4	50	121	2	21	13	157	.1338	35	4	210	584	3	28	75	690	.0406
	5	39	82	0	8	16	106	.0755		5	153	431	4	12	63	510	.0235
Ave. 18									Ave. 33								
	6	74	8	1	3	50	62	.0484		6	352	79	2	7	240	328	.0213
	7	5	3	0	0	2	5			7	50	29	0	3	18	50	
	8	3	0	0	0	1	1			8	22	7	0	2	7	16	
	9	0	0	0	0	0	0			9	7	0	0	0	3	3	
(6 yrs.)	10	0	0	0	(145)	0	(1231)	(.1178)	(6 yrs.)	10	0	0	0	(190)	0	(5102)	(.0372)
	1	125	963	3	42	38	1046	.0402		1	178	1297	17	23	67	1404	.0164
21	2	218	745	1	93	57	896	.1038	36	2	232	1065	6	28	85	1184	.0236
to	3	222	523	4	64	69	660	.0970	to	3	245	820	4	28	87	939	.0298
25	4	138	385	0	53	38	476	.1113	40	4	193	627	6	11	82	726	.0152
	5	106	279	0	18	35	332	.0542		5	139	488	2	12	57	559	.0215
Ave. 23									Ave. 38								
	6	238	41	0	8	160	209	.0383		6	386	102	1	3	256	362	.0083
	7	22	19	0	3	6	28			7	55	47	2	1	22	72	
	8	16	3	0	4	4	11			8	35	12	0	2	13	27	
	9	3	0	0	1	0	1			9	10	2	0	0	2	4	
(6 yrs.)	10	0	0	0	(278)	0	(3619)	(.0768)	(6 yrs.)	10	2	0	0	(105)	1	(5174)	(.0203)
	1	169	1233	3	43	62	1341	.0321		1	128	1137	8	10	55	1210	.0083
26	2	297	936	3	119	83	1141	.1043	41	2	208	929	8	30	80	1047	.0287
to	3	248	688	3	59	85	835	.0707	to	3	204	725	6	16	75	822	.0195
30	4	175	513	2	49	57	621	.0789	45	4	166	559	4	13	71	647	.0201
	5	135	378	3	15	47	443	.0339		5	146	413	4	8	60	485	.0165
Ave. 28									Ave. 43								
	6	296	82	4	9	193	288	.0313		6	314	99	5	1	202	307	.0033
	7	58	24	1	0	25	50			7	55	44	1	1	18	64	
	8	17	7	0	1	7	15			8	36	8	0	0	15	23	
	9	7	0	0	0	1	1			9	8	0	0	0	2	2	
(6 yrs.)	10	0	0	0	(294)	0	(4669)	(.0630)	(6 yrs.)	10	0	0	0	(78)	0	(4518)	(.0173)

	1	149	968	18	8	59	1053	.0076		1	66	382	12	2	24	420	.0048
46	2	183	785	8	19	77	889	.0214	61	2	77	305	10	4	30	349	.0115
to	3	154	631	12	6	59	708	.0085	to	3	71	234	5	0	31	270	.0000
50	4	123	508	3	4	47	562	.0071	65	4	50	184	4	1	21	210	.0048
	5	139	369	6	6	58	439	.0137		5	53	131	2	1	23	157	.0064
Ave. 48									Ave. 63								
	6	293	76	2	3	191	272	.0110		6	98	33	3	0	63	99	.0000
	7	45	31	3	0	16	50			7	17	16	2	0	7	25	
	8	24	7	0	0	10	17			8	14	2	0	0	7	9	
	9	7	0	0	0	4	4			9	2	0	0	0	0	0	
(6 yrs.)	10	0	0	0	(46)	0	(3923)	(.0117)	(6 yrs.)	10	0	0	0	(8)	0	(1505)	(.0053)
	1	84	826	8	4	39	877	.0046		1	35	225	5	1	16	247	.0040
51	2	125	701	11	7	50	769	.0091	66	2	39	186	7	0	15	208	.0000
to	3	130	571	5	5	53	634	.0079	to	3	38	148	5	3	14	170	.0176
55	4	107	464	7	5	42	518	.0097	70	4	41	107	5	0	15	127	.0000
	5	111	353	7	1	48	409	.0024		5	31	76	4	0	12	92	.0000
Ave. 53									Ave. 68								
	6	277	76	4	0	175	255	.0000		6	57	19	2	0	39	60	.0000
	7	52	24	2	1	20	47			7	15	4	2	0	5	11	
	8	15	9	1	0	6	16			8	3	1	0	0	0	1	
	9	8	1	0	1	1	3			9	1	0	0	0	1	1	
(6 yrs.)	10	1	0	0	(22)	0	(3462)	(.0064)	(6 yrs.)	10	0	0	0	(4)	0	(904)	(.0044)
	1	93	635	10	0	44	689	.0000		1	13	91	3	0	5	99	.0000
56	2	107	528	12	8	43	591	.0135	71	2	22	69	7	1	6	83	.0120
to	3	98	430	14	5	31	480	.0104	to	3	21	48	2	0	9	59	.0000
60	4	100	330	7	1	44	382	.0026	75	4	9	39	5	0	2	46	.0000
	5	97	233	11	0	34	278	.0000		5	15	24	7	0	4	35	.0000
Ave. 58									Ave. 73								
	6	170	63	2	2	107	174	.0115		6	19	5	1	0	11	17	.0000
	7	33	30	4	0	12	46			7	5	0	0	0	3	3	
	8	26	4	1	0	8	13			8	0	0	0	0	0	0	
	9	4	0	0	0	1	1			9	0	0	0	0	0	0	
(6 yrs.)	10	0	0	0	(16)	0	(2594)	(.0062)	(6 yrs.)	10	0	0	0	(1)	0	(339)	(.0029)

EXHIBIT III—*Continued*

REMARRIAGE DATA

CALCULATION OF UNGRADUATED REMARRIAGE RATES—TABULATION II

Age Husb. Death	Yr. of W.H.	Total With-draw.	No. Surv. Year	No. Dth.	No. Re-mar.	Other Exps. Yrs.	Total Exps. (4) to (7)	Rem. Rate (6) ÷ (8)	Age Husb. Death	Yr. of W.H.	Total With-draw.	No. Surv. Year	No. Dth.	No. Re-mar.	Other Exps. Yrs.	Total Exps. (4) to (7)	Rem. Rate (6) ÷ (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	1	74	465	2	40	19	526	.0760		1	189	1310	8	39	76	1433	.0272
17	2	122	343	1	71	20	435	.1632	32	2	259	1051	6	57	82	1196	.0477
to	3	97	246	3	32	24	305	.1049	to	3	248	803	3	36	90	932	.0386
21	4	66	180	1	28	18	227	.1233	36	4	205	598	3	24	76	701	.0342
	5	59	121	0	13	22	156	.0833		5	152	446	4	13	47	510	.0255
Ave. 19									Ave. 34								
	6	109	12	1	4	80	97	.0412		6	361	85	2	5	246	338	.0148
	7	7	5	0	0	2	7			7	51	34	1	3	18	56	
	8	5	0	0	1	1	2			8	26	8	0	2	9	19	
	9	0	0	0	0	0	0			9	7	1	0	0	3	4	
(6 yrs.)	10	0	0	0	(188)	0	(1746)	(.1077)	(6 yrs.)	10	1	0	0	(174)	1	(5110)	(.0341)
	1	137	1060	2	43	47	1152	.0373		1	171	1294	18	18	65	1395	.0129
22	2	262	798	2	108	70	978	.1104	37	2	233	1061	5	34	85	1185	.0287
to	3	231	567	4	65	60	696	.0934	to	3	247	814	3	30	91	938	.0320
26	4	156	411	1	54	45	511	.1057	41	4	187	627	7	9	81	724	.0124
	5	110	301	0	16	38	355	.0451		5	140	487	4	12	56	559	.0215
Ave. 24									Ave. 39								
	6	254	47	0	8	182	237	.0338		6	382	105	1	4	250	360	.0111
	7	25	22	0	3	7	32			7	57	48	1	1	22	72	
	8	19	3	0	4	6	13			8	37	11	0	2	14	27	
	9	3	0	0	0	1	1			9	10	1	0	0	2	3	
(6 yrs.)	10	0	0	0	(294)	0	(3929)	(.0748)	(6 yrs.)	10	1	0	0	(107)	0	(5161)	(.0207)
	1	173	1220	4	42	55	1321	.0318		1	131	1074	7	11	58	1150	.0096
27	2	263	957	2	95	78	1132	.0839	42	2	210	864	12	28	81	985	.0284
to	3	255	702	5	57	88	852	.0669	to	3	190	674	11	12	67	764	.0157
31	4	176	526	2	47	55	630	.0746	46	4	156	518	3	11	67	599	.0184
	5	141	385	3	13	36	437	.0297		5	131	387	2	6	55	450	.0133
Ave. 29									Ave. 44								
	6	302	83	4	10	194	291	.0344		6	297	90	6	0	194	290	.0000
	7	59	24	1	0	24	49			7	51	39	1	1	17	58	
	8	17	7	0	1	6	14			8	31	8	0	0	13	21	
	9	7	0	0	0	1	1			9	8	0	0	0	3	3	
(6 yrs.)	10	0	0	0	(264)	0	(4663)	(.0566)	(6 yrs.)	10	0	0	0	(68)	0	(4238)	(.0160)

	1	133	957	19	6	50	1032	.0058		1	65	364	10	2	27	403	.0050
47	2	163	794	6	14	72	886	.0158	62	2	77	287	11	4	28	330	.0121
to	3	150	644	8	5	59	716	.0070	to	3	62	225	5	1	27	258	.0039
51	4	125	519	2	4	49	574	.0070	66	4	47	178	3	1	18	200	.0050
	5	142	377	7	6	58	448	.0134		5	50	128	2	0	22	152	.0000
Ave. 49									Ave. 64								
	6	297	80	1	3	194	278	.0108		6	95	33	4	0	61	98	.0000
	7	53	27	1	3	20	51			7	16	17	1	0	4	22	
	8	21	6	0	0	8	14			8	15	2	0	0	28	30	
	9	6	0	0	0	3	3			9	2	0	0	0	1	1	
(6 yrs.)	10	0	0	0	(38)	0	(3934)	(.0097)	(6 yrs.)	10	0	0	0	(8)	0	(1441)	(.0056)
	1	94	808	8	4	46	866	.0046		1	30	198	4	0	13	215	.0000
52	2	133	675	12	8	53	748	.0107	67	2	34	164	8	0	12	184	.0000
to	3	119	556	6	6	46	614	.0098	to	3	38	126	6	2	16	150	.0133
56	4	107	449	8	5	43	505	.0099	71	4	34	92	4	0	12	108	.0000
	5	120	329	9	1	49	388	.0026		5	27	65	3	0	32	100	.0000
Ave. 54									Ave. 69								
	6	251	78	5	0	141	224	.0000		6	50	15	2	0	34	51	.0000
	7	47	31	2	0	18	51			7	14	1	2	0	5	8	
	8	22	9	1	0	9	19			8	1	0	0	0	0	0	
	9	8	1	0	1	1	3			9	0	0	0	0	0	0	
(6 yrs.)	10	1	0	0	(24)	0	(3345)	(.0072)	(6 yrs.)	10	0	0	0	(2)	0	(808)	(.0025)
	1	85	570	11	1	38	620	.0016		1							
57	2	89	481	9	6	35	531	.0113		2							
to	3	97	384	12	4	31	431	.0093		3							
61	4	94	290	8	1	42	341	.0029		4							
	5	77	213	9	1	27	250	.0040		5							
Ave. 59																	
	6	163	50	1	2	99	152	.0132		6							
	7	27	23	3	2	9	37			7							
	8	19	4	1	0	6	11			8							
	9	4	0	0	0	1	1			9							
(6 yrs.)	10	0	0	0	(15)	0	(2325)	(.0065)		10							

EXHIBIT III—*Continued*

REMARRIAGE DATA

CALCULATION OF UNGRADUATED REMARRIAGE RATES—TABULATION III

Age Husb. Death	Yr. of W.H.	Total With-draw.	No. Surv. Year	No. Dth.	No. Re-mar.	Other Exps. Yrs.	Total Exps. (4) to (7)	Rem. Rate (6) ÷ (8)	Age Husb. Death	Yr. of W.H.	Total With-draw.	No. Surv. Year	No. Dth.	No. Re-mar.	Other Exps. Yrs.	Total Exps. (4) to (7)	Rem. Rate (6) ÷ (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	1	306	589	2	45	24	660	.0682		1	198	1277	7	37	79	1400	.0264
18	2	143	446	1	74	30	551	.1343	33	2	256	1021	7	55	83	1166	.0472
to	3	124	322	4	43	30	399	.1078	to	3	248	773	3	41	84	901	.0455
22	4	85	237	1	33	24	295	.1119	37	4	202	571	4	23	73	671	.0343
	5	70	167	0	13	26	206	.0631		5	133	438	3	11	56	508	.0217
Ave. 20									Ave. 35								
	6	148	19	1	5	103	128	.0391		6	360	78	1	3	244	326	.0092
	7	11	8	0	1	4	13			7	45	33	1	1	17	52	
	8	5	3	0	1	2	6			8	26	7	0	3	8	18	
	9	3	0	0	1	0	1			9	6	1	0	0	2	3	
(6 yrs.)	10				(213)		(2239)	(.0951)	(6 yrs.)	10	1	0	0	(170)		(4972)	(.0342)
	1	145	1107	1	47	51	1206	.0390		1	162	1299	17	19	63	1398	.0136
23	2	271	836	2	114	70	1022	.1115	38	2	241	1058	8	39	81	1186	.0329
to	3	248	588	3	68	79	738	.0921	to	3	236	822	2	23	87	934	.0246
27	4	163	425	1	56	49	531	.1055	42	4	176	646	7	11	74	738	.0149
	5	116	309	0	18	33	360	.0500		5	164	482	4	14	64	564	.0248
Ave. 25									Ave. 40								
	6	255	54	0	7	171	232	.0302		6	366	116	2	4	240	362	.0110
	7	33	21	1	2	11	35			7	63	53	1	1	23	78	
	8	17	4	0	3	7	14			8	41	12	0	1	17	30	
	9	4	0	0	0	1	1			9	11	1	0	0	3	4	
(6 yrs.)	10				(310)		(4089)	.0758	(6 yrs.)	10	1	0	0	(110)	0	(5182)	(.0212)
	1	167	1278	6	35	63	1382	.0253		1	127	996	10	8	54	1068	.0075
28	2	261	1017	3	82	82	1184	.0693	43	2	189	807	11	21	80	919	.0229
to	3	255	762	6	48	94	910	.0527	to	3	170	637	13	13	60	723	.0180
32	4	186	576	3	39	66	684	.0570	47	4	150	487	1	2	66	556	.0036
	5	151	425	4	12	60	501	.0240		5	122	365	4	4	52	425	.0094
Ave. 30									Ave. 45								
	6	336	89	5	12	215	321	.0374		6	286	79	4	1	188	272	.0037
	7	60	29	0	2	25	56			7	44	35	1	1	15	52	
	8	21	8	0	1	8	17			8	29	6	0	0	10	16	
	9	8	0	0	0	2	2			9	6	0	0	0	2	2	
(6 yrs.)	10				(228)		(4982)	(.0458)	(6 yrs.)	10				(49)		(3963)	(.0124)

	1	129	969	19	5	51	1044	.0048		1	57	314	8	1	24	347	.0029
48	2	160	809	4	13	71	897	.0145	63	2	69	245	12	3	25	285	.0105
to	3	149	660	7	5	58	730	.0068	to	3	49	196	6	2	19	223	.0090
52	4	131	529	4	6	50	589	.0102	67	4	42	154	4	1	15	174	.0057
	5	143	386	6	6	60	458	.0131		5	45	109	2	0	21	132	.0000
Ave. 50									Ave. 65								
	6	306	80	2	2	197	281	.0071		6	83	26	2	0	57	85	.0000
	7	53	27	3	1	20	51			7	12	14	0	0	5	19	
	8	18	9	0	0	7	16			8	12	2	0	0	5	7	
	9	9	0	0	0	3	3			9	2	0	0	0	1	1	
(6 yrs.)	10				(37)		(3999)	(.0093)	(6 yrs.)	10				(7)		(1246)	(.0056)
	1	93	761	6	3	47	817	.0037		1	24	172	3	0	11	186	.0000
53	2	127	634	17	6	48	705	.0085	68	2	23	149	7	0	7	163	.0000
to	3	112	522	6	5	47	580	.0086	to	3	33	116	4	1	15	136	.0074
57	4	100	422	8	3	40	473	.0063	72	4	28	88	4	0	9	101	.0000
	5	118	304	12	0	46	362	.0000		5	28	60	5	0	9	74	.0000
Ave. 55									Ave. 70								
	6	228	76	4	2	140	222	.0090		6	46	14	2	0	30	46	.0000
	7	44	32	4	0	16	52			7	13	1	1	0	4	6	
	8	24	8	2	0	9	19			8	1	0	0	0	0	0	
	9	7	1	0	1	1	3			9							
(6 yrs.)	10	1	0	0	(19)	1	(3159)	(.0060)	(6 yrs.)	10				(1)		(706)	(.0014)
	1	82	520	13	2	45	580	.0034		1							
58	2	88	432	5	6	37	480	.0125		2							
to	3	101	331	12	3	35	381	.0079		3							
62	4	83	248	6	1	37	292	.0034		4							
	5	59	189	5	1	23	218	.0046		5							
Ave. 60																	
	6	142	47	3	0	86	136	.0000		6							
	7	29	18	4	0	11	33			7							
	8	16	2	0	0	5	7			8							
	9	2	0	0	0	0	0			9							
(6 yrs.)	10	0	0	0	(13)	0	(2087)	(.0062)		10							

EXHIBIT III—*Continued*

REMARRIAGE DATA

CALCULATION OF UNGRADUATED REMARRIAGE RATES—TABULATION IV

Age Husb. Death (1)	Yr. of W.H. (2)	Total With-draw. (3)	No. Surv. Year (4)	No. Dth. (5)	No. Re-mar. (6)	Other Exps. Yrs. (7)	Total Exps. (4) to (7) (8)	Rem. Rate (6) ÷ (8) (9)	Age Husb. Death (1)	Yr. of W.H. (2)	Total With-draw. (3)	No. Surv. Year (4)	No. Dth. (5)	No. Re-mar. (6)	Other Exps. Yrs. (7)	Total Exps. (4) to (7) (8)	Rem. Rate (6) ÷ (8) (9)
	1	99	707	2	47	28	784	.0599		1	205	1313	9	31	86	1439	.0215
19	2	166	541	0	79	39	659	.1199	34	2	261	1052	7	47	87	1193	.0394
to	3	152	389	3	48	44	484	.0992	to	3	249	803	4	34	85	926	.0367
23	4	103	286	1	43	24	354	.1215	38	4	191	612	4	19	75	710	.0268
	5	79	207	0	15	29	251	.0598		5	135	477	3	13	55	548	.0237
Ave. 21									Ave. 36								
	6	184	23	1	5	128	157	.0319		6	384	93	1	3	257	354	.0085
	7	12	11	0	1	4	16			7	48	45	1	1	20	67	
	8	8	3	0	2	2	7			8	33	12	0	4	10	26	
	9	3	0	0	1	0	1			9	10	2	0	1	2	5	
(6 yrs.)	10				(237)		(2689)	(.0881)	(6 yrs.)	10	2		0	(147)	1	(5170)	.(0284)
	1	156	1176	2	45	58	1281	.0351		1	145	1234	15	15	56	1320	.0114
24	2	285	891	2	122	76	1091	.1118	39	2	228	1006	7	35	83	1131	.0309
to	3	258	633	4	67	81	785	.0854	to	3	229	777	1	21	88	887	.0237
28	4	165	468	1	51	51	571	.0893	43	4	170	607	6	13	67	693	.0188
	5	129	339	2	18	44	403	.0447		5	152	455	4	11	62	532	.0207
Ave. 26									Ave. 41								
	6	274	65	1	9	183	258	.0349		6	343	112	3	2	223	340	.0059
	7	43	22	1	2	15	40			7	64	48	1	1	23	73	
	8	17	5	0	2	8	15			8	38	10	0	0	15	25	
	9	5	0	0	0	1	1			9	10	0	0	0	2	2	
(6 yrs.)	10				(312)		(4389)	(.0711)	(6 yrs.)	10				(97)		(4903)	(.0198)
	1	172	1283	6	39	64	1392	.0280		1	129	975	11	8	55	1049	.0076
29	2	255	1028	3	72	78	1181	.0610	44	2	176	799	11	22	73	905	.0243
to	3	244	784	5	49	88	926	.0529	to	3	166	633	13	8	60	714	.0112
33	4	204	580	4	37	75	696	.0532	48	4	140	493	2	7	60	562	.0125
	5	159	421	3	13	62	499	.0261		5	119	374	5	3	48	430	.0070
Ave. 31									Ave. 46								
	6	336	85	4	11	221	321	.0343		6	298	76	4	3	193	276	.0109
	7	56	29	0	2	23	54			7	43	33	1	1	15	50	
	8	21	8	0	1	8	17			8	28	5	0	0	10	15	
	9	8	0	0	0	2	2			9	5	0	0	0	2	2	
(6 yrs.)	10				(221)		(5015)	(.0441)	(6 yrs.)	10				(51)		(3936)	(.0130)

	1	101	942	16	6	50	1014	.0059		1	50	276	5	1	22	304	.0033
49	2	157	785	4	9	70	868	.0104	64	2	63	213	12	3	23	251	.0120
to	3	137	648	7	3	54	712	.0042	to	3	36	177	5	2	12	196	.0102
53	4	128	520	4	4	51	579	.0069	68	4	37	140	4	1	13	158	.0063
	5	144	376	6	4	62	448	.0089		5	44	96	3	0	19	118	.0000
Ave. 51									Ave. 66								
	6	296	80	3	0	189	272	.0000		6	77	19	3	0	53	75	.0000
	7	53	27	3	1	20	51			7	10	9	0	0	5	14	
	8	16	11	0	0	6	17			8	7	2	0	0	2	4	
	9	11	0	0	1	3	4			9	2	0	0	0	1	1	
(6 yrs.)	10	0	0	0	(26)		(3893)	(.0067)	(6 yrs.)	10				(7)		(1102)	(.0064)
	1	106	689	8	2	51	750	.0027		1	17	152	4	0	7	163	.0000
54	2	118	571	18	6	45	640	.0094	69	2	25	127	8	0	6	141	.0000
to	3	113	458	8	8	43	517	.0155	to	3	33	94	5	1	15	115	.0087
58	4	98	360	8	2	42	412	.0049	73	4	24	70	4	0	9	83	.0000
	5	109	251	10	0	41	302	.0000		5	25	45	8	0	7	60	.0000
Ave. 56									Ave. 71								
	6	185	66	4	2	117	189	.0106		6	31	14	1	0	20	35	.0000
	7	38	28	4	0	14	46			7	14	0	2	0	6	8	
	8	23	5	2	0	8	15			8		0		0	0	0	
	9	4	1	0	0	1	2			9		0					
(6 yrs.)	10	1			(20)		(2810)	(.0071)	(6 yrs.)	10				(1)		(597)	(.0017)
	1	72	504	14	2	29	549	.0036		1							
59	2	83	421	5	6	33	465	.0129		2							
to	3	97	324	11	0	35	370	.0000		3							
64	4	78	246	5	1	34	286	.0035		4							
	5	45	191	5	1	21	218	.0046		5							
Ave. 61																	
	6	142	49	2	0	84	135	.0000		6							
	7	28	21	4	0	9	34			7							
	8	19	2	0	0	7	9			8							
	9	2	0	0	0	0	0			9							
(6 yrs.)	10				(10)		(2023)	(.0049)		10							

EXHIBIT III—*Continued*

REMARRIAGE DATA

CALCULATION OF UNGRADUATED REMARRIAGE RATES—TABULATION V

Age Husb. Death	Yr. of W.H.	Total With-draw.	No. Surv. Year	No. Dth.	No. Re-mar.	Other Exps. Yrs.	Total Exps. (4) to (7)	Rem. Rate (6) ÷ (8)	Age Husb. Death	Yr. of W.H.	Total With-draw.	No. Surv. Year	No. Dth.	No. Re-mar.	Other Exps. Yrs.	Total Exps. (4) to (7)	Rem. Rate (6) ÷ (8)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	1	110	837	3	43	33	916	.0469		1	199	1277	14	28	80	1399	.0200
20	2	193	644	0	92	48	784	.1173	35	2	250	1027	8	35	88	1158	.0302
to	3	182	462	2	51	58	573	.0890	to	3	234	793	5	28	83	909	.0308
24	4	117	345	0	51	30	426	.1197	39	4	188	605	4	16	82	707	.0226
	5	95	250	0	18	34	302	.0596		5	140	465	2	14	56	537	.0261
Ave. 22									Ave. 37								
	6	215	35	1	7	147	190	.0368		6	370	95	2	3	248	348	.0086
	7	17	18	0	3	4	25			7	51	44	1	1	22	68	
	8	14	4	0	3	4	11			8	31	13	0	3	11	27	
	9	4	0	0	1	0	1			9	11	2	0	1	2	5	
(6 yrs.)	10				(262)		(3191)	(.0821)	(6 yrs.)	10	2	0		(124)	1	(5058)	(.0245)
	1	158	1190	2	49	56	1297	.0378		1	132	1209	10	11	55	1285	.0086
25	2	291	899	4	118	77	1098	.1075	40	2	214	995	6	35	78	1114	.0314
to	3	251	648	5	63	79	795	.0792	to	3	229	766	3	22	83	874	.0251
29	4	169	479	1	48	54	582	.0824	44	4	161	605	6	13	65	689	.0189
	5	129	350	2	14	45	411	.0341		5	154	451	5	10	65	531	.0188
Ave. 27									Ave. 42								
	6	280	70	2	10	185	267	.0375		6	340	111	2	2	219	334	.0060
	7	50	20	1	0	23	44			7	60	51	1	2	21	75	
	8	16	4	0	1	6	11			8	42	9	0	0	17	26	
	9	4	0	0	0	1	1			9	9	0	0	0	2	2	
(6 yrs.)	10				(302)		(4450)	(.0679)	(6 yrs.)	10				(93)		(4827)	(.0193)
	1	184	1313	7	40	70	1430	.0280		1	133	974	15	9	51	1049	.0086
30	2	256	1057	2	70	81	1210	.0579	45	2	183	791	11	26	75	903	.0265
to	3	255	802	4	49	92	947	.0517	to	3	163	628	12	7	60	707	.0099
34	4	217	585	4	33	77	699	.0472	49	4	132	496	2	4	53	555	.0072
	5	153	432	4	12	63	511	.0235		5	130	366	5	3	56	430	.0070
Ave. 32									Ave. 47								
	6	352	80	3	8	233	324	.0247		6	286	80	5	3	185	272	.0110
	7	50	30	0	2	18	50			7	48	32	1	0	17	50	
	8	21	9	0	2	8	19			8	26	6	0	0	9	15	
	9	9	0	0	0	3	3			9	6	0	0	0	2	2	
(6 yrs.)	10				(212)		(5121)	(.0414)	(6 yrs.)	10				(52)		(3916)	(.0133)

	1	108	909	13	4	46	972	.0041		1	42	248	4	1	20	273	.0037
50	2	148	761	6	9	67	843	.0107	65	2	53	195	12	1	19	227	.0044
to	3	133	628	6	3	53	690	.0043	to	3	44	151	5	3	17	176	.0170
54	4	124	504	5	6	50	565	.0106	69	4	35	116	5	0	13	134	.0000
	5	124	380	5	4	52	441	.0091		5	38	78	4	0	16	98	.0000
Ave. 52									Ave. 67								
	6	306	74	2	0	197	273	.0000		6	60	18	2	0	40	60	.0000
	7	50	24	2	1	19	46			7	11	7	1	0	4	12	
	8	16	8	0	0	6	14			8	6	1	0	0	2	3	
	9	7	1	0	1	2	4			9	1	0			1	1	
(6 yrs.)	10	1			(26)	0	(3784)	(.0069)	(6 yrs.)	10				(5)		(968)	(.0052)
	1	103	621	9	1	50	681	.0015		1	18	130	4	0	8	142	.0000
55	2	100	521	15	5	38	579	.0086	70	2	30	100	7	1	8	116	.0086
to	3	100	421	13	7	34	475	.0147	to	3	25	75	3	0	11	89	.0000
59	4	92	329	9	0	41	379	.0000	74	4	15	60	2	0	5	67	.0000
	5	105	224	12	0	36	272	.0000		5	22	38	8	0	6	52	.0000
Ave. 57									Ave. 72								
	6	160	64	4	2	100	170	.0118		6	27	11	1	0	19	31	.0000
	7	36	28	5	0	13	46			7	11	0	1	0	4	5	
	8	24	4	2	0	8	14			8					0	0	
	9	4	0	0	0	1	1			9					0	0	
(6 yrs.)	10				(15)		(2556)	(.0059)	(6 yrs.)	10				(1)		(497)	(.0020)
	1	70	473	13	2	29	517	.0039		1							
60	2	85	388	7	7	32	434	.0161		2							
to	3	87	301	7	0	35	343	.0000		3							
64	4	73	228	4	2	33	267	.0075		4							
	5	52	176	3	1	21	201	.0050		5							
Ave. 62																	
	6	134	42	3	0	84	129	.0000		6							
	7	23	19	3	0	8	30			7							
	8	16	3	0	0	6	9			8							
	9	3	0	0	0	0	0			9							
(6 yrs.)	10				(12)		(1891)	(.0063)		10							

EXHIBIT IV

UNGRADUATED REMARRIAGE RATES BY AGE AND YEAR OF WIDOWHOOD

Age at Entry [x]	YEARLY PROBABILITY OF REMARRIAGE BY YEAR OF WIDOWHOOD						Ave. Rate	Exposure	y
	1st	2nd	3rd	4th	5th	6th	r'_x	W_x	$x-45$
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
18	.0836	.1859	.1090	.1338	.0755	.0484	.1178	1231	−27
19	.0760	.1632	.1049	.1233	.0833	.0412	.1077	1746	−26
20	.0682	.1343	.1078	.1119	.0631	.0391	.0951	2239	−25
21	.0599	.1199	.0992	.1215	.0598	.0319	.0881	2689	−24
22	.0469	.1173	.0890	.1197	.0596	.0368	.0821	3191	−23
23	.0402	.1038	.0970	.1113	.0542	.0383	.0768	3619	−22
24	.0373	.1104	.0934	.1057	.0451	.0338	.0748	3929	−21
25	.0390	.1115	.0921	.1055	.0500	.0302	.0758	4089	−20
26	.0351	.1118	.0854	.0893	.0447	.0349	.0711	4389	−19
27	.0378	.1075	.0792	.0824	.0341	.0375	.0679	4450	−18
28	.0321	.1043	.0707	.0789	.0339	.0313	.0630	4669	−17
29	.0318	.0839	.0669	.0746	.0297	.0344	.0566	4663	−16
30	.0253	.0693	.0527	.0570	.0240	.0374	.0458	4982	−15
31	.0280	.0610	.0529	.0532	.0261	.0343	.0441	5015	−14
32	.0280	.0579	.0517	.0472	.0235	.0247	.0414	5121	−13
33	.0277	.0517	.0440	.0406	.0235	.0213	.0372	5102	−12
34	.0272	.0477	.0386	.0342	.0255	.0148	.0341	5110	−11
35	.0264	.0472	.0455	.0343	.0217	.0092	.0342	4972	−10
36	.0215	.0394	.0367	.0268	.0237	.0085	.0284	5170	− 9
37	.0200	.0302	.0308	.0226	.0261	.0086	.0245	5058	− 8
38	.0164	.0236	.0298	.0152	.0215	.0083	.0203	5174	− 7
39	.0129	.0287	.0320	.0124	.0215	.0111	.0207	5161	− 6
40	.0136	.0329	.0246	.0149	.0248	.0110	.0212	5182	− 5
41	.0114	.0309	.0237	.0188	.0207	.0059	.0198	4903	− 4
42	.0086	.0314	.0251	.0189	.0188	.0060	.0193	4827	− 3
43	.0083	.0287	.0195	.0201	.0165	.0033	.0173	4518	− 2
44	.0096	.0284	.0157	.0184	.0133	....	.0160	4238	− 1
45	.0075	.0229	.0180	.0036	.0094	.0037	.0124	3963	0
46	.0076	.0243	.0112	.0125	.0070	.0109	.0130	3936	1
47	.0086	.0265	.0099	.0072	.0070	.0110	.0133	3916	2
48	.0076	.0214	.0085	.0071	.0137	.0110	.0117	3923	3
49	.0058	.0158	.0070	.0070	.0134	.0108	.0097	3934	4
50	.0048	.0145	.0068	.0102	.0131	.0071	.0093	3999	5
51	.0059	.0104	.0042	.0069	.0089	....	.0067	3893	6
52	.0041	.0107	.0043	.0106	.0091	....	.0069	3784	7

EXHIBIT IV—*Continued*

UNGRADUATED REMARRIAGE RATES BY AGE AND YEAR OF WIDOWHOOD

Age at Entry [x]	Yearly Probability of Remarriage by Year of Widowhood						Ave. Rate	Exposure	y
	1st	2nd	3rd	4th	5th	6th	r_x^r	W_x	$x-45$
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
53	.0046	.0091	.0079	.0097	.0024	....	.0064	3462	8
54	.0046	.0107	.0098	.0099	.0026	....	.0072	3345	9
55	.0037	.0085	.0086	.0063	....	.0090	.0060	3159	10
56	.0027	.0094	.0155	.0049	....	.0106	.0071	2810	11
57	.0015	.0086	.0147	....	....	.0118	.0059	2556	12
58	....	.0135	.0104	.0026	....	.0115	.0062	2594	13
59	.0016	.0113	.0093	.0029	.0040	.0132	.0065	2325	14
60	.0034	.0125	.0079	.0034	.0046	....	.0062	2087	15
61	.0036	.0129	....	.0035	.0046	....	.0049	2023	16
62	.0039	.0161	....	.0075	.0050	....	.0063	1891	17
63	.0048	.0115	....	.0048	.0064	....	.0053	1505	18
64	.0050	.0121	.0039	.0050	....	....	.0056	1441	19
65	.0029	.0105	.0090	.0057	....	....	.0056	1246	20
66	.0033	.0120	.0102	.0063	....	....	.0064	1102	21
67	.0037	.0044	.0170	....	....	....	.0052	968	22
68	.0040	....	.0176	....	....	....	.0044	904	23
69	....	....	.0133	....	....	....	.0025	808	24
70	....	....	.0074	....	....	....	.0014	706	25
71	....	....	.0087	....	....	....	.0017	597	26
72	....	.0086	....	....	....	....	.0020	497	27
73	....	.0120	....	....	....	....	.0029	339	28

EXHIBIT V

Graduation of Remarriage Rates by Method of Least Squares

Normal Equations and Constants

General equation

$$W_x \cdot r'_x = W_x \cdot a + W_x \cdot b \cdot y + W_x \cdot c \cdot y^2 + W_x \cdot d \cdot y^3$$

Normal equation I

$$\Sigma (W_x \cdot r'_x) = a \Sigma W_x + b \Sigma (W_x \cdot y) + c \Sigma (W_x \cdot y^2) + d \Sigma (W_x \cdot y^3)$$

Normal equation II

$$\Sigma (W_x \cdot r'_x \cdot y) = a \Sigma (W_x \cdot y) + b \Sigma (W_x \cdot y^2) + c \Sigma (W_x \cdot y^3) + d \Sigma (W_x \cdot y^4)$$

Normal equation III

$$\Sigma (W_x \cdot r'_x \cdot y^2) = a \Sigma (W_x \cdot y^2) + b \Sigma (W_x \cdot y^3) + c \Sigma (W_x \cdot y^4) + d \Sigma (W_x \cdot y^5)$$

Normal equation IV

$$\Sigma (W_x \cdot r'_x \cdot y^3) = a \Sigma (W_x \cdot y^3) + b \Sigma (W_x \cdot y^4) + c \Sigma (W_x \cdot y^5) + d \Sigma (W_x \cdot y^6)$$

From columns (8), (9) and (10) of Exhibit IV by multiplication and summation:—

$\Sigma W_x \cdot r_x = 5760.1530$	$\Sigma W_x \cdot y^2 = 33{,}043{,}423$
$\Sigma W_x \cdot r_x \cdot y = -81343.8753$	$\Sigma W_x \cdot y^3 = -279{,}107{,}681$
$\Sigma W_x \cdot r_x \cdot y^2 = 1{,}671{,}211.8583$	$\Sigma W_x \cdot y^4 = 12{,}280{,}606{,}471$
$\Sigma W_x \cdot r_x \cdot y^3 = -32{,}592{,}929.$	$\Sigma W_x \cdot y^5 = -122{,}867{,}202{,}665$
$\Sigma W_x = 183{,}150$	$\Sigma W_x \cdot y^6 = 5{,}816{,}915{,}438{,}000$
$\Sigma W_x \cdot y = -797765$	

Substituting these values in the normal equation and solving simultaneously the following values for the constants are obtained:—

$a = +.0134313$	$c = +.000061384$
$b = -.0011977$	$d = -.0000011336$

The graduation formula thus becomes:—

$$r'_x = .0134313 - .0011977y + .000061384y^2 - .0000011336y^3$$

EXHIBIT VI

REMARRIAGE RATES—AVERAGE OF 6 YEARS OF WIDOWHOOD

Age at Husband's Death (1)	Ungraduated 6 Year Average Rate (2)	Graduated 6 Year Average Rate (3)	Deviations (3) − (2) (4)	Cumulative Deviations Σ Col. (4) (5)
18	.1178	.1128	−.0050	−.0050
19	.1077	.1060	−.0017	−.0067
20	.0951	.0995	+.0044	−.0023
21	.0881	.0932	+.0051	+.0028
22	.0821	.0872	+.0051	+.0079
23	.0768	.0816	+.0048	+.0127
24	.0748	.0762	+.0014	+.0141
25	.0758	.0710	−.0048	+.0093
26	.0711	.0661	−.0050	+.0043
27	.0679	.0615	−.0064	−.0021
28	.0630	.0571	−.0059	−.0080
29	.0566	.0530	−.0036	−.0116
30	.0458	.0490	+.0032	−.0084
31	.0441	.0453	+.0012	−.0072
32	.0414	.0419	+.0005	−.0067
33	.0372	.0386	+.0014	−.0053
34	.0341	.0355	+.0014	−.0039
35	.0342	.0327	−.0015	−.0054
36	.0284	.0300	+.0016	−.0038
37	.0245	.0275	+.0030	−.0008

EXHIBIT VI—*Continued*

REMARRIAGE RATES—AVERAGE OF 6 YEARS OF WIDOWHOOD

Age at Husband's Death (1)	Ungraduated 6 Year Average Rate (2)	Graduated 6 Year Average Rate (3)	Deviations (3) − (2) (4)	Cumulative Deviations Σ Col. (4) (5)
38	.0203	.0252	+.0049	+.0041
39	.0207	.0231	+.0024	+.0065
40	.0212	.0211	−.0001	+.0064
41	.0198	.0193	−.0005	+.0059
42	.0193	.0176	−.0017	+.0042
43	.0173	.0161	−.0012	+.0030
44	.0160	.0147	−.0013	+.0017
45	.0124	.0134	+.0010	+.0027
46	.0130	.0123	−.0007	+.0020
47	.0133	.0113	−.0020	+.0000
48	.0117	.0104	−.0013	−.0013
49	.0097	.0095	−.0002	−.0015
50	.0093	.0088	−.0005	−.0020
51	.0067	.0082	+.0015	−.0005
52	.0069	.0077	+.0008	+.0003
53	.0064	.0072	+.0008	+.0011
54	.0072	.0068	−.0004	+.0007
55	.0060	.0065	+.0005	+.0012
56	.0071	.0062	−.0009	+.0003
57	.0059	.0059	+.0000	+.0003

EXHIBIT VI—*Continued*

REMARRIAGE RATES—AVERAGE OF 6 YEARS OF WIDOWHOOD

Age at Husband's Death (1)	Ungraduated 6 Year Average Rate (2)	Graduated 6 Year Average Rate (3)	Deviations (3) − (2) (4)	Cumulative Deviations Σ Col. (4) (5)
58	.0062	.0057	−.0005	−.0002
59	.0065	.0056	−.0009	−.0011
60	.0062	.0055	−.0007	−.0018
61	.0049	.0053	+.0004	−.0014
62	.0063	.0052	−.0011	−.0025
63	.0053	.0051	−.0002	−.0027
64	.0056	.0051	−.0005	−.0032
65	.0056	.0050	−.0006	−.0038
66	.0064	.0049	−.0015	−.0053
67	.0052	.0047	−.0005	−.0058
68	.0044	.0046	+.0002	−.0056
69	.0025	.0044	+.0019	−.0037
70	.0014	.0041	+.0027	−.0010
71	.0017	.0039	+.0022	+.0012
72	.0020	.0035	+.0015	+.0027
73	.0029	.0031	+.0002	+.0029

EXHIBIT VII

RATIOS OF REMARRIAGE RATES IN EACH OF FIRST SIX YEARS
OF WIDOWHOOD TO THE AVERAGE RATE
FOR THE SIX YEAR PERIOD
TREND LINES FITTED TO DATA FOR AGES 18 TO 60

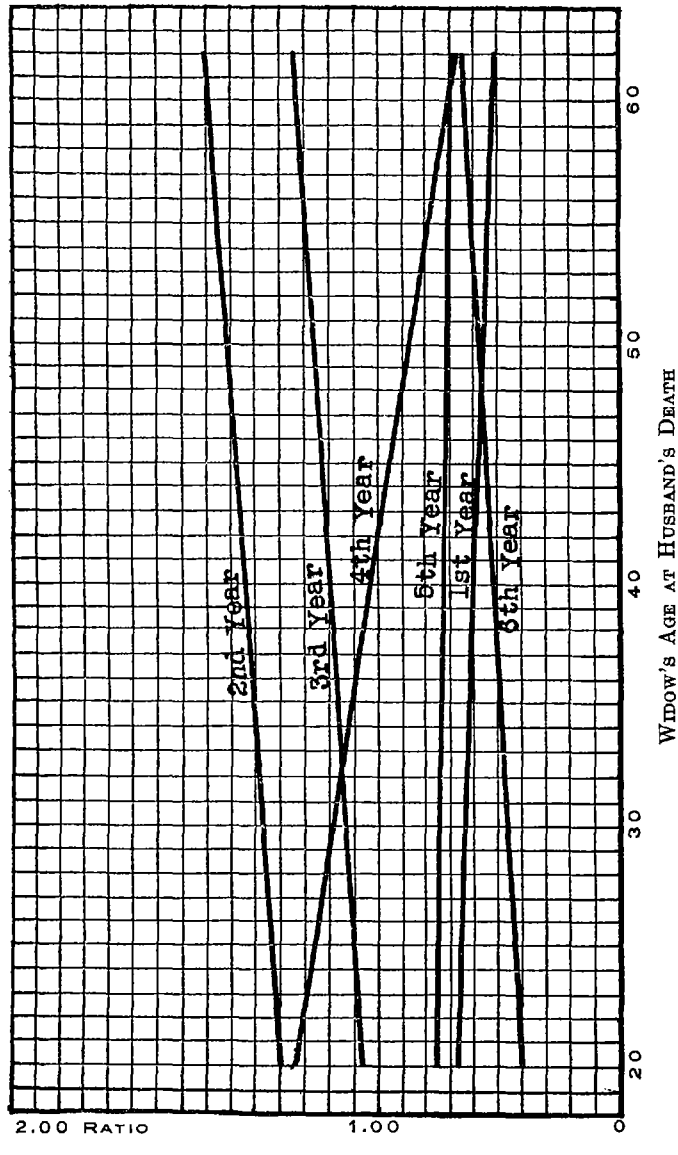

EXHIBIT VIII

AVERAGE RATE OF REMARRIAGE BY
YEAR OF WIDOWHOOD AND RATIO TO AVERAGE RATE
OF FIRST SIX YEARS

ADJUSTMENT TO REPRODUCE ACTUAL NUMBER OF REMARRIAGES
(Using Data for Widows From Age 16 to Age 75)

Year of Widowhood (1)	Number of Remarriages (2)	Exposure (3)	Remarriage Rate (2) ÷ (3) (4)	Ratio to Average Rate (4) ÷ (4a) (5)	Adjustment Factors (Exhibit IX) (6)	Adjusted Ratios to Average Rate (5) ÷ (6) (7)
1.....	205	10213	.02007246	.626355	1.0265	.6102
2.....	429	8668	.04949239	1.54440	1.0332	1.4948
3.....	250	6719	.03720792	1.16106	.9846	1.1793
4.....	186	5162	.03603255	1.12439	.9776	1.1502
5.....	81	3845	.02106632	.65738	.9403	.6991
6.....	36	2433	.01479655	.461722	.9343	.4942
(a) Total and Average	1187	37040	.03204644	1.0000	xx	xx

EXHIBIT IX

Test of Unadjusted Graduated Remarriage Rates
Comparison of Number of Expected Remarriages With Actual Number
(Number of Expected Remarriages Obtained by Applying Graduated Remarriage Rates to Exposure)

Age at Husband's Death	Number of Remarriages by Year of Widowhood												Total for First 6 Years of Widowhood	
	1st Year		2nd Year		3rd Year		4th Year		5th Year		6th Year			
	Act.	Exp.	Act.	Exp.	Act.	Exp.	Act.	Exp.	Act.	Exp.	Act.	Exp.	Act.	Exp.
18	32	27.1	58	54.4	23	27.6	21	19.9	8	7.9	3	3.2	145	140.1
19	40	34.9	71	71.2	32	37.5	28	27.1	13	10.9	4	4.7	188	186.3
20	45	41.1	74	84.7	43	46.1	33	33.0	13	13.5	5	5.9	213	224.3
21	47	45.8	79	94.8	48	52.4	43	37.1	15	15.4	5	6.8	237	252.3
22	43	50.0	92	105.6	51	58.0	51	41.7	18	17.3	7	7.7	262	280.3
23	42	53.5	93	112.9	64	62.5	53	43.7	18	17.8	8	7.9	278	298.3
24	43	55.0	108	115.1	65	61.6	54	43.8	16	17.8	8	8.3	294	301.6
25	47	53.7	114	112.1	68	60.8	56	42.4	18	16.8	7	7.6	310	293.4
26	45	53.0	122	111.4	67	60.2	51	42.4	18	17.5	9	7.9	312	292.4
27	49	49.9	118	104.3	63	56.8	48	40.3	14	16.6	10	7.6	302	275.5
28	43	48.0	119	100.6	59	55.4	49	39.9	15	16.6	9	7.6	294	268.1
29	42	43.9	95	92.7	57	52.4	47	37.5	13	15.2	10	7.1	264	248.8
30	35	42.4	82	89.6	48	51.8	39	37.7	12	16.1	12	7.3	228	244.9
31	39	39.5	72	82.7	49	48.7	37	35.4	13	14.9	11	6.7	221	227.9
32	40	37.5	70	78.3	49	46.1	33	32.9	12	14.1	8	6.3	212	215.2
33	40	34.9	62	71.5	41	41.7	28	29.9	12	13.0	7	5.8	190	196.8
34	39	31.8	57	65.5	36	38.4	24	28.0	13	11.9	5	5.4	174	181.0
35	37	28.7	55	58.9	41	34.2	23	24.7	11	10.9	3	4.9	170	162.3
36	31	27.1	47	55.2	34	32.2	19	23.9	13	10.8	3	4.9	147	154.1
37	28	24.1	35	49.2	28	29.0	16	21.8	14	9.7	3	4.4	124	138.2
38	23	22.2	28	46.1	28	27.5	11	20.5	12	9.3	3	4.2	105	129.8
39	18	20.2	34	42.3	30	25.1	9	18.8	12	8.5	4	3.9	107	118.8
40	19	18.5	39	38.7	23	22.9	11	17.5	14	7.8	4	3.5	110	108.9
41	15	16.0	35	33.7	21	19.9	13	15.0	11	6.8	2	3.0	97	94.4
42	11	14.1	35	30.3	22	17.8	13	13.6	10	6.2	2	2.7	93	84.7
43	10	12.2	30	26.1	16	15.4	13	11.7	8	5.1	1	2.3	78	72.8
44	11	10.6	28	22.4	12	13.1	11	9.9	6	4.4	0	2.0	68	62.4
45	8	9.0	21	19.0	13	11.3	2	8.4	4	3.7	1	1.7	49	53.1
46	8	8.1	22	17.2	8	10.2	7	7.8	3	3.5	3	1.6	51	48.4
47	9	7.4	26	15.8	7	9.3	4	7.0	2	3.2	1	1.4	50	44.1

48	8	6.8	19	14.3	6	8.6	4	6.6	6	3.0	3	1.3	46	40.6
49	6	6.2	14	13.0	5	7.9	4	6.1	6	2.8	3	1.2	38	37.2
50	5	5.7	13	12.2	5	7.4	6	5.8	6	2.7	2	1.2	37	35.0
51	6	5.2	9	11.0	3	6.8	4	5.3	4	2.4	0	1.0	26	31.7
52	4	4.7	9	10.0	3	6.1	6	4.9	4	2.2	0	1.0	26	28.9
53	4	3.9	7	8.5	5	5.3	5	4.2	1	1.9	0	0.8	22	24.6
54	4	3.7	8	7.9	6	4.9	5	3.8	1	1.7	0	0.7	24	22.7
55	3	3.3	6	7.1	5	4.4	3	3.5	0	1.6	2	0.7	19	20.6
56	2	2.9	6	6.1	8	3.7	2	2.9	0	1.2	2	0.5	20	17.3
57	1	2.5	5	5.3	7	3.3	0	2.5	0	1.1	2	0.5	15	15.2
58	0	2.5	8	5.2	5	3.2	1	2.4	0	1.0	2	0.5	16	14.8
59	1	2.2	6	4.6	4	2.8	1	2.1	1	0.9	2	0.4	15	13.0
60	2	2.0	6	4.1	3	2.4	1	1.8	1	0.8	0	0.3	13	11.4
61	2	1.8	6	3.8	0	2.3	1	1.7	1	0.8	0	0.3	10	10.7
62	2	1.7	7	3.5	0	2.1	2	1.5	1	0.7	0	0.3	12	9.8
63	2	1.3	4	2.8	0	1.6	1	1.2	1	0.5	0	0.2	8	7.6
64	2	1.3	4	2.6	1	1.5	1	1.1	0	0.5	0	0.2	8	7.2
65	1	1.1	3	2.2	2	1.3	1	1.0	0	0.4	0	0.2	7	6.2
66	1	0.9	3	1.9	2	1.1	1	0.9	0	0.4	0	0.2	7	5.4
67	1	0.8	1	1.7	3	1.0	0	0.7	0	0.3	0	0.1	5	4.6
68	1	0.7	0	1.5	3	0.9	0	0.7	0	0.3	0	0.1	4	4.2
69	0	0.6	0	1.3	2	0.8	0	0.5	0	0.3	0	0.1	2	3.6
70	0	0.5	0	1.0	1	0.7	0	0.5	0	0.2	0	0.1	1	3.0
71	0	0.4	0	0.8	1	0.5	0	0.4	0	0.2	0	0.1	1	2.4
72	0	0.3	1	0.6	0	0.4	0	0.3	0	0.2	0	0.0	1	1.8
73	0	0.2	1	0.4	0	0.2	0	0.2	0	0.1	0	0.0	1	1.1
Totals	997	1023.4	2067	2135.7	1226	1207.1	896	875.9	395	371.4	178	166.3	5759	5779.8
Differential Correction Factors	1023.4 / 997 = 1.0265		2135.7 / 2067 = 1.0332		1207.1 / 1226 = .9846		875.9 / 896 = .9776		371.4 / 395 = .9403		166.3 / 178 = .9343		XXX	

EXHIBIT X

Graduated Remarriage Rates

Adjusted to Approximate Actual Number of Remarriages in Each Year of Widowhood

Age at Entry [x]	Average Remarriage Rate	YEARS ELAPSED SINCE HUSBAND'S DEATH						Age Attained x+5
		0	1	2	3	4	5 or more	
		$r^r_{[x]}$	$r^r_{[x]+1}$	$r^r_{[x]+2}$	$r^r_{[x]+3}$	$r^r_{[x]+4}$	r^r_{x+5}	
		(2)x .6102	(2)x 1.4948	(2)x 1.1793	(2)x 1.1502	(2)x .6991	(2)x .4942	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
18	.1128	.0688	.1686	.1330	.1297	.0789	.0557	23
19	.1060	.0647	.1584	.1250	.1219	.0741	.0524	24
20	.0995	.0607	.1487	.1173	.1144	.0696	.0492	25
21	.0932	.0569	.1393	.1099	.1072	.0652	.0461	26
22	.0872	.0532	.1303	.1028	.1003	.0610	.0431	27
23	.0816	.0498	.1220	.0962	.0939	.0570	.0403	28
24	.0762	.0465	.1139	.0899	.0876	.0533	.0377	29
25	.0710	.0433	.1061	.0837	.0817	.0496	.0351	30
26	.0661	.0403	.0988	.0780	.0760	.0462	.0327	31
27	.0615	.0375	.0919	.0725	.0707	.0430	.0304	32
28	.0571	.0348	.0854	.0673	.0657	.0399	.0282	33
29	.0530	.0323	.0792	.0625	.0610	.0371	.0262	34
30	.0490	.0299	.0732	.0578	.0564	.0343	.0242	35
31	.0453	.0276	.0677	.0534	.0521	.0317	.0224	36
32	.0419	.0256	.0626	.0494	.0482	.0293	.0207	37
33	.0386	.0236	.0577	.0455	.0444	.0270	.0191	38
34	.0355	.0217	.0531	.0419	.0408	.0248	.0175	39
35	.0327	.0200	.0489	.0386	.0376	.0229	.0162	40
36	.0300	.0183	.0448	.0354	.0345	.0210	.0148	41
37	.0275	.0168	.0411	.0324	.0316	.0192	.0136	42
38	.0252	.0154	.0377	.0297	.0290	.0176	.0125	43
39	.0231	.0141	.0345	.0272	.0266	.0161	.0114	44
40	.0211	.0129	.0315	.0249	.0243	.0148	.0104	45
41	.0193	.0118	.0288	.0228	.0222	.0135	.0095	46
42	.0176	.0107	.0263	.0208	.0202	.0123	.0087	57

43	.0161	.0098	.0241	.0190	.0185	.0113	.0080	48
44	.0147	.0090	.0220	.0173	.0169	.0103	.0073	49
45	.0134	.0082	.0200	.0158	.0154	.0094	.0066	50
46	.0123	.0075	.0184	.0145	.0141	.0086	.0061	51
47	.0113	.0069	.0169	.0133	.0130	.0079	.0056	52
48	.0104	.0063	.0155	.0123	.0120	.0073	.0051	53
49	.0095	.0058	.0142	.0112	.0109	.0066	.0047	54
50	.0088	.0054	.0132	.0104	.0101	.0062	.0043	55
51	.0082	.0050	.0123	.0097	.0094	.0057	.0041	56
52	.0077	.0047	.0115	.0091	.0089	.0054	.0038	57
53	.0072	.0044	.0108	.0085	.0083	.0050	.0036	58
54	.0068	.0041	.0102	.0080	.0078	.0048	.0034	59
55	.0065	.0040	.0097	.0077	.0075	.0045	.0032	60
56	.0062	.0038	.0093	.0073	.0071	.0043	.0031	61
57	.0059	.0036	.0088	.0070	.0068	.0041	.0029	62
58	.0057	.0035	.0085	.0067	.0066	.0040	.0028	63
59	.0056	.0034	.0084	.0066	.0064	.0039	.0028	64
60	.0055	.0034	.0082	.0065	.0063	.0038	.0027	65
61	.0053	.0032	.0079	.0063	.0061	.0037	.0026	66
62	.0052	.0032	.0078	.0061	.0060	.0036	.0026	67
63	.0051	.0031	.0076	.0060	.0059	.0036	.0025	68
64	.0051	.0031	.0076	.0060	.0059	.0036	.0025	69
65	.0050	.0031	.0075	.0059	.0058	.0035	.0025	70
66	.0049	.0030	.0073	.0058	.0056	.0034	.0024	71
67	.0047	.0029	.0070	.0055	.0054	.0033	.0023	72
68	.0046	.0028	.0069	.0054	.0053	.0032	.0023	73
69	.0044	.0027	.0066	.0052	.0051	.0031	.0022	74
70	.0041	.0025	.0061	.0048	.0047	.0029	.0020	75
71	.0039	.0024	.0058	.0046	.0045	.0027	.0019	76
72	.0035	.0021	.0052	.0041	.0040	.0024	.0017	77
73	.0031	.0019	.0046	.0037	.0036	.0022	.0015	78

EXHIBIT XI

AVERAGE UNGRADUATED REMARRIAGE RATES BY STATE DIVISIONS
AVERAGE YEARLY PROBABILITY OF REMARRIAGE
(First Six Years of Widowhood Combined)

	Penn. C. M.	Penn. Inds.	N. Y.	A. O.	Total
16 to 20	.1086	.1111	.1733	.1035	.1178
21 to 25	.0653	.0689	.0992	.0759	.0768
26 to 30	.0606	.0494	.0759	.0655	.0630
31 to 35	.0414	.0264	.0378	.0438	.0372
36 to 40	.0210	.0169	.0220	.0211	.0203
41 to 45	.0154	.0113	.0201	.0207	.0173
46 to 50	.0176	.0087	.0142	.0092	.0117
51 to 55	.0106	.0028	.0038	.00115	.0064
56 to 60	.0080	.0041	.0061	.0076	.0062
61 to 65	.0137	.0040	.0024	.0078	.0053
66 to 70	.0000	.0000	.0145	.0000	.0044
71 to 75	.0000	.0104	.0000	.0000	.0029
All Ages	.0372	.0245	.0334	.0351	.0320

EXHIBIT XII

AVERAGE UNGRADUATED REMARRIAGE RATE FOR FIRST SIX YEARS OF WIDOWHOOD BY AGE GROUP AND NUMBER OF DEPENDENT CHILDREN

Number of Children	AVERAGE YEARLY PROBABILITY OF REMARRIAGE ACCORDING TO WIDOW'S AGE					
	19 to 23	24 to 28	29 to 33	34 to 38	39 to 43	44 to 48
0	.0893	.0880	.0554	.0317	.0286	.0216
1	.0831	.0558	.0508	.0307	.0241	.0101
2	.1098	.0644	.0273	.0395	.0196	.0102
3	.0679	.0647	.0510	.0272	.0119	.0000
4 or more	.0816	.0769	.0443	.0217	.0134	.0096

EXHIBIT XIII

COMPARISON OF AMERICAN REMARRIAGE EXPERIENCE WITH DUTCH AND DANISH

Age at Entry	Expectation of Remarriage		Yearly Mortality Rates		Complete Expectation of Unmarried Life	
	American	D. & D.	American	D. & D.	American	D. & D.
(1)	(2)	(3)	(4)	(5)	(6)	(7)
20	.676	.782	.00407	.00533	18.170	14.171
25	.538	.656	.00511	.00549	21.920	18.180
30	.403	.491	.00594	.00569	24.406	22.545
35	.285	.319	.00706	.00611	25.315	25.826
40	.193	.179	.00798	.00677	24.729	26.938
45	.128	.087	.00987	.00789	22.911	25.878
50	.086	.036	.01256	.00980	20.314	23.357
55	.061	.012	.01789	.01302	17.328	20.124
60	.046	.003	.02579	.01845	14.387	16.692
65	.035	.000	.03780	.02759	11.629	13.375
70	.023	.000	.05656	.04287	9.197	10.347
75	.000	.000	.08244	.06821	7.155	7.724
80	.000	.000	.12579	.10963	5.354	5.553

TABLE I

Remarriage Tables

Number Living Unmarried

Age at Entry [x]	Years Elapsed Since Husband's Death						Age Attained x+5
	0	1	2	3	4	5 or more	
	$l^r_{[x]}$	$l^r_{[x]+1}$	$l^r_{[x]+2}$	$l^r_{[x]+3}$	$l^r_{[x]+4}$	l^r_{x+5}	
18.....	100000	92777	76807	66291	57415	52626	23
19.....	90401	84214	70549	61434	53674	49446	24
20.....	82149	76828	65085	57163	50362	46612	25
21.....	75003	70409	60293	53390	47412	44081	26
22.....	68801	64826	56085	50051	44783	41817	27
23.....	63466	60005	52401	47100	42435	39788	28
24.....	58787	55764	49138	44467	40336	37962	29
25.....	54653	52007	46224	42110	38439	36313	30
26.....	51044	48717	43647	40003	36737	34823	31
27.....	47861	45806	41347	38116	35199	33471	32
28.....	45042	43222	39288	36415	33803	32241	33
29.....	42552	40932	37453	34886	32540	31119	34
30.....	40300	38856	35779	33487	31381	30092	35
31.....	38302	37010	34274	32221	30326	29152	36
32.....	36533	35365	32922	31074	29360	28288	37
33.....	34918	33863	31862	30020	28472	27493	38
34.....	33460	32505	30553	29053	27654	26759	39
35.....	32160	31290	29536	28179	26908	26083	40
36.....	30958	30167	28594	27367	26212	25453	41
37.....	29872	29148	27731	26619	25568	24867	42
38.....	28890	28226	26945	25932	24968	24316	43
39.....	27995	27382	26221	25294	24406	23795	44
40.....	27172	26605	25550	24697	23878	23301	45
41.....	26420	25891	24926	24136	23375	22829	46
42.....	25717	25222	24335	23602	22894	22375	47
43.....	25079	24609	23787	23101	22435	21937	48
44.....	24473	24023	23259	22616	21988	21511	49
45.....	23899	23467	22755	22149	21556	21096	50
46.....	23369	22951	22280	21704	21139	20692	51
47.....	22865	22458	21824	21273	20730	20292	52
48.....	22381	21985	21382	20852	20327	19892	53
49.....	21908	21518	20943	20432	19922	19488	54
50.....	21468	21082	20526	20024	19518	19076	55
51.....	21037	20653	20109	19609	19103	18653	56
52.....	20620	20232	19693	19191	18678	18214	57

TABLE I—*Continued*

Age at Entry [z]	Years Elapsed Since Husband's Death						Age Attained x+5
	0	1	2	3	4	5 or more	
	$l^r_{[x]}$	$l^r_{[x]+1}$	$l^r_{[x]+2}$	$l^r_{[x]+3}$	$l^r_{[x]+4}$	l^r_{x+5}	
53.....	20198	19802	19264	18756	18236	17762	58
54.....	19775	19369	18826	18310	17784	17299	59
55.....	19354	18930	18379	17852	17318	16823	60
56.....	18913	18473	17915	17382	16841	16335	61
57.....	18460	18006	17444	16902	16352	15832	62
58.....	17998	17531	16961	16411	15849	15312	63
59.....	17534	17052	16470	15906	15329	14772	64
60.....	17054	16556	15963	15382	14787	14212	65
61.....	16549	16038	15433	14836	14226	13636	66
62.....	16041	15510	14887	14275	13650	13044	67
63.....	15511	14959	14322	13695	13057	12434	68
64.....	14968	14397	13745	13103	12448	11807	69
65.....	14402	13813	13147	12490	11820	11164	70
66.....	13812	13207	12529	11857	11175	10505	71
67.....	13202	12581	11892	11209	10515	9835	72
68.....	12582	11944	11242	10546	9844	9161	73
69.....	11941	11288	10576	9873	9169	8488	74
70.....	11273	10607	9893	9191	8494	7819	75
71.....	10603	9927	9213	8515	7825	7159	76
72.....	9909	9232	8528	7840	7163	6510	77
73.....	9218	8544	7851	7175	6513	5874	78

Values Beyond Age at Entry 73 Are Ultimate Depending Upon Mortality Rates Only

See Table XII

TABLE II

Remarriage Tables

Number Remarrying

($l^r_{[18]} = 100{,}000$)

Age at Entry [x]	Years Elapsed Since Husband's Death						Age Attained x+5
	0	1	2	3	4	5 or more	
	$m^r_{[x]}$	$m^r_{[x]+1}$	$m^r_{[x]+2}$	$m^r_{[x]+3}$	$m^r_{[x]+4}$	m^r_{x+5}	
18.....	6880	15642	10215	8598	4530	2932	23
19.....	5849	13339	8819	7489	3977	2591	24
20.....	4987	11424	7634	6539	3505	2294	25
21.....	4268	9808	6626	5723	3091	2032	26
22.....	3660	8447	5766	5020	2732	1802	27
23.....	3160	7320	5041	4423	2419	1604	28
24.....	2734	6352	4418	3895	2150	1431	29
25.....	2367	5518	3869	3441	1907	1275	30
26.....	2057	4813	3405	3040	1698	1139	31
27.....	1795	4210	2997	2695	1513	1017	32
28.....	1568	3691	2644	2392	1348	909	33
29.....	1374	3242	2341	2128	1207	815	34
30.....	1205	2844	2068	1889	1076	728	35
31.....	1057	2505	1830	1678	961	653	36
32.....	935	2214	1626	1498	860	585	37
33.....	824	1954	1441	1333	768	525	38
34.....	726	1726	1281	1185	686	468	39
35.....	643	1530	1140	1059	616	422	40
36.....	566	1352	1012	944	551	377	41
37.....	502	1198	898	841	491	339	42
38.....	444	1064	800	752	439	304	43
39.....	395	945	713	673	393	271	44
40.....	350	838	636	600	354	242	45
41.....	312	745	568	536	316	217	46
42.....	275	663	506	476	282	194	47
43.....	246	593	452	427	254	176	48
44.....	220	529	403	383	226	157	49
45.....	196	470	359	341	202	139	50
46.....	175	422	323	306	182	126	51
47.....	158	379	290	277	164	114	52
48.....	141	341	263	250	148	102	53
49.....	127	306	235	223	131	92	54
50.....	116	278	213	202	121	82	55
51.....	105	254	195	184	109	76	56
52.....	97	233	179	171	101	69	57

TABLE II—*Continued*

Age at Entry [x]	Years Elapsed Since Husband's Death						Age Attained x+5
	0	1	2	3	4	5 or more	
	$m'_{[x]}$	$m'_{[x]+1}$	$m'_{[x]+2}$	$m'_{[x]+3}$	$m'_{[x]+4}$	m'_{x+5}	
53.....	89	214	164	156	91	64	58
54.....	81	198	151	143	85	59	59
55.....	78	184	142	134	78	54	60
56.....	72	172	131	123	72	51	61
57.....	66	158	122	115	67	46	62
58.....	63	149	114	108	63	43	63
59.....	60	143	109	102	60	41	64
60.....	58	136	104	97	56	38	65
61.....	53	127	97	90	53	36	66
62.....	51	121	91	86	49	34	67
63.....	48	114	86	81	47	31	68
64.....	46	109	82	77	45	30	69
65.....	45	104	78	73	41	28	70
66.....	42	96	73	66	38	25	71
67.....	38	88	65	61	35	23	72
68.....	35	82	61	56	32	21	73
69.....	32	75	55	50	28	19	74
70.....	28	65	47	43	25	16	75
71.....	25	58	42	38	21	14	76
72.....	21	48	35	31	17	11	77
73.....	18	39	29	26	14	9	78

No Remarriages Beyond Age at Entry 73

TABLE III

Remarriage Tables

Number Dying Unmarried

($l'_{[18]} = 100{,}000$)

Age at Entry [x]	Years Elapsed Since Husband's Death						Age Attained x+5
	0	1	2	3	4	5 or more	
	$d'_{[x]}$	$d'_{[x]+1}$	$d'_{[x]+2}$	$d'_{[x]+3}$	$d'_{[x]+4}$	d'_{x+5}	
18.....	343	328	301	278	259	248	23
19.....	338	326	296	271	251	243	24
20.....	334	319	288	262	245	237	25
21.....	326	308	277	255	240	232	26
22.....	315	294	268	248	234	227	27
23.....	301	284	260	242	228	222	28
24.....	289	274	253	236	224	218	29
25.....	279	265	245	230	219	215	30
26.....	270	257	239	226	216	213	31
27.....	260	249	234	222	215	213	32
28.....	252	243	229	220	214	213	33
29.....	246	237	226	218	214	212	34
30.....	239	233	224	217	213	212	35
31.....	235	231	223	217	213	211	36
32.....	233	229	222	216	212	210	37
33.....	231	227	221	215	211	209	38
34.....	229	226	219	214	209	208	39
35.....	227	224	217	212	209	208	40
36.....	225	221	215	211	208	209	41
37.....	222	219	214	210	210	212	42
38.....	220	217	213	212	213	217	43
39.....	218	216	214	215	218	223	44
40.....	217	217	217	219	223	230	45
41.....	217	220	222	225	230	237	46
42.....	220	224	227	232	237	244	47
43.....	224	229	234	239	244	250	48
44.....	230	235	240	245	251	258	49
45.....	236	242	247	252	258	265	50
46.....	243	249	253	259	265	274	51
47.....	249	255	261	266	274	286	52
48.....	255	262	267	275	287	302	53
49.....	263	269	276	287	303	320	54
50.....	270	278	289	304	321	341	55
51.....	279	290	305	322	341	363	56
52.....	291	306	323	342	363	383	57

TABLE III—*Continued*

Age at Entry [x]	Years Elapsed Since Husband's Death						Age Attained x+5
	0	1	2	3	4	5 or more	
	$d^r_{[x]}$	$d^r_{[x]+1}$	$d^r_{[x]+2}$	$d^r_{[x]+3}$	$d^r_{[x]+4}$	d^r_{x+5}	
53.....	307	324	344	364	383	399	58
54.....	325	345	365	383	400	417	59
55.....	346	367	385	400	417	434	60
56.....	368	386	402	418	434	452	61
57.....	388	404	420	435	453	474	62
58.....	404	421	436	454	474	497	63
59.....	422	439	455	475	497	519	64
60.....	440	457	477	498	519	538	65
61.....	458	478	500	520	537	556	66
62.....	480	502	521	539	557	576	67
63.....	504	523	541	557	576	596	68
64.....	525	543	560	578	596	613	69
65.....	544	562	579	597	615	631	70
66.....	563	582	599	616	632	645	71
67.....	583	601	618	633	645	651	72
68.....	603	620	635	646	651	652	73
69.....	621	637	648	654	653	650	74
70.....	638	649	655	654	650	644	75
71.....	651	656	656	652	645	635	76
72.....	656	656	653	646	636	625	77
73.....	656	654	647	636	625	613	78

Values Beyond Age at Entry 73 Are Ultimate Depending Upon Mortality Rates Only

See Table XII

TABLE IV

Remarriage Tables

Yearly Probability of Remarriage

($l'_{[18]} = 100{,}000$)

Age at Entry [x]	Years Elapsed Since Husband's Death						Age Attained x+5
	0	1	2	3	4	5 or more	
	$r'_{[x]}$	$r'_{[x]+1}$	$r'_{[x]+2}$	$r'_{[x]+3}$	$r'_{[x]+4}$	r'_{x+5}	
18.....	.0688	.1686	.1330	.1297	.0789	.0557	23
19.....	.0647	.1584	.1250	.1219	.0741	.0524	24
20.....	.0607	.1487	.1173	.1144	.0696	.0492	25
21.....	.0569	.1393	.1099	.1072	.0652	.0461	26
22.....	.0532	.1303	.1028	.1003	.0610	.0431	27
23.....	.0498	.1220	.0962	.0939	.0570	.0403	28
24.....	.0465	.1139	.0899	.0876	.0533	.0377	29
25.....	.0433	.1061	.0837	.0817	.0496	.0351	30
26.....	.0403	.0988	.0780	.0760	.0462	.0327	31
27.....	.0375	.0919	.0725	.0707	.0430	.0304	32
28.....	.0348	.0854	.0673	.0657	.0399	.0282	33
29.....	.0323	.0792	.0625	.0610	.0371	.0262	34
30.....	.0299	.0732	.0578	.0564	.0343	.0242	35
31.....	.0276	.0677	.0534	.0521	.0317	.0224	36
32.....	.0256	.0626	.0494	.0482	.0293	.0207	37
33.....	.0236	.0577	.0455	.0444	.0270	.0191	38
34.....	.0217	.0531	.0419	.0408	.0248	.0175	39
35.....	.0200	.0489	.0386	.0376	.0229	.0162	40
36.....	.0183	.0448	.0354	.0345	.0210	.0148	41
37.....	.0168	.0411	.0324	.0316	.0192	.0136	42
38.....	.0154	.0377	.0297	.0290	.0176	.0125	43
39.....	.0141	.0345	.0272	.0266	.0161	.0114	44
40.....	.0129	.0315	.0249	.0243	.0148	.0104	45
41.....	.0118	.0288	.0228	.0222	.0135	.0095	46
42.....	.0107	.0263	.0208	.0202	.0123	.0087	47
43.....	.0098	.0241	.0190	.0185	.0113	.0080	48
44.....	.0090	.0220	.0173	.0169	.0103	.0073	49
45.....	.0082	.0200	.0158	.0154	.0094	.0066	50
46.....	.0075	.0184	.0145	.0141	.0086	.0061	51
47.....	.0069	.0169	.0133	.0130	.0079	.0056	52
48.....	.0063	.0155	.0123	.0120	.0073	.0051	53
49.....	.0058	.0142	.0112	.0109	.0066	.0047	54
50.....	.0054	.0132	.0104	.0101	.0062	.0043	55
51.....	.0050	.0123	.0097	.0094	.0057	.0041	56
52.....	.0047	.0115	.0091	.0089	.0054	.0038	57

TABLE IV—*Continued*

Age at Entry [x]	Years Elapsed Since Husband's Death						Age Attained x+5
	0	1	2	3	4	5 or more	
	$r^{r}_{[x]}$	$r^{r}_{[x]+1}$	$r^{r}_{[x]+2}$	$r^{r}_{[x]+3}$	$r^{r}_{[x]+4}$	r^{r}_{x+5}	
53.....	.0044	.0108	.0085	.0083	.0050	.0036	58
54.....	.0041	.0102	.0080	.0078	.0048	.0034	59
55.....	.0040	.0097	.0077	.0075	.0045	.0032	60
56.....	.0038	.0093	.0073	.0071	.0043	.0031	61
57.....	.0036	.0088	.0070	.0068	.0041	.0029	62
58.....	.0035	.0085	.0067	.0066	.0040	.0028	63
59.....	.0034	.0084	.0066	.0064	.0039	.0028	64
60.....	.0034	.0082	.0065	.0063	.0038	.0027	65
61.....	.0032	.0079	.0063	.0061	.0037	.0026	66
62.....	.0032	.0078	.0061	.0060	.0036	.0026	67
63.....	.0031	.0076	.0060	.0059	.0036	.0025	68
64.....	.0031	.0076	.0060	.0059	.0036	.0025	69
65.....	.0031	.0075	.0059	.0058	.0035	.0025	70
66.....	.0030	.0073	.0058	.0056	.0034	.0024	71
67.....	.0029	.0070	.0055	.0054	.0033	.0023	72
68.....	.0028	.0069	.0054	.0053	.0032	.0023	73
69.....	.0027	.0066	.0052	.0051	.0031	.0022	74
70.....	.0025	.0061	.0048	.0047	.0029	.0020	75
71.....	.0024	.0058	.0046	.0045	.0027	.0019	76
72.....	.0021	.0052	.0041	.0040	.0024	.0017	77
73.....	.0019	.0046	.0037	.0036	.0022	.0015	78

No Remarriages Beyond Age at Entry 73

TABLE V

Remarriage Tables

Yearly Probability of Dying Unmarried

($l^r_{[18]} = 100{,}000$)

Age at Entry [x]	Years Elapsed Since Husband's Death						Age Attained x+5
	0	1	2	3	4	5 or more	
	$q^r_{[x]}$	$q^r_{[x]+1}$	$q^r_{[x]+2}$	$q^r_{[x]+3}$	$q^r_{[x]+4}$	q^r_{x+5}	
18.....	.00343	.00354	.00392	.00419	.00451	.00472	23
19.....	.00374	.00387	.00420	.00441	.00468	.00491	24
20.....	.00407	.00415	.00442	.00458	.00486	.00509	25
21.....	.00435	.00437	.00459	.00477	.00505	.00527	26
22.....	.00457	.00454	.00478	.00496	.00523	.00542	27
23.....	.00474	.00473	.00497	.00514	.00538	.00559	28
24.....	.00492	.00492	.00515	.00530	.00555	.00575	29
25.....	.00511	.00510	.00531	.00547	.00571	.00592	30
26.....	.00528	.00527	.00548	.00564	.00589	.00613	31
27.....	.00544	.00544	.00565	.00582	.00610	.00635	32
28.....	.00560	.00561	.00583	.00603	.00632	.00659	33
29.....	.00577	.00579	.00604	.00625	.00656	.00681	34
30.....	.00594	.00600	.00626	.00649	.00678	.00704	35
31.....	.00614	.00623	.00650	.00672	.00702	.00725	36
32.....	.00637	.00647	.00673	.00696	.00722	.00742	37
33.....	.00660	.00670	.00697	.00717	.00740	.00759	38
34.....	.00683	.00694	.00718	.00735	.00757	.00777	39
35.....	.00706	.00715	.00736	.00752	.00775	.00796	40
36.....	.00726	.00733	.00752	.00770	.00795	.00822	41
37.....	.00744	.00750	.00771	.00790	.00820	.00854	42
38.....	.00760	.00769	.00791	.00816	.00852	.00893	43
39.....	.00778	.00789	.00817	.00849	.00892	.00937	44
40.....	.00798	.00815	.00849	.00888	.00935	.00986	45
41.....	.00823	.00848	.00889	.00932	.00984	.01038	46
42.....	.00855	.00887	.00932	.00981	.01037	.01089	47
43.....	.00895	.00931	.00982	.01033	.01088	.01140	48
44.....	.00938	.00980	.01034	.01085	.01139	.01197	49
45.....	.00987	.01033	.01085	.01136	.01195	.01255	50
46.....	.01039	.01084	.01137	.01193	.01254	.01324	51
47.....	.01090	.01135	.01193	.01251	.01323	.01411	52
48.....	.01141	.01192	.01251	.01320	.01410	.01520	53
49.....	.01198	.01250	.01321	.01407	.01519	.01644	54
50.....	.01256	.01319	.01408	.01516	.01643	.01799	55
51.....	.01325	.01406	.01517	.01640	.01788	.01946	56
52.....	.01412	.01515	.01641	.01785	.01945	.02099	57

TABLE V—*Continued*

Age at Entry [x]	Years Elapsed Since Husband's Death						Age Attained x+5
	0	1	2	3	4	5 or more	
	$q^r_{[x]}$	$q^r_{[x]+1}$	$q^r_{[x]+2}$	$q^r_{[x]+3}$	$q^r_{[x]+4}$	q^r_{x+5}	
53.....	.01521	.01639	.01785	.01942	.02098	.02247	58
54.....	.01645	.01784	.01942	.02095	.02246	.02409	59
55.....	.01789	.01941	.02095	.02243	.02408	.02579	60
56.....	.01946	.02093	.02243	.02404	.02577	.02770	61
57.....	.02099	.02241	.02405	.02574	.02768	.02993	62
58.....	.02247	.02403	.02574	.02765	.02991	.03246	63
59.....	.02409	.02572	.02765	.02987	.03245	.03508	64
60.....	.02579	.02763	.02987	.03241	.03506	.03781	65
61.....	.02770	.02985	.03241	.03502	.03779	.04079	66
62.....	.02992	.03238	.03502	.03775	.04077	.04413	67
63.....	.03246	.03500	.03775	.04072	.04411	.04790	68
64.....	.03508	.03772	.04072	.04406	.04787	.05200	69
65.....	.03780	.04069	.04406	.04782	.05198	.05656	70
66.....	.04078	.04403	.04782	.05192	.05653	.06138	71
67.....	.04413	.04779	.05193	.05648	.06135	.06625	72
68.....	.04789	.05189	.05648	.06129	.06622	.07121	73
69.....	.05200	.05644	.06129	.06616	.07118	.07662	74
70.....	.05656	.06126	.06617	.07112	.07659	.08244	75
71.....	.06138	.06614	.07113	.07653	.08241	.08880	76
72.....	.06626	.07110	.07654	.08235	.08877	.09601	77
73.....	.07122	.07652	.08237	.08872	.09598	.10434	78

Values Beyond Age at Entry 73 Are Ultimate Depending on Mortality Rates Only

See Table XII

TABLE VI

Remarriage Tables

Yearly Probability of Surviving Unmarried

$(l_{[18]} = 100{,}000)$

Age at Entry [x]	Years Elapsed Since Husband's Death						Age Attained x+5
	0	1	2	3	4	5 or more	
	$p^l_{[x]}$	$p^l_{[x]+1}$	$p^l_{[x]+2}$	$p^l_{[x]+3}$	$p^l_{[x]+4}$	p^l_{x+5}	
18.....	.92777	.82786	.86308	.86611	.91659	.93958	23
19.....	.93156	.83773	.87080	.87369	.92122	.94269	24
20.....	.93523	.84715	.87828	.88102	.92554	.94571	25
21.....	.93875	.85633	.88551	.88803	.92975	.94863	26
22.....	.94223	.86516	.89242	.89474	.93377	.95148	27
23.....	.94546	.87327	.89883	.90096	.93762	.95411	28
24.....	.94858	.88118	.90495	.90710	.94115	.95655	29
25.....	.95159	.88880	.91099	.91283	.94469	.95898	30
26.....	.95442	.89593	.91652	.91836	.94791	.96117	31
27.....	.95706	.90266	.92185	.92348	.95090	.96325	32
28.....	.95960	.90899	.92687	.92827	.95378	.96521	33
29.....	.96193	.91501	.93146	.93275	.95634	.96699	34
30.....	.96416	.92080	.93594	.93711	.95892	.96876	35
31.....	.96626	.92607	.94010	.94118	.96128	.97035	36
32.....	.96803	.93093	.94387	.94484	.96348	.97188	37
33.....	.96980	.93560	.94753	.94843	.96560	.97331	38
34.....	.97147	.93996	.95092	.95185	.96763	.97473	39
35.....	.97294	.94395	.95404	.95488	.96935	.97584	40
36.....	.97444	.94787	.95708	.95780	.97105	.97698	41
37.....	.97576	.95140	.95989	.96050	.97260	.97786	42
38.....	.97700	.95461	.96239	.96284	.97388	.97857	43
39.....	.97812	.95761	.96463	.96491	.97498	.97923	44
40.....	.97912	.96035	.96661	.96682	.97585	.97974	45
41.....	.97997	.96272	.96831	.96848	.97666	.98012	46
42.....	.98075	.96483	.96988	.96999	.97733	.98041	47
43.....	.98125	.96659	.97118	.97117	.97782	.98060	48
44.....	.98162	.96820	.97236	.97225	.97831	.98073	49
45.....	.98193	.96967	.97335	.97324	.97865	.98085	50
46.....	.98211	.97076	.97413	.97397	.97886	.98066	51
47.....	.98220	.97175	.97477	.97449	.97887	.98029	52
48.....	.98229	.97258	.97519	.97480	.97860	.97970	53
49.....	.98222	.97330	.97559	.97503	.97821	.97886	54
50.....	.98204	.97361	.97552	.97474	.97737	.97781	55
51.....	.98175	.97364	.97513	.97420	.97642	.97644	56
52.....	.98118	.97335	.97449	.97325	.97515	.97521	57

TABLE VI—*Continued*

Age at Entry [x]	Years Elapsed Since Husband's Death						Age Attained x+5
	0	1	2	3	4	5 or more	
	$p^r_{[x]}$	$p^r_{[x]+1}$	$p^r_{[x]+2}$	$p^r_{[x]+3}$	$p^r_{[x]+4}$	p^r_{x+5}	
53.....	.98039	.97281	.97365	.97228	.97402	.97393	58
54.....	.97945	.97196	.97258	.97125	.97274	.97251	59
55.....	.97811	.97089	.97135	.97007	.97142	.97101	60
56.....	.97674	.96977	.97027	.96886	.96993	.96920	61
57.....	.97541	.96879	.96895	.96746	.96822	.96717	62
58.....	.97403	.96747	.96756	.96575	.96609	.96474	63
59.....	.97251	.96588	.96575	.96373	.96365	.96212	64
60.....	.97081	.96417	.96363	.96129	.96114	.95949	65
61.....	.96910	.96225	.96129	.95888	.95851	.95661	66
62.....	.96688	.95982	.95888	.95625	.95563	.95327	67
63.....	.96444	.95740	.95625	.95338	.95229	.94960	68
64.....	.96182	.95468	.95328	.95004	.94853	.94550	69
65.....	.95910	.95181	.95004	.94638	.94452	.94094	70
66.....	.95622	.94867	.94638	.94248	.94007	.93622	71
67.....	.95297	.94521	.94257	.93812	.93535	.93145	72
68.....	.94931	.94121	.93812	.93341	.93058	.92649	73
69.....	.94530	.93696	.93351	.92874	.92572	.92118	74
70.....	.94094	.93264	.92903	.92418	.92051	.91556	75
71.....	.93622	.92806	.92427	.91897	.91489	.90930	76
72.....	.93164	.92370	.91936	.91365	.90883	.90229	77
73.....	.92688	.91888	.91393	.90768	.90182	.89416	78

Values Beyond Age at Entry 73 Are Ultimate Depending Upon Mortality Rates Only See Table XII

TABLE VII

Remarriage Rates

Complete Expectation of Unmarried Life

($l_{[18]} = 100{,}000$)

Age at Entry [x]	Years Elapsed Since Husband's Death						Age Attained x+5
	0	1	2	3	4	5 or more	
	$\overset{\circ r}{e}_{[x]}$	$\overset{\circ r}{e}_{[x]+1}$	$\overset{\circ r}{e}_{[x]+2}$	$\overset{\circ r}{e}_{[x]+3}$	$\overset{\circ r}{e}_{[x]+4}$	$\overset{\circ r}{e}_{x+5}$	
18.....	16.475	16.719	19.091	21.040	23.216	24.283	23
19.....	17.330	17.567	19.872	21.747	23.819	24.812	24
20.....	18.170	18.394	20.623	22.411	24.370	25.291	25
21.....	18.993	19.200	21.337	23.031	24.872	25.714	26
22.....	19.791	19.973	22.008	23.601	25.319	26.079	27
23.....	20.536	20.691	22.621	24.111	25.707	26.384	28
24.....	21.245	21.370	23.184	24.567	26.032	26.629	29
25.....	21.920	22.010	23.701	24.968	26.304	26.815	30
26.....	22.534	22.586	24.152	25.306	26.511	26.941	31
27.....	23.091	23.104	24.542	25.580	26.659	27.009	32
28.....	23.590	23.562	24.871	25.794	26.749	27.020	33
29.....	24.021	23.952	25.130	25.942	26.777	26.977	34
30.....	24.406	24.295	25.341	26.042	26.756	26.880	35
31.....	24.720	24.565	25.486	26.078	26.677	26.731	36
32.....	24.955	24.762	25.563	26.053	26.545	26.532	37
33.....	25.142	24.909	25.590	25.979	26.364	26.285	38
34.....	25.266	24.994	25.558	25.852	26.135	25.992	39
35.....	25.315	25.005	25.460	25.662	25.851	25.653	40
36.....	25.321	24.972	25.318	25.430	25.529	25.275	41
37.....	25.261	24.876	25.122	25.151	25.164	24.859	42
38.....	25.139	24.718	24.870	24.822	24.761	24.411	43
39.....	24.959	24.506	24.569	24.452	24.323	23.935	44
40.....	24.729	24.246	24.226	24.046	23.853	23.432	45
41.....	24.446	23.935	23.843	23.607	23.359	22.906	46
42.....	24.125	23.588	23.430	23.142	22.842	22.360	47
43.....	23.749	23.193	22.977	22.644	22.302	21.797	48
44.....	23.345	22.772	22.504	22.130	21.747	21.219	49
45.....	22.911	22.324	22.007	21.595	21.175	20.626	50
46.....	22.437	21.837	21.480	21.036	20.585	20.019	51
47.....	21.938	21.326	20.931	20.460	19.983	19.404	52
48.....	21.417	20.794	20.366	19.871	19.371	18.784	53
49.....	20.882	20.251	19.793	19.276	18.756	18.163	54
50.....	20.314	19.677	19.196	18.665	18.136	17.545	55
51.....	19.733	19.091	18.594	18.055	17.520	16.931	56
52.....	19.136	18.494	17.986	17.444	16.909	16.327	57

TABLE VII—*Continued*

Age at Entry $[x]$	Years Elapsed Since Husband's Death						Age Attained $x+5$
	0	1	2	3	4	5 or more	
	$\mathring{e}^r_{[x]}$	$\mathring{e}^r_{[x]+1}$	$\mathring{e}^r_{[x]+2}$	$\mathring{e}^r_{[x]+3}$	$\mathring{e}^r_{[x]+4}$	$\mathring{e}^r_{x+5}$	
53.....	18.538	17.899	17.385	16.842	16.308	15.730	58
54.....	17.936	17.302	16.786	16.245	15.711	15.137	59
55.....	17.328	16.705	16.191	15.654	15.121	14.552	60
56.....	16.372	16.119	15.605	15.069	14.537	13.971	61
57.....	16.142	15.537	15.021	14.487	13.957	13.399	62
58.....	15.556	14.957	14.443	13.910	13.386	12.837	63
59.....	14.967	14.376	13.866	13.340	12.824	12.288	64
60.....	14.387	13.805	13.299	12.782	12.276	11.753	65
61.....	13.822	13.246	12.746	12.239	11.742	11.228	66
62.....	13.256	12.692	12.203	11.704	11.217	10.715	67
63.....	12.703	12.153	11.672	11.183	10.705	10.216	68
64.....	12.159	11.621	11.149	10.670	10.205	9.732	69
65.....	11.629	11.103	10.640	10.174	9.722	9.264	70
66.....	11.115	10.601	10.148	9.694	9.255	8.814	71
67.....	10.615	10.114	9.671	9.230	8.806	7.880	72
68.....	10.123	9.637	9.208	8.782	8.373	7.960	73
69.....	9.649	9.178	8.762	8.351	7.953	7.551	74
70.....	9.197	8.743	8.338	7.936	7.547	7.155	75
71.....	8.754	8.316	7.921	7.530	7.150	6.768	76
72.....	8.335	7.910	7.521	7.138	6.765	6.393	77
73.....	7.925	7.511	7.130	6.755	6.391	6.031	78

Values Beyond Age at Entry 73 Are Ultimate Depending Upon Mortality Rates Only

See Table XII

Note: $\mathring{e}^r_x = (\Sigma\, l^r_{x+1} \div l^r_x) + \frac{1}{2}$ Values of l^r_x From Table I

TABLE VIII

REMARRIAGE TABLES

COMMUTATION COLUMNS (3½% INTEREST) – D^r_x

($l^r_{[18]} = 100{,}000$)

Age at Entry [x]	YEARS ELAPSED SINCE HUSBAND'S DEATH						Age Attained x+5
	0	1	2	3	4	5 or more	
	$D^r_{[x]}$	$D^r_{[x]+1}$	$D^r_{[x]+2}$	$D^r_{[x]+3}$	$D^r_{[x]+4}$	D^r_{x+5}	
18.....	53836.1	48258.5	38600.6	32189.0	26936.3	23854.6	23
19.....	47022.6	42323.1	34256.5	28821.8	24329.7	21655.2	24
20.....	41285.3	37305.4	30534.7	25911.2	22056.4	19723.7	25
21.....	36419.3	33032.5	27330.0	23382.5	20062.2	18022.0	26
22.....	32278.1	29384.7	24562.8	21178.9	18309.0	16518.2	27
23.....	28768.2	26279.6	22173.3	19256.3	16762.3	15185.2	28
24.....	25746.2	23596.4	20089.5	17565.0	15394.4	13998.4	29
25.....	23126.3	21262.4	18259.0	16071.4	14174.3	12937.5	30
26.....	20868.7	19243.8	16658.1	14751.0	13088.6	11987.1	31
27.....	18905.7	17482.0	15246.6	13579.9	12116.6	11132.1	32
28.....	17190.5	15938.0	13997.5	12535.1	11242.5	10360.4	33
29.....	15691.0	14583.2	12892.4	11602.7	10456.5	9661.70	34
30.....	14358.0	13375.4	11899.7	10760.8	9743.05	9026.91	35
31.....	13184.7	12309.2	11013.7	10003.8	9097.10	8449.21	36
32.....	12150.5	11364.3	10221.5	9321.49	8509.50	7921.55	37
33.....	11220.7	10513.6	9503.87	8700.79	7973.07	7438.56	38
34.....	10388.5	9750.75	8855.27	8135.77	7482.12	6995.15	39
35.....	9647.26	9068.87	8271.03	7624.17	7304.10	6587.84	40
36.....	8972.65	8447.73	7736.45	7154.09	6620.42	6211.32	41
37.....	8365.12	7886.34	7249.24	6723.21	6239.38	5863.12	42
38.....	7816.54	7378.64	6805.55	6328.21	5886.93	5539.33	43
39.....	7318.26	6915.93	6398.74	5963.79	5559.83	5237.33	44
40.....	6862.89	6492.44	6024.15	5626.12	5255.60	4955.17	45
41.....	6447.30	6104.55	5678.29	5312.38	4970.90	4690.63	46
42.....	6063.53	5745.72	5356.18	5019.18	4703.98	4441.89	47
43.....	5713.15	5416.49	5058.52	4746.52	4453.80	4207.65	48
44.....	5386.56	5108.71	4778.98	4489.73	4217.43	3986.42	49
45.....	5082.34	4821.72	4517.32	4248.31	3994.76	3777.30	50
46.....	4801.58	4556.23	4273.44	4022.19	3785.00	3579.67	51
47.....	4539.16	4307.58	4044.42	3808.99	3586.25	3391.77	52
48.....	4292.81	4074.26	3828.51	3607.35	3397.62	3212.48	53
49.....	4059.99	3852.86	3623.10	3415.17	3217.32	3040.81	54
50.....	3843.91	3647.14	3430.88	3233.80	3045.49	2875.86	55
51.....	3639.36	3452.11	3247.52	3059.69	2879.93	2717.00	56
52.....	3446.59	3267.39	3072.80	2893.20	2720.64	2563.33	57

TABLE VIII—*Continued*

Age at Entry [x]	Years Elapsed Since Husband's Death						Age Attained x+5
	0	1	2	3	4	5 or more	
	$D^r_{[x]}$	$D^r_{[x]+1}$	$D^r_{[x]+2}$	$D^r_{[x]+3}$	$D^r_{[x]+4}$	D^r_{x+5}	
53.....	3261.90	3089.81	2904.20	2732.00	2566.43	2415.19	58
54.....	3085.59	2920.03	2742.20	2576.84	2418.18	2272.69	59
55.....	2917.77	2757.34	2586.55	2427.43	2275.19	2135.41	60
56.....	2754.87	2599.78	2435.99	2283.60	2137.70	2003.36	61
57.....	2597.95	2448.37	2291.74	2145.44	2005.44	1876.01	62
58.....	2447.28	2303.17	2152.93	2012.68	1878.03	1753.02	63
59.....	2303.56	2164.48	2019.91	1884.78	1754.97	1634.02	64
60.....	2164.73	2030.46	1891.54	1761.04	1635.68	1518.91	65
61.....	2029.60	1900.42	1766.88	1641.10	1520.40	1408.07	66
62.....	1900.78	1775.69	1646.74	1525.64	1409.51	1301.39	67
63.....	1775.81	1654.70	1530.66	1414.16	1302.68	1198.58	68
64.....	1655.70	1538.68	1419.32	1307.27	1199.92	1099.66	69
65.....	1539.21	1426.34	1311.66	1203.97	1100.87	1004.60	70
66.....	1426.24	1317.65	1207.73	1104.31	1005.59	913.336	71
67.....	1317.15	1212.75	1107.57	1008.65	914.206	826.170	72
68.....	1212.84	1112.42	1011.62	916.901	826.926	743.525	73
69.....	1112.14	1015.76	919.509	829.362	744.174	665.612	74
70.....	1014.41	922.204	831.042	745.960	666.082	592.414	75
71.....	921.857	833.898	747.746	667.729	592.869	524.067	76
72.....	832.386	749.288	668.749	594.005	524.360	460.439	77
73.....	748.151	670.003	594.839	525.239	460.651	401.412	78

Values Beyond Age at Entry 73 Are Ultimate Depending Upon Mortality Rates Only See Table XII

Note: $D^r_x = v^x \cdot l^r_x$ Values of v^x at 3½%. Values of l^r_x From Table I.

TABLE IX

Remarriage Tables

Commutation Columns (3½%) Interest) – N^r_x

($l^r_{[18]} = 100{,}000$)

Age at Entry [x]	Years Elapsed Since Husband's Death						Age Attained x+5
	0	1	2	3	4	5 or more	
	$N^r_{[x]}$	$N^r_{[x]+1}$	$N^r_{[x]+2}$	$N^r_{[x]+3}$	$N^r_{[x]+4}$	N^r_{x+5}	
18.....	530193.2	476357.1	428098.6	389498.0	357309.0	330372.7	23
19.....	483271.8	436249.2	393926.1	359669.6	330847.8	306518.1	24
20.....	441955.9	400670.6	363365.2	332830.5	306919.3	284862.9	25
21.....	405365.7	368946.4	335913.9	308583.9	285201.4	265139.2	26
22.....	372830.7	340552.6	311167.9	286605.1	265426.2	247117.2	27
23.....	343838.7	315070.5	288790.9	266617.6	247361.3	230599.0	28
24.....	317805.3	292059.1	268462.7	248373.2	230808.2	215413.8	29
25.....	294308.8	271182.5	249920.1	231661.1	215589.7	201415.4	30
26.....	273088.1	252219.4	232975.6	216317.5	201566.5	188477.9	31
27.....	253821.6	234915.9	217433.9	202187.3	188607.4	176490.8	32
28.....	236262.3	219071.8	203133.8	189136.3	176601.2	165358.7	33
29.....	220224.1	204533.1	189949.9	177057.5	164454.8	154998.3	34
30.....	205473.6	191115.6	177740.2	165840.5	155079.7	145336.6	35
31.....	191918.2	178733.5	166424.3	155410.6	145406.8	136309.7	36
32.....	179427.8	167277.3	155913.0	145691.5	136370.0	127860.5	37
33.....	167851.0	156630.3	146116.7	136612.9	127912.1	119939.0	38
34.....	157112.8	146724.3	136973.6	128118.3	119982.5	112500.4	39
35.....	147150.7	137503.5	128434.6	120163.6	112539.4	105505.3	40
36.....	137848.7	128876.1	120428.4	112691.9	105537.8	98917.4	41
37.....	129169.4	120804.3	112917.9	105668.7	98945.5	92706.1	42
38.....	121058.9	113242.3	105863.7	99058.1	92729.9	86843.0	43
39.....	113460.2	106141.9	99226.0	92827.2	86863.4	81303.6	44
40.....	106327.5	99464.6	92972.2	86948.0	81321.9	76066.3	45
41.....	99624.5	93177.2	87072.7	81394.4	76082.0	71111.1	46
42.....	93309.1	87245.6	81499.8	76143.7	71124.5	66420.5	47
43.....	87367.1	81653.9	76237.4	71178.9	66432.4	61978.6	48
44.....	81752.4	76365.9	71257.1	66478.2	61988.4	57771.0	49
45.....	76449.1	71366.7	66545.0	62027.7	57779.4	53784.6	50
46.....	71445.7	66644.2	62087.9	57814.5	53792.3	50007.3	51
47.....	66714.0	62174.8	57867.3	53822.8	50013.9	46427.6	52
48.....	62236.4	57943.5	53869.3	50040.8	46433.4	43035.8	53
49.....	57991.7	53931.8	50078.9	46455.8	43040.6	39823.3	54
50.....	53983.7	50139.8	46492.7	43061.8	39828.0	36782.5	55
51.....	50185.3	46546.0	43093.8	39846.3	36786.6	33906.7	56
52.....	46590.3	43143.7	39876.3	36803.5	33910.3	31189.7	57

TABLE IX—*Continued*

Age at Entry [x]	Years Elapsed Since Husband's Death						Age Attained x+5
	0	1	2	3	4	5 or more	
	$N^r_{[x]}$	$N^r_{[x]+1}$	$N^r_{[x]+2}$	$N^r_{[x]+3}$	$N^r_{[x]+4}$	N^r_{x+5}	
53.....	43180.6	39918.7	36828.9	33924.7	31192.7	28626.3	58
54.....	39953.9	36868.4	33948.3	31206.1	28629.3	26211.1	59
55.....	36902.8	33985.0	31227.7	28641.1	26213.7	23938.5	60
56.....	34014.9	31260.1	28660.3	26224.3	23940.7	21803.0	61
57.....	31288.6	28690.7	26242.3	23950.6	21805.1	19799.7	62
58.....	28717.8	26270.5	23967.3	21814.4	19801.7	17923.7	63
59.....	26298.4	23994.8	21830.4	19810.5	17925.7	16170.7	64
60.....	24020.1	21855.3	19824.9	17933.3	16172.3	14536.6	65
61.....	21876.1	19846.5	17946.1	16179.2	14538.1	13017.7	66
62.....	19868.1	17967.3	16191.6	14544.9	13019.2	11609.7	67
63.....	17986.3	16210.5	14555.8	13025.1	11611.0	10308.3	68
64.....	16230.6	14574.9	13036.2	11616.9	10309.6	9109.68	69
65.....	14592.1	13052.9	11626.5	10314.9	9110.89	8010.02	70
66.....	13066.9	11640.7	10323.1	9115.32	8011.01	7005.42	71
67.....	11652.4	10335.3	9122.52	8014.95	7006.30	6092.09	72
68.....	10346.6	9133.79	8021.37	7009.75	6092.85	5265.92	73
69.....	9143.34	8031.20	7015.44	6095.93	5266.56	4522.39	74
70.....	8036.48	7022.07	6099.86	5268.82	4522.86	3856.78	75
71.....	7028.47	6106.61	5272.71	4524.97	3857.24	3264.37	76
72.....	6109.09	5276.70	4527.41	3858.67	3264.66	2740.30	77
73.....	5278.74	4530.59	3860.59	3265.75	2740.51	2279.86	78

Values Beyond Age at Entry 73 Are Ultimate Depending Upon Mortality Rates Only See Table XII

Notes: $N^r_x = \Sigma D^r_x$ Values of D^r_x From Table VIII

Present Value of 1 Per Annum for Duration of Unmarried Life.

Payable at End of Each Year $a^r_x = N^r_{x+1} \div D^r_x$

Present Value of Temporary Annuity of 1 Per Annum for n Years

Payable at End of Each Year $a^r_{x\,\overline{n}|} = \dfrac{N^r_{x+1} - N^r_{x+n+1}}{D^r_x}$

TABLE X

Remarriage Tables

Commutation Columns ($3\frac{1}{2}\%$ Interest) – $\bar{N}^r_x$

($l^r_{[18]} = 100{,}000$)

Age at Entry $[x]$	Years Elapsed Since Husband's Death						Age Attained $x+5$
	0	1	2	3	4	5 or more	
	$\bar{N}^r_{[x]}$	$\bar{N}^r_{[x]+1}$	$\bar{N}^r_{[x]+2}$	$\bar{N}^r_{[x]+3}$	$\bar{N}^r_{[x]+4}$	$\bar{N}^r_{x+5}$	
18	503275.2	452227.9	408798.3	373403.5	343840.9	318445.4	23
19	459760.5	415087.7	376797.9	345258.7	318683.0	295690.5	24
20	421313.3	382017.9	348097.9	319874.9	295891.1	275001.1	25
21	387156.1	352430.2	322248.9	296892.7	275170.3	256128.2	26
22	356691.7	325860.3	298886.5	276015.7	256271.7	238858.1	27
23	329454.6	301930.7	277704.3	256989.5	238980.2	223006.4	28
24	304932.2	280260.9	258418.0	239590.7	223111.0	208414.6	29
25	282745.7	260551.3	240790.6	223625.4	208502.6	194946.7	30
26	262653.8	242597.5	224646.6	208942.0	195022.2	182484.4	31
27	244368.8	226174.9	209810.6	195397.4	182549.1	170924.8	32
28	227667.1	211102.8	196135.1	182868.8	170980.0	160178.5	33
29	212378.6	197241.5	183503.7	171256.2	160226.6	150167.5	34
30	198294.6	184427.9	171790.4	160460.1	150208.2	140823.2	35
31	185325.9	172578.9	160917.5	150408.7	140858.3	132085.1	36
32	173352.6	161595.2	150802.3	141030.8	132115.3	123899.8	37
33	162240.7	151373.5	141364.8	132262.5	123925.6	116219.7	38
34	151918.6	141849.0	132546.0	124050.4	116241.5	109002.9	39
35	142327.1	132969.1	124299.1	116351.5	109022.4	102211.4	40
36	133362.4	124652.3	116560.2	109114.9	102227.6	95811.8	41
37	124986.9	116861.1	109293.3	102307.1	95825.8	89774.6	42
38	117150.6	109553.0	102460.9	95894.0	89786.5	84073.3	43
39	109801.1	102684.0	96026.6	89845.3	84083.5	78685.0	44
40	102896.1	96218.4	89960.1	84135.0	78694.1	73588.7	45
41	96400.9	90125.0	84233.6	78738.2	73596.6	68765.8	46
42	90277.4	84372.7	78821.8	73634.1	68772.5	64199.6	47
43	84510.5	78945.7	73708.2	68805.7	64205.5	59874.8	48
44	79059.2	73811.5	68867.7	64233.3	59879.7	55777.8	49
45	73907.9	68955.9	64286.4	59903.6	55782.0	51896.0	50
46	69045.0	64366.1	59951.2	55803.4	51899.8	48217.5	51
47	64444.4	60021.1	55845.1	51918.4	48220.8	44731.7	52
48	60090.0	55906.4	51955.1	48237.1	44734.6	41429.6	53
49	55961.8	52005.4	48267.4	44748.2	41432.0	38302.9	54
50	52061.8	48316.3	44777.3	41444.9	38305.3	35344.6	55
51	48365.7	44819.9	41470.1	38316.5	35346.7	32548.2	56
52	44867.0	41510.0	38339.9	35356.9	32550.0	29908.0	57

TABLE X—*Continued*

Age at Entry [x]	Years Elapsed Since Husband's Death						Age Attained x+5
	0	1	2	3	4	5 or more	
	$\bar{N}^r_{[x]}$	$\bar{N}^r_{[x]+1}$	$\bar{N}^r_{[x]+2}$	$\bar{N}^r_{[x]+3}$	$\bar{N}^r_{[x]+4}$	$\bar{N}^r_{x+5}$	
53.....	41549.7	38373.8	35376.8	32558.7	29909.5	27418.7	58
54.....	38411.2	35408.4	32577.2	29917.7	27420.2	25074.8	59
55.....	35443.9	32606.4	29934.4	27427.4	25076.1	22870.8	60
56.....	32637.5	29960.2	27442.3	25082.5	22871.9	20801.4	61
57.....	29989.7	27466.5	25096.5	22877.9	20802.4	18861.7	62
58.....	27494.2	25118.9	22890.9	20808.1	18862.7	17047.2	63
59.....	25146.6	22912.6	20820.5	18868.1	17048.2	15353.7	64
60.....	22937.7	20840.1	18879.1	17052.8	15354.5	13777.2	65
61.....	20861.3	18896.3	17062.7	15358.7	13777.9	12313.7	66
62.....	18917.7	17079.5	15368.3	13782.1	12314.5	10959.0	67
63.....	17098.4	15383.2	13790.5	12318.1	10959.7	9708.99	68
64.....	15402.8	13805.6	12326.6	10963.3	9709.64	8559.85	69
65.....	13822.5	12339.7	10970.7	9712.90	8560.46	7507.72	70
66.....	12353.8	10981.9	9719.21	8563.17	7508.22	6548.76	71
67.....	10993.9	9728.91	8568.74	7510.63	6549.20	5679.01	72
68.....	9740.20	8577.58	7515.56	6551.30	5679.39	4894.16	73
69.....	8587.27	7523.32	6555.69	5681.25	4894.48	4189.59	74
70.....	7529.28	6560.97	5684.34	4895.84	4189.82	3560.58	75
71.....	6567.54	5689.66	4898.84	4191.11	3560.81	3002.34	76
72.....	5692.90	4902.06	4193.04	3561.67	3002.48	2510.08	77
73.....	4904.67	4195.59	3563.17	3003.13	2510.19	2079.16	78

Values Beyond Age at Entry 73 Are Ultimate Depending Upon Mortality Rates Only See Table XII

Notes: $\bar{N}^r_x = \frac{1}{2}(N^r_x + N^r_{x+1})$ Values of N^r_x From Table IX

Present Value of 1 Per Annum for Duration of Unmarried Life Payable Continuously $\bar{a}^r_x = \bar{N}^r_x \div D^r_x$

Present Value of Temporary Annuity of 1 Per Annum for n Years Payable Continuously $\bar{a}^r_{x\,\overline{n}|} = \dfrac{\bar{N}^r_x - \bar{N}^r_{x+n}}{D^r_x}$

TABLE XI

REMARRIAGE TABLES

COMMUTATION COLUMNS (3½% INTEREST) – $\overline{M}^{r}_{x}$

($l^{r}_{[18]} = 100{,}000$)

Age at Entry [x]	YEARS ELAPSED SINCE HUSBAND'S DEATH						Age Attained x+5
	0	1	2	3	4	5 or more	
	$\overline{M}^{r}_{[x]}$	$\overline{M}^{r}_{[x]+1}$	$\overline{M}^{r}_{[x]+2}$	$\overline{M}^{r}_{[x]+3}$	$\overline{M}^{r}_{[x]+4}$	$\overline{M}^{r}_{x+5}$	
18.....	32207.3	28566.5	20569.0	15522.8	11419.0	9330.02	23
19.....	27038.3	24047.8	17458.4	13249.2	9796.62	8023.65	24
20.....	22767.2	20303.6	14851.1	11330.6	8417.12	6908.25	25
21.....	19215.7	17178.7	12655.7	9703.43	7239.75	5954.10	26
22.....	16257.0	14569.2	10805.6	8323.39	6235.41	5137.52	27
23.....	13810.4	12402.4	9251.24	7154.53	5377.08	4437.84	28
24.....	11749.4	10572.4	7930.45	6155.01	4642.68	3836.11	29
25.....	10003.8	9019.25	6801.75	5299.51	4008.63	3317.43	30
26.....	8540.23	7713.59	5844.82	4567.44	3465.56	2870.92	31
27.....	7303.88	6606.93	5027.56	3941.26	2997.47	2485.53	32
28.....	6255.10	5666.86	4329.03	3403.10	2593.73	2153.05	33
29.....	5368.33	4870.32	3734.97	2942.86	2247.18	1865.93	34
30.....	4602.60	4180.62	3218.32	2542.25	1945.59	1617.21	35
31.....	3952.61	3594.97	2776.03	2198.01	1685.91	1402.55	36
32.....	3404.44	3098.78	2394.45	1903.23	1461.53	1216.52	37
33.....	2928.14	2667.87	2071.54	1646.65	1266.89	1055.49	38
34.....	2519.93	2298.37	1789.44	1424.49	1098.31	915.869	39
35.....	2174.81	1985.22	1549.33	1235.54	953.898	795.614	40
36.....	1872.74	1711.49	1339.34	1070.20	827.641	690.847	41
37.....	1614.51	1476.34	1157.72	926.982	718.191	600.416	42
38.....	1394.06	1275.99	1002.59	803.974	623.592	521.850	43
39.....	1204.89	1103.39	868.778	697.752	541.779	453.778	44
40.....	1041.39	954.496	753.485	606.086	471.734	395.147	45
41.....	901.264	826.425	653.765	526.578	410.616	344.561	46
42.....	778.854	715.120	566.660	457.188	357.689	300.735	47
43.....	676.544	621.459	493.164	398.682	312.443	262.879	48
44.....	586.609	539.012	428.434	347.041	272.305	229.696	49
45.....	508.131	467.161	372.237	302.184	237.894	201.098	50
46.....	442.993	407.649	325.303	264.406	208.666	176.633	51
47.....	386.960	356.128	284.674	231.848	183.096	155.208	52
48.....	338.293	311.710	249.594	203.305	160.793	136.478	53
49.....	294.671	271.537	217.681	177.720	141.082	120.286	54
50.....	259.484	239.069	191.795	156.800	124.734	106.176	55
51.....	228.939	211.084	169.352	138.397	110.177	94.0243	56
52.....	203.321	187.385	150.398	122.944	97.6036	83.1429	57

TABLE XI—*Continued*

Age at Entry [x]	Years Elapsed Since Husband's Death						Age Attained x+5
	0	1	2	3	4	5 or more	
	$\overline{M}^r_{[x]}$	$\overline{M}^r_{[x]+1}$	$\overline{M}^r_{[x]+2}$	$\overline{M}^r_{[x]+3}$	$\overline{M}^r_{[x]+4}$	$\overline{M}^r_{x+5}$	
53.....	179.774	165.646	132.824	108.522	86.1862	73.5978	58
54.....	159.570	147.147	117.806	96.1864	76.4046	65.0439	59
55.....	142.954	131.395	105.051	85.4074	67.4975	57.4248	60
56.....	127.166	116.857	93.0634	75.5544	59.6706	50.6872	61
57.....	112.967	103.837	82.7191	66.9645	52.6160	44.5391	62
58.....	101.424	93.0038	73.7625	59.5387	46.5191	39.1813	63
59.....	91.7050	83.9569	66.1148	52.9747	41.0944	34.3423	64
60.....	82.6339	75.3973	59.0024	46.8893	35.9733	29.8845	65
61.....	73.3430	66.9538	52.1618	41.2458	31.4601	25.8924	66
62.....	65.6977	59.7576	46.1409	36.2465	27.2120	22.2385	67
63.....	58.5662	53.1645	40.7693	31.7348	23.5133	18.9041	68
64.....	52.5571	47.5555	36.1048	27.7818	20.2306	15.9668	69
65.....	46.8233	42.0960	31.5400	23.8907	16.9738	13.2204	70
66.....	40.7414	36.4784	27.0638	20.1470	14.1048	10.7437	71
67.....	35.0093	31.2826	22.9445	16.9939	11.5984	8.60724	72
68.....	30.3549	27.0385	19.5317	14.1362	9.35036	6.70812	73
69.....	25.6588	22.7292	16.0954	11.3950	7.26656	5.03277	74
70.....	20.8381	18.3614	12.8065	8.92573	5.49526	3.56824	75
71.....	17.1460	15.0095	10.2204	6.86968	3.94061	2.37666	76
72.....	13.1624	11.4284	7.59904	4.90123	2.59253	1.36929	77
73.....	10.0506	8.61458	5.60845	3.44869	1.57786	0.604544	78

No Remarriages Beyond Age at Entry 73

Notes: $\overline{M}^r_x = \Sigma v^{x+½} \cdot m^r_x$ Values of $v^{x+½}$ At 3½% Values of m^r_x From Table II

Present Value of 1 Payable Immediately Upon Remarriage

(a) Remarriage at Any Time Following Husband's Death $\overline{M}^r_x \div D^r_x$

(b) Remarriage During n Years Immediately Following Husband's Death $= \dfrac{\overline{M}^r_x - \overline{M}^r_{x+n}}{D^r_x}$

TABLE XII

REMARRIAGE TABLES

ULTIMATE VALUES

$(l^r_{[18]} = 100{,}000)$

Age at Entry x	Number Living Unmarried l^r_x	Number Dying Unmarried d^r_x	Yearly Probab. of Dying Unmarried q^r_x	Yearly Probab. of Surviving Unmarried p^r_x	Complete Expectation of Unmarried Life $\mathring{e}^r_x$	Commut. Column (3½%) D^r_x	Commut. Column (3½%) N^r_x	Commut. Column (3½%) $\overline{N}^r_x$
74	8488	650	.07662	.92118	7.551	665.612	4522.39	4189.59
75	7819	644	.08244	.91556	7.155	592.414	3856.78	3560.58
76	7159	635	.08880	.90930	6.768	524.067	3264.37	3002.34
77	6510	625	.09601	.90229	6.393	460.439	2740.30	2510.08
78	5874	613	.10434	.89416	6.031	401.412	2279.86	2079.16
79	5252	599	.11406	.88594	5.686	346.769	1878.45	1705.07
80	4653	585	.12579	.87421	5.354	296.829	1531.68	1383.27
81	4068	562	.13819	.86181	5.052	250.735	1234.85	1109.48
82	3506	523	.14910	.85090	4.782	208.786	984.113	879.720
83	2983	472	.15811	.84189	4.533	171.636	755.327	689.509
84	2511	422	.16804	.83196	4.291	139.592	603.691	533.895
85	2089	373	.17832	.82168	4.056	112.204	464.099	407.997
86	1716	325	.18967	.81033	3.829	89.0535	351.895	307.368
87	1391	281	.20211	.79789	3.607	69.7461	262.841	227.968
88	1110	240	.21585	.78415	3.394	53.7740	193.095	166.208
89	870	201	.23105	.76895	3.192	40.7221	139.321	118.960
90	669	166	.24759	.75241	3.001	30.2549	98.5990	83.4716
91	503	133	.26504	.73496	2.826	21.9786	68.3441	57.3548
92	370	105	.28282	.71718	2.662	15.6203	46.3655	38.5554
93	265	80	.30044	.69956	2.519	10.8091	30.7452	25.3407

94.....	185	59	.31760	.68240	2.392	7.29085	19.9361	16.2907
95.....	126	42	.33423	.66577	2.278	4.79770	12.6452	10.2464
96.....	84	29	.35048	.64952	2.167	3.09036	7.84751	6.30233
97.....	55	20	.36682	.63318	2.045	1.95503	4.75715	3.77964
98.....	35	13	.38380	.61620	1.929	1.20204	2.80212	2.20110
99.....	22	9	.40179	.59821	1.773	0.730004	1.60008	1.23508
100.....	13	5	.42099	.57901	1.654	0.416780	0.870071	0.661681
101.....	8	4	.44152	.55848	1.375	0.247808	0.453291	0.329387
102.....	4	2	.46345	.53655	1.250	0.119712	0.205483	0.145627
103.....	2	1	.48668	.51332	1.000	0.057832	0.085771	0.056855
104.....	1	1	.51119	.48881	.0500	0.027939	0.027939	0.013969

ABSTRACT OF THE DISCUSSION OF PAPERS READ AT THE PREVIOUS MEETING

WISCONSIN UNEMPLOYMENT COMPENSATION ACT—
WILLIAM H. BURHOP
VOLUME XIX, PAGE 13
WRITTEN DISCUSSION

MR. JAMES D. CRAIG:

Mr. Burhop's paper is an able summary of the Wisconsin Act and the circumstances under which it was adopted. In a general way, he has indicated the attitude of both employers and employees towards the law, but the motivating influences behind this bill are much more difficult to determine. He states that over a period of years the discussion of unemployment by employers and employees created an organized demand for protection and relief from within industry. This demand was presumably expressed in the Groves Law of 1932. Yet, it is interesting to note, in delving into the real genesis of this matter, that when the actual steps were taken to translate into action this reported demand of the parties to industry for such legislation, the legislative drafting was done, not as would naturally be expected by employers, or stockholders, or workers. It was Professor Commons who drafted Wisconsin's first unemployment insurance bill 12 years ago. It was Professor Groves, a student of Professor Commons, who drafted and introduced the law which went on to the statute books of that state in 1932.

As a result of allowing the detailed framing of the legislation to be done by parties outside of industry, the bill was clearly a compromise which has never commanded the unqualified and enthusiastic endorsement of the parties to industry. It is rather unfortunate that a bill which has such possibilities for good, or evil, should be forced through the legislature of any state as a compromise. Without the whole-hearted sympathy and endorsement of all involved, the evil features may easily crowd out the good.

When employers and employees voluntarily cooperate for the successful conduct of a business, it is not uncommon for employers to feel keen responsibility for the welfare of their work-

ing people. It has been no strange thing in these later days for employers to continue men and women at work despite a reduced volume of business and in the face of a current loss. Employers have contributed large sums for the unemployed, often assuming a direct responsibility for the care of the people in the particular town where one of their factories was located. The funds with which this relief has been carried on has come out of the surplus of the individual company. No part of this surplus has been earmarked for any particular purpose, but the entire amount has often been available for such uses as the management has determined to be in the interests not only of the business itself, but of local public policy. This widespread activity on the part of American industrialists constitutes a creditable page in American industrial history.

There are large proportions of the community, however, who seem to feel that this action has been ineffective and that these same employers who have failed to meet completely the entire problem created by the world crisis should now be told by legislative mandate to set aside a definite earmarked fund for the particular purpose of unemployment relief.

When a state makes such a legislative mandate, it announces to the world that the social policy of that state has changed from voluntarism to compulsion. There may follow a changed attitude on the part of employers doing business within such a state. A new order has been set up by legislation for both the employer and his employees. Would it not be very natural for a feeling to develop among employers that the state has decreed the social policies which they are expected to follow? Many employers, therefore, might feel that if they comply with this social edict their conscience is clear and they need go no further than the fulfillment of the minimum requirements. Naturally, also, if there is any way in which this social edict can be avoided legally, employers are still within their rights in taking advantage of such openings, and can do so with peace of mind. The original spirit which actuated the handling of these problems would, therefore, have been violated, and the results may be less advantageous to the community than was expected.

Mandatory social legislation, therefore, should be considered not only with respect to its terms and conditions, but to its consequences, namely, the economic effect upon the state and the

moral effect upon the citizens of that state. What the effect of the Wisconsin Unemployment Compensation Act will be is beyond prophesy, but in one respect it is fairly clear that it will hardly prove the panacea claimed by some. The statement has frequently been made that if funds such as those proposed under the Wisconsin Act had been accumulated in the past there would have been millions of dollars available for distribution to unemployed people in this period of depression. Assume that every one of the 48 states had provided for a reserve fund on the Wisconsin formula ten years ago. The outgo would have equaled the income, with the result that the funds would have been exhausted and the people of the nation would have been in the same dire straits as they are in May 1933. In both England and Germany today the real problem is not with those unemployed who are entitled to insurance benefit, but with those whose period of benefit has expired.

The general aspects of the problem are all so vital that it is important for actuaries, if they are to counsel wisely, to have a thorough understanding of the fundamentals of any such legislation. Mr. Burhop's paper discusses certain of these principles and gives the major points covered in the Bill. It may be added in passing that there seem to be indications that the compulsory feature of the Wisconsin Act will not go into force on July 1, 1933, as scheduled, but that the effective date will be postponed.

The phase of greatest interest to an actuary, I suggest, is the adequacy of the reserves which the Act proposes to accumulate. Assuming an average wage of $1,000 a year, it would require about four years of continuous accumulation, without any claims on the fund, to build up the prescribed reserve of $75 per employee. When that maximum had been provided, would it last any considerable time under conditions such as have confronted us for the past three years? Seventy-five percent of the employees laid off at any one time would deplete the fund in ten weeks, while 15% laid off each ten weeks would deplete it in less than one year, if we exclude the reduction in benefit incident to a decreasing fund.

A definite answer one way or another to this question would require some knowledge as to the future rate of unemployment and estimates of this factor vary widely. Every estimate as to the probable number of beneficiaries under the British and Ger-

man State plans, as well as under some of our private company schemes, has had to be revised upward. Over the ten year period ending in April 1932, the rate of unemployment in Great Britain averaged 13.25 per cent. The contributions in the original 1911 Act were based upon the assumption that the percentage of unemployed persons over a period of ten years would average 8.6%. When the plan was enlarged and extended in 1920 the assumption was made that the average rate of unemployment would in the future be 5.32%.

The recent British experience with unemployment has been borne out in general by such statistics as exist for a similar period in some of our industrial states. For example, it has been estimated that the rate of unemployment in the State of Ohio for the nine years from 1923 to 1931 has averaged 13.5%. To what extent would we be justified in projecting this past experience into even the immediate future? The world situation since 1918 has been so unprecedented, and current conditions are so fraught with diverse possibilities that any attempt to predict when the next upturn of the business cycle will take place, how long it will last, and to what heights it will take us, or how soon and how precipitous will be the succeeding plunge, and whether it will bring us to present or even lower depths, requires greater powers of prophecy than would be claimed by any of us.

The very provisions of the Wisconsin Act seem to recognize the virtual impossibility of predicting what would be an adequate reserve. Compensation is payable only so long as the individual employer's reserve account has a credit balance. Thereafter, neither the employer nor the state has any further liability under this plan toward an unemployed worker. Thus, a wage earner who becomes unemployed in the early stages of a prolonged depression receives compensation, while one who loses his employment later on may not. There might also be said to be discrimination between those who actually do receive payments, inasmuch as the rate of compensation decreases as the reserve per employee falls below $50.

While the limitation of liability to the amount actually in the employer's reserve makes the plan financially sound, it precludes the giving of any definite guarantee to employees and leaves them with very insecure and possibly inadquate protection. One of the lessons to be learned from the study of the experience in

this field at home and abroad is that the provision of certainty to the employee, the sureness of benefit, is an essential both from the viewpoint of public policy as well as from that of good industrial relations. From the worker's sense of insecurity, fear and a lack of confidence develops and with them goes a definite tendency toward a diminishing exercise of his mental and physical duties, all of which is harmful to the *esprit de corps* both within the given establishment and in the wider circle of the state or even in the nation. In evaluating any plan such as that now under discussion, it is necessary that we consider the expectations which it may hold out to those it covers, and also any possible tendency to hold the state, which made the system mandatory, responsible in the event that these expectations are not realized. Should reserves be entirely depleted and therefore compensation payments cease, will the workers assume a sympathetic attitude, or will they demand that the state step in with loans or grants from the public treasury as has been the case in governmentally sponsored plans abroad?

Mr. Burhop has pointed out that the Wisconsin scheme does not pretend to be insurance. In addition to involving a limitation of liability, the law requires the same rate of contributions from all employers regardless of whether unemployment in their particular industry and organization has been heavy or light. Thus, establishments with a favorable employment record may have an overabundance of accumulation, while those with a poorer experience may not have sufficient reserves. Some of the penalty for a good employment record is removed by the fact that employers with a favorable experience will have less difficulty in maintaining the full reserve and may cease to contribute after a limited number of years, while employers with a high rate of unemployment will have to continue contributing. This fact is intended to act as an inducement to employers to take every possible step toward the regularization of their businesses and the reduction of unemployment therein to a minimum.

An additional incentive, as mentioned by Mr. Burhop, is the provision which entirely exempts employers who guarantee to provide work or wages for at least forty-two weeks of thirty-six hours each in the succeeding year. However, it has been pointed out that this provision might possibly lead to abuse, inasmuch as Wisconsin laws do not limit the number of working hours in a

week. Consequently, an employer might reduce the size of his staff just prior to the effective date of the Unemployment Compensation Act and introduce longer hours. If he made a sufficiently large reduction in the size of his personnel he might with little difficulty be able to give the guarantee which would exempt him from any contributions.

The provision for keeping individual accounts for each employer, instead of pooling the risk, is another non-insurance feature, but one which prevents the saddling of an extra burden upon efficient, regularized concerns. This provision, and the others relating to the payment of contributions by employers, would seem to presuppose that an individual employer is able to control the volume of unemployment in his business. There has been considerable debate as to whether or not this is true in all cases.

The maximum benefit of $10 a week seems rather low for the support of a man and his family, as in the state of Wisconsin the average family consists of about four persons. It has been stated that the amount of benefit has been purposely made small in order not to overburden Wisconsin industry in competition with that of other states. However, the experience under governmental plans has always been that the rate of benefit, no matter how modest at the outset, is continuously increased once the law has been enacted, if for no other than political reasons. Consequently, it is not unreasonable to suppose that if the Wisconsin law becomes effective there will immediately be considerable pressure brought to bear to raise the rate of benefits to possibly several times the present scale.

The social aspect, however, of the Wisconsin plan is the most important aspect in attempting to evaluate it. Will the scheme relieve distress and provide at least a subsistence to unemployed workers throughout a prolonged business contraction? Compensation payments are limited under the law to ten weeks in any one calendar year. After the expiration of that period the individual has recourse only to charity or other relief. Thus, it is evident that the plan will not fully relieve unemployment of long duration. While it is highly questionable as to whether it is possible to make complete provision for depressional unemployment under any scheme, there are those who believe that to be the principal type to plan against. They think that workers

normally have sufficient savings to tide them over short periods of normal employment fluctuations.

It is contended that the Wisconsin Act is designed not so much to relieve unemployment as to prevent it. By placing the burden of contribution on the employer, it is stated, every incentive and inducement will be afforded him to reduce or even eliminate unemployment. However, experience has shown that in Great Britain and Germany, where the burden of contributions on the employer has been as high, and at times higher, than that proposed under the Wisconsin plan, there has not been a tendency to eliminate unemployment or even to reduce it greatly below the level existing in this country.

In closing I would like to say that I do not have too much patience with the super-critics—those who are always tearing down the supposedly sincere, constructive remedies suggested to improve this or that situation. We owe a debt to Professor Commons and others who have conducted much research in this field and who, by producing concrete proposals, have broken the ground preparatory to the erection, at some future time, of a structure which will be worthy of American ideals and traditions, although we question the advisability of making them mandatory until they meet with more general accord and acclaim from all interested parties.

TEN YEARS OF RATES AND RATING BUREAUS IN ONTARIO, APPLIED TO AUTOMOBILE INSURANCE.—JOHN EDWARDS

VOLUME XIX, PAGE 22

WRITTEN DISCUSSION

MR. CARL H. FREDRICKSON:

So much poetry has been printed in the *Proceedings* lately that I hesitate greatly in adding any more to previously received contributions. However, it is hard to suppress the following thought after having read Mr. Edwards' paper.

"No single thing abides, but all things flow.
Fragment to fragment clings; the things thus grow
Until we know and name them. By degrees
They melt, and are no more the things we know".

Mr. Edwards' contribution is like history of a constant changing pattern which may be interpreted by different minds in a

totally different way. As Talleyrand is supposed to have said: "History would not contain so much for us to learn if we learned anything from it".

Although I am not particularly familiar with the history of insurance legislation in the United States, I have no doubt but that it follows largely the same fundamental lines as the Ontario legislation.

The weak point in any legislation is the administration of the law, which in its turn is dependent upon the means given the administrator to properly see that the law is lived up to. In Ontario it appears that the administrative tools were not very effective but always affected, not only by an original weakness but subsequently by political tampering and manipulation. Even after the Royal Commissioner had published his findings as to the rates charged by the insurance companies, it is found that any legislative system tending to eliminate the repetition of occurrences giving rise to the Commission is placed on the shelf indefinitely. It is a question in one's mind whether laws are laws or just a form of political stimulation.

Much of Mr. Edwards' paper deals with the Royal Commission appointed in 1929 to investigate automobile insurance rates and rating organizations.

My own opinion is that the result of the Royal Commission was practically nil insofar as rates are concerned. The fact is that at the time of the publication of the Royal Commission's findings, the tariff companies had begun to feel considerable non-tariff competition and would consequently have been forced to shade the rates as much as possible, in order to hold this in check. It is interesting to note that a rate readjustment has been made in the Province of Ontario for 1933, which reduces the 1933 rate level by approximately 15 per cent. One might conceivably visualize as one probable outcome of this downward scaling of rates another Royal Commission to investigate a possible inadequacy of rates.

The only real benefit accruing from the Royal Commission rating-wise was a piece of legislation compelling all companies, whether tariff or non-tariff, to file with a Statistical Agency, appointed by the Superintendent of Insurance, their experience uniformly in accordance with a Plan prescribed by him. And, therefore, Ontario is today in the unique position of compiling

experience of all companies transacting a certain line of business without compulsory insurance requirements.

The value and effect of this experience is under the same discussion here as in the United States and we have our Messrs. Richardsons and our Messrs. Michelbachers here in Canada, more or less ably filling the *rôles* so vivaciously acted by these two gentlemen in the States. But "Me thinks she doth protest too much".

I agree with Mr. Michelbacher regarding the futility of predicting insurance trends and visualizing what the future should carry in its lap when nothing has happened in the past which in any way changes the validity of the experience data. Hence my opinion, that there is no earthly gain by endeavouring a prediction of what the future may carry insofar as insurance legislation in the Province of Ontario is concerned.

REVIEWS OF PUBLICATIONS

CLARENCE A. KULP, BOOK REVIEW EDITOR

Medical Care for the American People. The Final Report of the Committee on the Costs of Medical Care. Adopted October 31, 1932. The University of Chicago Press, Chicago, Ill. Pp. xvi, 213.

The Committee on the Costs of Medical Care was organized in 1927 under the chairmanship of Ray Lyman Wilbur, who became Secretary of the Interior in the Hoover administration, to conduct an intensive five-year program of research in the economic aspects of medical care. The Committee consisted of some fifty prominent persons drawn from "fields of private practice, public health, medical institutions and special interests, social sciences and the general public".

According to the program set forth in its first publication, the task assumed by this body was, in the most general terms, "to analyze the present intricate and confused situation in the field of medicine, to execute studies which will point the way to more efficient service for all the people, and to formulate wise recommendations on the basis of the facts revealed by the studies . . ." The recommendations adopted by the Committee in its Final Report are as ambitious and far reaching as the program itself. Their wisdom is vigorously proclaimed by some and denied by others. There are those again who regard them as inadequate. Whether, however, the reader adopts one or none of these attitudes towards them, the Report constitutes an interesting document, well calculated to provoke thought and discussion. The material is well arranged within the limits of a handy volume, equipped with a useful index, the style is not labored, as is apt to be the case with official or quasi-official reports of a similar nature, and statistical information is presented for the most part in the form of diagrams and tables which catch the eye and often speak louder than many words.

To facilitate selection on the part of the "hurried reader", the compilers of the Report have inserted a brief summary of its contents. As this will serve equally well to indicate the nature and scope of the Committee's findings to any prospective reader, we quote it as follows:

Chapter I outlines the present situation and the nature of the problem. In very brief compass, it gives the highlights from the Committee's twenty-six fact-finding studies.

Chapter II enunciates the essential elements of a satisfactory medical program and discusses the three major lines of approach to such a program.

Chapter III translates these policies into terms of organization and administration. It presents the Committee's concept of an ultimate objective.

Chapter IV depicts the most significant plans and experiments now under way. The advantages and disadvantages of each of them are briefly summarized.

Chapter V gives the Committee's specific recommendations. There are five broad recommendations and under each of these are listed specific measures for putting it into effect. A thorough understanding of them requires some familiarity with Chapters II, III and IV.

Chapter VI presents the needs for action and some practical immediate steps.

The summary tells us further that the Report includes supplementary analyses and recommendations presented by two minority groups in the Committee who did not fully agree with the exposition and analysis in Chapters I to IV, as well as personal statements by two other members.

As examples of the specific recommendations of the majority in Chapter V, we quote numbers I and III:

I —The Committee recommends that medical service, both preventive and therapeutic, should be furnished largely by organized groups of physicians, dentists, nurses, pharmacists, and other associated personnel. Such groups should be organized, preferably around a hospital, for rendering complete home, office and hospital care. The form of organization should encourage the maintenance of high standards and the development or preservation of a personal relation between patient and physician.

III—The Committee recommends that the costs of medical care be placed on a group payment basis, through the use of insurance, through the use of taxation, or through the use of both these methods. This is not meant to preclude the continuation of medical service provided on an individual fee basis for those who prefer the present method. Cash benefits, i.e., compensation for wage-loss due to illness, if and when provided, should be separate and distinct from medical services.

Other recommendations of the Committee concern the extension of public health services, the evaluation and coordination of medical service, and the education of medical practitioners.

The first of the minority groups which submitted separate reports includes nine of the forty-eight Committee members listed in the report—eight of the nine being doctors of medicine. This group takes issue with the majority on several cardinal points. They deprecate government competition in the practice of medicine, advocating the limitation of medical activities on the part of the government to strictly defined spheres, such as public health, and extension of governmental responsibility for the indigent so as to relieve the medical profession of the burden. They call for united efforts to restore the general practitioner to the central place in medical practice. They vigorously oppose the "corporate practice of medicine, financed through intermediary agencies,—as being economically wasteful, inimical to a continued and sustained high quality of medical care, or unfair exploitation of the medical profession".

Of the two Committee members who offered personal statements in explanation of their refusal to sign either the majority, or a minority report, one is of the opinion that the irreducible minimum which the Committee should have recommended was a scheme of compulsory health insurance, since maintenance of the "common health" is a "public necessity" which should not be left to the free choice of the individual; still less when, in the phraseology of an old maxim, "the consumer is not a proper judge of the quality of the ware". This compulsory health plan should be supported, he tells us, by contributions on a basis which preserves the ancient medical principle—"to each according to his needs, from each according to his ability to pay".

In addition to the free services of members of the Committee, the investigation received the financial backing of eight foundations; the Carnegie Corporation, the Josiah Macy Jr. Foundation, the Milbank Memorial Fund, the New York Foundation, the Rockefeller Foundation, the Julius Rosenwald Fund, the Russell Sage Foundation and the Twentieth Century Fund. Grants for a special study were made by the Social Science Research Council and the Vermont Commission on Country Life. The Committee also benefited in varying degree from the collaboration of individuals and other agencies, such as the Ameri-

can Medical and Dental Associations, the Metropolitan Life Insurance Company, the National Bureau of Economic Research, the National Tuberculosis Association, the United States Public Health Service, state and local departments of health, and visiting nurse associations.

Medical Care for the American People is undoubtedly a document which should be thoroughly familiar to all persons who are interested in what the Secretary of the American Medical Association calls "the delivery of adequate, scientific medical service to all the people, rich and poor, at a cost which can be reasonably met by them in their respective stations in life".

JAMES D. CRAIG.

The Way of Health Insurance. A. M. Simons and Nathan Sinai. The University of Chicago Press, Chicago, Ill, 1932. Pp. ix, 215.

This contribution to the existing voluminous literature on the subject of health insurance is refreshingly different. It is not a rehashing of the pros and cons of social insurance in general, or health insurance in particular. Neither is it one of those arid catalogs of minute comparisons between the detailed features of existing plans. Attention is directed rather to the manner in which this type of insurance operates, and especially the effect of that operation on the beneficiaries, the medical professions, and the public at large.

Writing under the auspices of the American Dental Association in cooperation with the Committee on the Costs of Medical Care, the authors naturally discuss somewhat at length the part played by doctor and dentist in the existing health insurance systems of Europe. The purpose is to call to the attention of American practitioners some of the problems of insurance which directly or indirectly involve them.

These practitioners are told frankly but sympathetically that in the past, in other countries, their colleagues have not been sufficiently informed to assume a position of leadership when health insurance plans were in process of organization. They were ill informed on the social, economic and political phases of their own work.

Health insurance, curiously enough, is not primarily a public

health program. It is essentially "poverty insurance". But of course absolutely nothing can be done without the doctors. European doctors almost uniformly adopted a negative policy in the face of insurance agitation, and thereby allowed themselves to be maneuvered into the position of appearing as obstructionists, much to their own detriment as well as to the detriment of the subsequent insurance structure itself. This negative policy, plus the general social and economic ignorance or indifference on the part of practitioners, enabled the better informed social workers and insurance societies to gain control of the national insurance system. When the clouds of political dust cleared away, the medical professions found themselves in a subservient and extremely unsatisfactory position.

Conditions precedent to the introduction of national health insurance are: first, the process of industrialization which has been going on in Europe since the Industrial Revolution; second, the emergence of a class in the community whose incomes for one reason or another are chronically inadequate to pay for medical care; third, the growing sense of social responsibility; and fourth, the realization on the part of the community that the diseases of individuals have rather wide and definite social results. These, the authors tell us, are the factors that bring on health insurance, and they emphatically claim that the very same forces are at work now in the United States, the most insurance-minded nation in the world.

In the light of this, the volume under consideration turns out to be a warning to the medical professions, as well as all other citizens, that health insurance is imminent in the United States, whether one likes it or not. But if it is imminent, it behooves the professions to study the problem and take that leading part which only they can take to insure the establishment of the best possible system.

Health insurance, as said before, does not insure health; it merely distributes the cost of medical care. Health insurance is not even insurance, for it can have no real actuarial basis. It is in fact only one possible way of providing such care for those who are underpaid. Can the medical professions of the United States bring to light an alternate plan? Or will they adopt a negative policy only to find themselves forced into a system they do not want? Or will they work with the existing social forces

and get for themselves such features as are congenial? No one, including the authors of this book, can answer such questions. Yet, on that answer depends much of our social development in the near future.

And why all this special consideration for the medical professions? They are the cornerstone of any health insurance system. You could almost entirely eliminate the bureaucratic features involved in administration, but you could never get along without the judgments of the physicians. They operate in a realm not subject to arbitrary rules and standards. Anything that interferes with the *rapport* between physician and patient at once becomes a major point of irritation. The authors conclude, quite correctly, therefore, that where doctors' services and cash benefits are most closely bound together, as in the German system, there is to be found the greatest amount of friction. On the other hand, where the cash and service benefits are most successfully separated, as in Great Britain, there is found the system which operates most smoothly.

There are many other problems and far-reaching social consequences flowing from the establishment of health insurance. *The Way of Health Insurance* is an excellent introduction to a study of the matter. Those who oppose this kind of insurance must propose some effective alternative, for a merely negative policy is doomed to defeat. Unfortunately in these pages there is no offer of an alternative although there is a faint hint at its possibility.

In case the impression should be gained that this book is written primarily for doctors and dentists, it may be well to point out that the technical phases of medical practice are not the subject of discussion, but rather the regular and natural relations between physician and patient. Since these human relationships are not always adequately understood by the layman, it is fair to conclude he will learn much on this point as well as on the social problems of health insurance.

WILLIAM B. BAILEY.

Industrial Pension Systems in the United States and Canada. Murray W. Latimer. Industrial Relations Counselors, Incorporated, New York, 1932. Two Volumes. Vol. I, pp. xxi, 561. Vol. II, pp. 634.

Trade Union Pension Systems. Murray W. Latimer. Industrial Relations Counselors, Incorporated, New York, 1932. Pp. xvi, 205.

Mr. Latimer has produced the most ambitious, most complete, and most authoritative treatise as yet published in America on industrial pensions, over 500 plans having been studied in close detail in the endeavour to answer the following questions:

1. When and where and how rapidly have industrial pension plans been adopted in the United States and Canada?
2. What are the provisions of these plans?
3. What have been the results in terms of beneficiaries and benefits?
4. What have been the results in terms of the aims for which the plans were established?
5. What types of plans have achieved the best results?
6. Is the adoption of such plans spreading, and, if so, how rapidly?
7. Does the experience permit the formulation of pension plans more satisfactory than those which now operate?

In so far as answers are possible, they are given. The book, moreover, is excellently indexed and is written in independent sections so that persons interested in specific questions need not be confused with irrelevant material.

The study was commenced in 1927 and the main body of the report was completed by 1929. However, the depression period 1929-1932 introduced so many special problems that long additional chapters have been added to bring the work down to the end of 1932.

Information was obtained from published reports, from questionnaires, and from direct correspondence with the individual concern or union, and it has been classified and displayed in fine detail in numerous tables. One appendix shows for every plan the date of establishment, the principal provisions relating to eligibility, age and service requirements, amounts of pension allowances and other benefits, the source and amount of the pension fund, and other pertinent information. Tables are also given for several of the above features with the plans classified by date of establishment, by industry, by type of pension plan (compulsory, voluntary or discretionary) and by size of company. Even the terms of plans never in force or discontinued are tabulated, as well as changes made in the provision of live

plans. As a storehouse of facts and a history of what has been tried in the past, the volumes will be invaluable to anyone trusted with the construction or maintenance of a pension plan.

But Mr. Latimer has produced more than a statistical compilation; he has also sought earnestly to discover what have been the underlying principles, if any. This side of the study culminates in an outline of twenty-nine provisions for a comprehensive pension plan, and it is significant of the difficulties inherent in the subject that probably few actuaries will be found who will agree with all of his suggested provisions. Nevertheless, a great deal of the text is devoted to arguments and factual presentations which lead up to the recommended provisions, and the consequent discussions of the accounting, legal, financial, actuarial, and employee-relationship aspects are unusually clear and complete.

Comparatively few workers, not more than one in seven, are covered by pension plans, and these plans give little, if any, legal right to a pension to the employees. Even after he is pensioned, the employee is in two-thirds of the cases without any guarantee that the pension will continue. Without any legal compulsion to set up reserves to meet the promises made, few employers have instituted adequately financed plans, and outside of a few large industrial concerns the pensions are almost all on a "pay as you go" basis.

Where pension reserves have been set up they are occasionally nothing more than "balance sheet" reserves, frequently apply to schemes on the elusive "final salary" basis, and are generally actuarially insolvent. The trade union schemes are in a still more deplorable condition. All in all, the old-age protection provided by the present system is so negligible that the picture drawn by Mr. Latimer depicts either a half-hearted attempt to solve a too-large problem, or else the first blind stirrings of a movement hardly yet born. To use the author's words, "The problem of support for aged and disabled industrial employees is as yet far from solution. It is doubtless true that industrial pension plans will continue to be subject to experiment over a long period of time. Admittedly they will be only a part of the total solution in any event. By sound management of these pension systems, by readiness to change them as conditions indicate the necessity, by attempting in all cases to give employees

security, industry may lead the way to a permanent solution of the problem of support for the aged".

It may be that compulsory state pension schemes will, as in Great Britain, encourage rather than discourage the formation of voluntary schemes. The "new deal" in industry, if it succeeds in eliminating cutthroat and wasteful competition, will make easier the financing of such schemes. Insurance companies (they have sold almost all the plans instituted in the last few years) will persuade many more employers to consider the problem seriously. It is safe to say that the problems of industrial pensions will be with us more and more in the future, and in searching for solutions Mr. Latimer's able and comprehensive study of what has been attempted in the past will be more than a help—it will be a necessity.

WILLIAM H. BURLING.

Unemployment Insurance and Relief in Germany. National Industrial Conference Board, Incorporated, New York, 1932. Pp. xvi, 107.

The National Industrial Conference Board has rendered a valuable service by the publication of a readable book entitled *Unemployment Insurance and Relief in Germany* based upon an extensive study made by a member of its research staff in Germany in the summer of 1932. The main conclusions reached are:

1. That the German unemployment insurance system has collapsed and
2. That it is generally expected that the system will eventually disappear as a plan for the relief of mass unemployment.

At the outset the reader is given a lucid and comprehensive description of the development of unemployment insurance in Germany. This system was originally designed to provide a plan of relief for unemployment of long duration, that is, for a minimum period of 58 and a maximum of 84 weeks. Contributions to the unemployment insurance fund by employers and workers were expected to provide for the unemployed during only the first 26 weeks, or in exceptional cases 39 weeks of unemployment. Provision was made for special emergency relief to workers in insured occupations who could not find employment after the expiration of this period.

It was estimated in 1927, when the present act was originally passed, that a contribution equal to 3% of the standard wage would cover this cost. This estimate proved incorrect and contributions were raised by successive stages until they reached 6.5% in October, 1931. Throughout this period, growing unemployment more than offset the increased revenue of the fund. The resulting deficits, met by loans from the Federal Government, placed a strain on its financial resources which soon became too great.

As a consequence, the Government requested the directors of the fund to balance the accounts in any manner they found necessary. To accomplish this assignment, emergency decrees were issued in June, 1932, which according to the Conference Board's study rang the death-knell of unemployment insurance as an important and independent part of unemployment relief. Benefits were reduced 23% on the average, and now are payable only after proof of need has been established. Their duration was severely curtailed. In order to cover the deficit of the fund a tax, over and above the regular contribution, varying from 1.5 to 6.5 per cent, was levied on the gross income of all wage earners. The Report maintains that:

> The changes made in the original provisions of the unemployment insurance law in June, 1932, mark the collapse of the greatest experiment in social insurance that the world has seen. Not only does unemployment insurance at the present time take care of only 11% of the total number of unemployed workers, but also the present rates of insurance benefits are not adequate to provide decent living conditions for the unemployed.

The reasons given for this collapse are that unemployment is not an actuarial risk and that unemployment insurance cannot be placed on a sound financial basis.

Other chapters of the book are devoted to discussions of the measures adopted to provide work, and the recent proposals for the reform of the system. A particularly valuable part of this timely study is a chapter which deals with the lessons to be learned in the United States from German experience, and in this connection the following statement is made:

> Germany's experience with unemployment insurance shows conclusively that no insurance system can be devised to take care of depressional unemployment and that the cost of this

unemployment falls largely on the state. There is no reason to believe that the experience of the United States would be different. If unemployment insurance is kept on a sound financial basis, that is, if the amount of expenditure is not allowed to exceed the income from contributions, the amount of relief would either be inadequate to provide for more than a small proportion of the unemployed and for a very short time, or the burden of contributions would be economically insupportable. In either event, the major part of the cost would fall on the state. That being the case, the best informed opinion in Germany advocates the establishment of a system that will be based on the following principles: (1) unemployment is not an insurable risk; (2) unemployment relief should be paid by the nation as a whole; and (3) relief should be given not as a legal right but only to persons who are in need and in proportion to the degree of that need.

The entire volume is well written and is a genuine contribution to the literature on this important subject. Anyone who has tried to coordinate figures from the various official German statistical publications will welcome the tables in this book which are presented in a clear and concise manner.

JAMES D. CRAIG.

Job Insurance. John Bertwell Ewing. University of Oklahoma Press, Norman, Oklahoma, 1933. Pp. 263.

In his book entitled *Job Insurance,* Mr. Ewing, Assistant Professor of Economics at the University of Oklahoma, seems to see two entirely different philosophies underlying the unemployment insurance and relief plans in effect today. He makes the interesting observation that Europeans have adopted a defeatist attitude believing that unemployment is inevitable. Therefore, he concludes that the systems abroad have largely become vast relief plans. On the other hand, he feels that we in America approach the problem with a more optimistic attitude exemplified in the Wisconsin plan, the only plan in this country which has any relation to government. "We", says Professor Ewing, "have developed a philosophy of prevention and stabilization and believe that if we offer proper incentives, employment can be kept more uniform".

A large portion of the book is given over to a discussion of

the unemployment reserve legislation in Wisconsin. It is stated that the success of the Workmen's Compensation Act in that commonwealth was responsible for the development of the "Wisconsin" or "American" plan. Although interest in the problem of unemployment was apparent as early as 1911 in Wisconsin, it was not until 1921 that the first unemployment compensation measure, known as the Huber Bill, was placed before the legislature. The theory underlying the Huber Bill was that expansion of credit is a main cause of unemployment and that an insurance liability should be placed on the employer against the day when he lays off a workman. The measure brought forth conflicting economic and social opinions and was defeated. It was reintroduced, however, with various changes and under different names in 1923, 1925, 1927 and 1929.

After the stock market crash in 1929, interest in unemployment was again revived and the present act was passed early in 1932. Its provisions are to become compulsory throughout the State of Wisconsin on July 1, 1933, if 175,000 employees are not then covered by approved voluntary reserve or insurance plans. Under the terms of the Act, the employer is to pay the entire cost, but when he has built up a reserve averaging $75 per eligible employee, he is relieved of the necessity of paying further contributions. Furthermore, employers who undertake to guarantee work for forty-two weeks of thiry-six hours each within the ensuing year are exempted from the scheme. All the provisions with regard to the payment of contributions are so designed, in theory at least, as to furnish encouragement to employers to stabilize and regularize employment conditions within their own organizations. While it is hoped to enlist the earnest coöperation of employers for the actual prevention of unemployment, certain conditions existing in Wisconsin make it impossible to say what the result will be, a point which the author passes over rather lightly. For instance, there is no law in that state limiting the number of hours in the work day. Consequently prior to the effective date of the law, an employer could cut his working force to the size for which he could reasonably guarantee employment, and then require them to work longer hours whenever necessary. Such an employer would be increasing the volume of unemployment but at the same time would be exempted from the provisions of the law.

The comparisons made between the Wisconsin plan and those of Great Britain and Germany are lessened in value because of the fact that the information presented regarding the latter two countries is not up-to-date. The position of the English plan is taken into account only up to 1931, the drastic changes which have been made in the last two years being almost entirely neglected. The German system is treated as though it were working successfully, whereas in the opinion of most students of the subject it has collapsed and now exists in name only.

The book deals with the subject of job insurance in a highly theoretical manner. It is to be regretted that the practical objections to many of the features incorporated in the Wisconsin plan are treated so inadequately. These objections are of such importance that there are indications that the plan will not go into operation on July 1, 1933, as scheduled, but that its effective date will be postponed.

JAMES D. CRAIG.

Standards of Unemployment Insurance. Paul H. Douglas. University of Chicago Press, Chicago, Ill., 1933. Pp. xiv, 251.

> The spectacle of men and women starving in the midst of an industrial system which, if properly organized, might yield them all plenty is not one to be quietly accepted. For tailors to be out of work while multitudes are in rags, for bakers to be unemployed while men and women are famished for food, and for building craftsmen to have no work in the face of the slums which cry aloud for clearance and reconstruction, are indeed examples of the economics of Bedlam.

While the author considers the questions arising out of this state of affairs as "the most fascinating questions of our times", the purpose of the book is the more modest one of suggesting ways of "lessening the present crushing hardships which fall upon those who lose their jobs in our society". The first chapter gives facts regarding the decrease in employment and in wages since 1926. It states that at least ten million workers, about 28% of the total wage and salary workers in the United States, were unemployed in June, 1932, and that real wages at that time were about 50% of what they were in 1929. With such facts to emphasize a need, the author points out that under present conditions the unemployed have recourse only to savings, borrow-

ing and public and private charity. Savings are soon depleted; public and private charity "has not met more than 3% of the wage loss resulting from unemployment"—and is not only inadequate but also humiliating. The author contends that unemployment insurance would be a more adequate, a more stable and a more self-respecting method of meeting the immediate problems of the unemployed.

Beginning with the second chapter, the book is a detailed discussion of different methods of setting up an unemployment insurance plan. The author supports a compulsory plan requiring contributions from both employer and employees, operated through a state fund administered jointly by representatives of both parties. He points out that the small amount of progress as yet made voluntarily by industry indicates that compulsion is necessary to get substantial results in a reasonable time. It is suggested that farm labor and domestic service be exempt, because without such exemption proposed legislation would have no chance of enactment. Conditions of eligibility for unemployment benefits are discussed in detail. As a means of protecting wage scales and collective bargaining, an unemployed person is usually not required to accept a job at a lower rate of pay than is standard for the kind of work in question. The author points out that this rule has been very troublesome during periods of falling prices, since it has had a tendency to make wages stationary with consequent decrease in the profit element of production. He suggests a compromise which would withhold unemployment benefits upon failure to accept an offer of employment after a specified period of unemployment if the wage offer was within 10% of the usual scale. The question of a flat benefit for all or benefits related to wage is discussed with the suggestion that the benefit be a percentage of wage, this percentage decreasing as the wage increases, with certain additions for dependents.

The chapter on Contributions discusses at length the author's opposition to the "Wisconsin" point of view that the employer alone should pay. It is argued that the Wisconsin plan was based on Professor Commons' theory that the employer is largely responsible for unemployment and that if the full cost is charged to the employer, the effect will be to minimize unemployment through "regularization" of employment. The author is not hopeful of much encouragement of regularization by instituting

unemployment insurance, holding the view that unemployment is very largely beyond the control of the employer. This argument seems to be largely negative in combating the Wisconsin method, rather than constructive in showing clearly the advantages of the plan suggested. In fact, the author does not seem to have clear convictions as to the real incidence of contributions regardless of how they are made and without such conviction it would seem difficult to contend successfully for one plan of contribution as against another. The author holds that the administration of unemployment insurance should be through free public employment offices which should be supported by the state or national government. He is opposed to placing a substantial part of the load of unemployment insurance on a state having no income tax law, since it is his conviction that a property tax places the burden on a group "neither responsible for unemployment nor able to pay the costs involved". He would encourage the enactment of state income tax laws and the participation of the states and national government to the extent of furnishing facilities for administration and of supporting emergency benefits. The chapter on the Cost of Unemployment Insurance is quite analytical, the purpose being to establish that the cost can be estimated within such reasonably close limits that the risk may be considered insurable. From the standpoint of the actuary, this question deserves most careful consideration.

The author contends for insurance principles as opposed to the idea of individual savings whether it be by employers or employees. He favors a statewide system with pooled assets for all employing institutions with no refunds upon withdrawal and no segregation of credit to individual employers. He favors a flat rate of contribution for all employers at the start with the thought of introducing merit rating later. He favors a basic plan grounded on insurance principles, supplemented by forms of state and national emergency relief to care for unemployment beyond the periods provided in the insurance plan.

The book shows careful study and thorough acquaintance with the problems involved in formulating unemployment insurance plans. The author appreciates the immense detail involved in the successful administration of such a plan and the book shows acquaintance with many difficulties which are sure to be met in

such administration. The book is distinctly for the purpose of discussing types of plans for unemployment insurance rather than for the purpose of establishing the need for such insurance.

RAINARD B. ROBBINS.

Essentials of a Program of Unemployment Reserves. National Industrial Conference Board, Incorporated, New York, 1933. Pp. ix, 68.

After distinguishing between efforts to stabilize employment and efforts to "ease the burden" of the unemployed, this publication lists four methods of dealing with the latter problem: (1) insurance, (2) reserves, (3) public relief and (4) private relief, and states the purpose of dealing only with the establishment of unemployment reserves. Great care is taken to distinguish the reserve method from the insurance method, it being repeatedly stated that the reserves in question make no pretense of being actuarially calculated or adequate to meet unemployment needs. "They do not promise or pretend to give complete protection and perfect security. They are avowedly only partial and palliative measures for relieving the hardships of unemployment". Insurance, on the other hand, is defined not only as a pooling of risk but as "based on actuarially computed rates, which are calculated to provide amounts adequate to pay current losses, to build up according to the type of insurance involved reserve funds for the payment of future losses, and to cover the expenses of administration. The basis of insurance is a scientific system of risk measurement and rate computation. It thus offers absolute protection and complete security to the insured as respects the risks covered". While we may hope for coverage which will offer protection as absolute as this statement would indicate, one may wonder if this is a fair definition of insurance. However, it is well that definite statement is made of the limitations expected of the reserves recommended for unemployment relief.

The responsibility for unemployment relief is presented as divided between the employer, the employee and society, the employer being responsible in normal times for seasonal, temporary and to some extent technological unemployment. The employee should do what he can through his savings and through contribution to unemployment funds, and society should take

care of other than "stable and permanent" workers and the bulk of depressional unemployment.

The Wisconsin compulsory unemployment insurance law is unfavorably reviewed, the statement being made that it is "founded on wrong principles" and that it "is intended by its sponsors to serve only as an entering wedge, to be driven in further year by year. Undoubtedly, the scope of the law will be extended by successive amendments, until the burden on industry is increased far beyond the limits set in the original act". The reports of the Interstate Committee (New York, New Jersey, Massachusetts, Pennsylvania, Ohio, Connecticut), the New York Legislative Commission, the Ohio, Massachusetts and Connecticut Commissions are reviewed as is also the action taken by the American Federation of Labor at its 1932 Convention in reversing its former stand by recommending compulsory unemployment insurance. It is anticipated that unemployment legislation will be proposed in most, if not all, of the forty-three legislatures meeting in 1933 and it is this prospect which presents serious aspects to industry:

> Consequences of the most serious import to industry must result, if the formulation of a program of unemployment insurance or reserves is left to legislators and their more irresponsible and radical advisors.
>
> Industry should see to it that any legislation that may be enacted is founded on sound principles and that employers are permitted to set up private plans of unemployment reserves, subject to a minimum of bureaucratic supervision and control, just as under the workmen's compensation laws of nearly all states they are permitted to self-insure, that is, to carry their own liability under proper safeguards provided by law.

After thus making clear the point of view that industry should agree on a program, provisions of a program for the establishment of unemployment reserves are discussed with definite recommendations. These recommendations include a benefit of half-pay but not more than $10.00 a week, to begin after eight weeks of total unemployment or after a longer period of partial unemployment. The question of employee contributions is discussed at length, with final recommendation of voluntary participation of present employees and compulsory participation of new employees. The question of pooling of reserves is compli-

cated by employee contributions. No definite recommendation is made on this point, but it is stated that "a preponderance of judgment indicates that individual reserves are to be preferred for employee contributions, but that the employer's contributions should be kept in a separate fund not allocated to the individual accounts of the employees".

For a contributory plan, administration by a board equally representative of employer and employees with trusteed funds invested in short term government securities is recommended.

With this outline of an approved plan for unemployment reserves, the program next suggests that if we must have legislation, industry should try to see that benefits are not more than half-pay, that a fairly long waiting period is allowed, that no pooling of employer contributions is required and that employers shall be permitted to carry their own plans instead of participating in state plans. The point of view is taken that if the employer plan is at least as favorable as the state plan, there is no "valid reason" why it should not be permitted. This is a positive statement and would seem to invite the rejoinder that under the conditions hypothecated there is no valid reason why the employer should not come under the state scheme. Probably both statements would be too positive.

The attitude which this book was apparently published to promulgate is well summarized in the final page under the heading Conclusion in which it is recognized that industry has a responsibility to stable and permanent employees, that by establishing private reserve plans industry will reduce the dimensions of the unemployment problem, that a program agreed upon by employers would serve as a standard that would influence the character of legislation on this subject and "If, as recent developments clearly indicate, legislation of some kind is inevitable, industry should take measures for shaping the course of legislation, particularly for preserving to employers the right to establish and operate their own plans. The most effective way to combat objectionable proposals of legislation is to offer sound alternative proposals of a constructive character that will command the support of legislatures and the public generally".

RAINARD B. ROBBINS.

Fraud in Medico-Legal Practice. Sir John Collie. Edwin Arnold & Co., London, 1932. Pp. ix, 276.

This volume is a successor to Sir John Collie's earlier book entitled *Malingering,* now out of print. It is in fact a *résumé* of Dr. Collie's experience to date relating to medico-legal cases involving fraud in one aspect or another.

Up to the time this book was written Dr. Collie had examined over 60,000 cases, and a majority of the cases cited in this book have been sifted out of this long experience, and may accordingly be treated with a greater respect than is ordinarily due the citation of cases involving fraud.

In considering a work of this character it is essential that the reader first take into account that the cases cited are necessarily scattered over a large area. In other words, that fraud is an abnormal condition, and must be viewed from that standpoint. Dr. Collie makes that clear, for he says in his Preface: "This work deals with a dark side of human nature, and does not admit of the display of that sympathy which I trust all genuine cases receive".

The diagrams, drawings and illustrations are excellent, and distinctly add to the text. The text is divided into twenty-six chapters and covers various tests, types of cases where fraud is met, description of cases and methods of detecting fraud, as well as describing the relation between various kinds of accidents and injuries, and the frauds growing out of them. The index is quite complete, so that one can easily locate any type of case of special interest.

While the examples cited are distinctly medical, yet the descriptions are so phrased that the non-medical reader can easily comprehend them. In fact, the whole book is written in a style that should prove attractive to the general reader, as well as to the trained medical and legal mind.

Dr. Collie makes it quite clear in this book that fraud may involve several parties, and the claimant may be the most innocent party to the transaction. An easy-going physician, or one inclined to condone fraud, may by little effort lead a claimant to exaggerate unconsciously his troubles, whereas a physician with the right balance may provide the claimant with the necessary stamina to overcome his fears.

To the reviewer it seems as though this book might very profit-

ably be used as a textbook by the student, as well as by the practical and professional worker in the claim field.

Dr. Collie's professional connections and long practical experience add weight to the cases he cites, as well as to the conclusions he makes, and anyone who has read his earlier work on *Malingering* will want to read this later book, embodying as it does the later conclusions of the author based on added experience. The new reader will find it rich in actual experience.

W. A. BUDLONG.

Insecurity, A Challenge to America. Abraham Epstein. Harrison Smith and Robert Haas, New York, 1933. Pp. xv, 680.

The time when the need for fire insurance is most acutely felt is when the engines come clanging up to your door. It must be admitted that Mr. Epstein has chosen a tactical moment to preach the gospel of social insurance. This he has done in soulful fashion, damning each and every other undertaking, public or private, designed to secure against or grapple with the ills of the time, as fakes, nostrums or marvels of insufficiency and inefficiency, and proclaiming loudly that the one, true and only panacea is social insurance, compulsory, state-administrated and supported by copious contributions from the state treasury. Indeed he goes a step further and indicates that the program should and must be nation-wide and under Federal authority.

Holding no particular brief for any of the organizations, interests or activities banged by the Epstein club, we can but note the main heads of the assault, and leave them to their own defence if any they have. He takes a healthy swat at the movement to encourage employees to enter into the capitalistic field by ownership of stock in their own industries, and in particular at "The Labor Bank Bubble". He assails American wage levels as insufficient, whangs the savings bank system, says of the American Bankers' Association, "up to 1933, no one, of course, suspected bankers of an utter disregard for stark realities", pays his compliments to that venerable matron Life Insurance and more particularly Industrial Life Insurance in no uncertain terms, but gives a clean bill of health to insurance agents. Under the heading The Illusions of Company Welfare he sails into industrial pensions, mutual benefit plans, group insurance and unemploy-

ment benefits. Under the caption The Paucity of Philanthropy and Relief, he stigmatizes the niggardliness of the rich and the inadequacy of public charity. Under the titles Nostrums and Antidotes for Unemployment and Haphazard Remedies he deals with the shortcomings of stabilization, economic planning, sharing work, reducing the working day and week, extension of foreign trade and removing the old and the young from the ranks of the employed. The attempts of government to deal with the unemployment situation through public employment offices and public works win no praise from him. Nowhere in the social fabric is there comfort and help for the workingman save through the medium of social insurance, nor can this be brought to pass in any other way than by kicking both employer and employee into it and throwing the public treasury in after them.

This does but summary justice to Mr. Epstein's long pages of discourse, and omits some very good sense which ought to be chalked up to his credit. It is a pity that its merit and the painstaking labor he has displayed should be marred by the venom of his assaults which constantly strike one as a deal less than fair. The economic and industrial system of this country is nothing to idolize: that can be admitted: nor are those who administer it supermen. It is going a little far to speak of "the blind greed and stupidity of our business leaders and their political allies" and much further to speak of "the debauchery of our big business leaders". On this last point, be it observed, that while now and then big business leaders kick over the traces in a way that gets into the papers, as a class they seem rather a staid and serious-minded lot, whose playful moments, if any, deserve no such term. As to blindness and stupidity, they are certainly no worse, and generally a deal better than their fellows, though, to be sure, as leaders they ought to be held to a higher standard than their followers. Still, some of our leading business men display no little desire to keep abreast of their time, and not all of them are bound heart and soul to the gospel according to Adam Smith. As to greed, it may be admitted that everybody in business hopes to make a dollar, and spends no little time in that endeavor, as do we all. But if they didn't want to make money, they wouldn't be in business: nor, indeed, if the New Deal goes to the point of removing all possibility of doing business at a profit, will they or anybody else remain in business. The whole

business structure is reared on a profit-making basis, and profit or advantage is the lure which draws every stockholder into a corporation, every depositor in a bank and every holder of an insurance policy. But profit is not necessarily the sole consideration, nor does it prevent a big business man from considering his position an opportunity for service or from holding himself trustee not merely of property and property interests, but of the lives and interests of his employees. Indeed, this tendency is probably commoner among big business men than among small ones. There are, to be sure, plenty of very selfish, short-sighted business men. But they reflect, as do all men, the ethical standards of the community in which they live, and it is rare that one rises much higher or sinks much lower.

Mr. Epstein's charge that they went into the depression with cheery optimism and failed to appreciate its full extent, and were reluctant to admit that their house of cards was tumbling about their ears is doubtless more or less true. Some were indeed so optimistic that they no longer are with us. Even so, if they had one and all lain down at the beginning of the depression, cut wages promptly to the bone, fired everybody they could and shut up their factories the minute things began to look black, would we be better off? No pessimist ever won high rank as leader, doer or builder. Faith and hope are the essentials of achievement, and while these not infrequently land one in a hole, they also help one to climb out: and the President in his inaugural address stressed these as the way to recovery. That recovery now largely depends upon breathing confidence into business which has lost all the cheery optimism of those earlier years. And no small element in that loss of optimism has been the specter of the imposition of new taxes and burdens, among which those championed by Mr. Epstein have no small part.

Among all the pathetic fallacies which are urged in behalf of the social insurance program, no single one is greater than that which argues that by removing money from *A* and conferring it upon *B* you thereby increase the purchasing power of the community. This assumes that *A* won't spend it and that *B* must and will: but this is not the case by a very great deal. *A* does not ordinarily lock his money into a safe-deposit box. He either spends or invests it. If he invests it, it passes into the hands of others who spend it, for money is of no value unless spent. Thus

the transfer from *A* to *B* neither increases nor decreases the purchasing power of the community but merely modifies its distribution.

But perhaps the distribution ought to be modified. Undoubtedly, wealth is very unevenly distributed. We have at one extreme huge fortunes: at the other, a lot of people who depend for a living on their labor and have no recourse save to find opportunity to labor for somebody else. They cannot, under present circumstances, even if constantly employed, earn a great deal above the actual cost of food and support for their families and still less are they able to buy insurance or lay up reserves against the contingencies of accident, illness, old age or death, and they are not constantly employed. There is seasonal unemployment, depression unemployment and a constant tendency of industry to replace labor by reorganization or by machinery, thus setting free employees at a rate which even a season of industrial expansion may not entirely offset. The industrial machine is itself a casualty producer, scattering freely death, dismemberment and disease. What are we to do with the machine —what with the unemployed, the old, the sick and disabled, the dependents of the dead?

This case Mr. Epstein has very ably stated. But he is not the only one who has envisioned this problem, and the efforts of those who have struggled with it (it may be not too wisely, nor in any too successful and comprehensive a fashion) yet deserve something more than the Epstein sneer. Endeavors to induce thrift and saving are aimed in a sound direction. A man who can and does look after himself is a lot surer of the future than a man who goes around howling for somebody else to look after him. Many, it is admitted, cannot do the former, though all can do the latter: but the substantial institutions which represent the accumulations of the former class deserve something more than a handful of mud.

But the problem is not solved. The endeavors made are not sufficient. What are we to do, then? Temporize and wait for better times or embark whole-heartedly with Mr. Epstein and insure everything on a compulsory basis?

Before too blithely entering upon the latter course, certain considerations should be given weight. First of all, government insurance is none too popular, and this Mr. Epstein admits. It

can attain general acceptance only by kicking everybody into the scheme. This, too, Mr. Epstein admits, and claims that the idea that we might not like to be kicked into it is perfectly preposterous. Is not the American people, he says, the one of all peoples on earth most used to governmental compulsion? Very likely so, but his conclusion that we have come to like it, feel proud of it, and are joyous at the idea of being booted into the whole social insurance program seems, particularly at the moment, very premature. Nor, may it be added, are other nations in whole-souled accord with the enforced collectivist program. Germany, who knows social insurance as does no other nation, is at the moment staging an anti-Marxist revolution. England has had a very pronounced conservative swing, and has rescued its finances from stark ruin by cutting down unemployment benefits, by refusing to let the fund add further to the appalling debt of over a hundred million pounds, and more latterly, by going off the gold standard. Germany likewise, I believe, has found it necessary to cut unemployment benefits. Now, if in view of these precedents Mr. Epstein still believes our willingness to be compelled is without limits, let him recall the action of the New Deal in slicing veterans' benefits, and also what is even now happening to the eighteenth amendment. Even on the subject of the one social insurance which this country has accepted, workmen's compensation, an industrial commissioner recently intimated that the legislature and the courts had gone so far with the compensation acts that there was danger of the whole system falling to the ground. This was a member of the State Industrial Commission of Ohio, prime exponent of state administered compensation insurance. If, therefore, there is doubt even as to this well-established line, the attempt to force upon us new compulsory insurances might produce a terrible reaction.

Again, the question of imposing new burdens upon industry must be settled with reference to what industry can stand; the question of further loading the state budget must take cognizance of the state's ability to raise revenue. Neither problem troubles Mr. Epstein in the least, and he dismisses it, in off-hand fashion. But neither industry, nor even the state or nation, is in possession of a Fortunatus purse. Industry must meet new burdens either by increases in prices or by cuts in expenses, and no radical cut in expenses can be made without cutting wages. Increases in prices

are possible only insofar as purchasers are willing to pay them, and purchasers for some years have been none too eager to buy at prices even below cost. Wages have already been cut as far as employers dare. As to state revenue, citizens are now, and will be for some time to come, acutely tax-conscious. States and nation alike are faced with a shortage of revenue, and have explored all possible sources about as far as they dare. Mr. Epstein's two proposals are a further levy on income and a levy on corporate surpluses. But income taxes have already been exploited to the point of exhaustion, particularly in the upper levels. Despairing of any great increase from this source, Congress has been compelled to assail the lower brackets, and to make levies on incomes as low as $1,000, which Mr. Epstein has already gone to some length in demonstrating to be inadequate for proper support. To raise large additional revenues from people who can ill afford to pay the present levies is out of the question. The proposal to tax corporate surpluses is fantastic. Mr. Epstein says "Billions of dollars in corporation surpluses remain untouched. It is suicidal to permit the depression to continue in a descending spiral" (whatever that may mean) "while a great amount of wealth remains untaxed and unproductive". But these grandiose billions of dollars in corporation surpluses have known three years of depression and have been fading like snow upon the mountains. Whatever their present amount they are not liquid funds, but are in great measure invested and used in the corporations' business. A substantial levy upon them would force the corporations affected to make large liquidations and curtailments of operation: for to obtain new capital or even new loans for organizations which the government is heavily taxing is out of the question. Then, too, the corporation surpluses are not self-renewing. Except in favored instances, business today is not making money. The tax could not be levied regularly without compelling a withdrawal from business, and Mr. Epstein himself has set forth the rapidity with which smaller industries are already passing out of the picture.

Mr. Epstein claims that there are today between five million and fifteen million unemployed. At $10.00 a week the amount specified in the Wisconsin law, this means an annual charge of from $2,500,000,000 to $7,500,000,000. The cost of compulsory

health insurance is estimated on page 447 of Mr. Epstein's work at from $1.50 to $3.25 per month per adult worker or from $18.00 to $39.00 per annum, with somewhat lower rates for dependents. The number of wage earners used to be somewhere around 30,000,000. That means an annual charge of from $540,000,000 to $1,170,000,000. The cost of a comprehensive system of old age pensions is estimated by Mr. Epstein at $95,000,000 if the pensionable age is 70, $133,000,000 if the pensionable age is 65: but this is based on figures from California, with 3 years' experience, New York with 2, Wisconsin with 7, Massachusetts with 2 and Montana with 10. The greater part of the experience used as a basis covers a spread of from 2 to 3 years only, and it would seem questionable if these estimates take into account the crescent character of the pension burden, new annuitants regularly outnumbering those who die off. The other social insurances advocated by Mr. Epstein are not estimated as to cost: but even so there is a tidy sum involved, to be split up between nation, states and industry. That there might be a certain difficulty in finding revenue to meet the part of state and nation in these prodigious sums is, I think, fairly obvious.

Furthermore, while there may be justification for a huge expenditure in time of emergency, it is by no means certain that the unemployment situation is altogether an emergency condition. Mr. Epstein is probably correct in saying that we have little prospect of a betterment in industrial conditions through increased foreign trade. He has also specified the increasing mechanization of industry, which even in times of prosperity was releasing labor faster than it could be absorbed. The operations of the New Deal are already beginning to scare individual employers to the point of getting out of business. The aggravated unemployment situation may be with us for years. Mr. Epstein scoffs at the idea of going back to barter and manual labor: but the New Deal's designs upon the currency may yet make barter the only feasible method of exchange, and if Mr. Epstein succeeds in selling his designs to the administration, we may not be so far from a reversion to the handicraft age. He mentions the fact that some have thought that the problem should be assailed from the side of making those now in the unfortunate position of being able-bodied superfluities once more active self-sustaining economic units, but at this he sniffs. The

Epstein ideal is a system of state-organized compulsory benevolences, with a horde of state officials to hand them out, and nothing can swerve him from this beatific vision.

But all this has its pertinence as to his ideal of security. Security is but a relative term. If employees can unload their burdens upon industry or upon the state they are doubtless more secure than when carrying them themselves: but there is no security even so unless industry is secure and unless the state is secure. Unfortunately at the moment neither assumption is justified. The states are badly strained financially, in some cases face a revolt of taxpayers and are hard put to prevent public distress from ripening into open revolt against law and order. The nation is struggling to balance its budget, with a failing revenue on one hand, and a demoralized Congress on the other. It has had to undertake extraordinary means to re-establish the whole banking system, and envisions means equally extraordinary to regulate production and industry. Industry is in a hole such as it has not been in for years, and while it will probably work out if not regulated to death, can hardly avoid the effects of the storm it has been through for a long time to come. It is not intended to question the desire or the ability of the administration to deal with all these problems, but they are big enough to tax all its energies. Right now we live in a nation and in a world where everything is insecure, and the attempt of the employee group to attain security by unloading its burdens on industry or on the state merely makes industry and the state doubly insecure.

All this is not intended to minimize the seriousness of the problem envisioned by this work or the need for a rational settlement. It cannot be settled in a way which will precipitate the economic structure in ruins about our ears. It is of the essence, not to shut our eyes to facts, nor to tie ourselves to a single empiric remedy, but to take counsel even with the "business leaders and their political allies" whom Mr. Epstein so heartily despises. It is no time for the government to wield the boot of compulsion to the point of threatening to wreck industry and itself along with it. Should that occur, we would all be in the same boat with a vengeance, every man for himself, and whether we like it or not, would perforce discard all collective activity and demonstrate the antithesis thereto, namely an individualism

of the ruggedest. Mr. Epstein sniffs at that term, but right at the moment we are nearer to an enforced realization of it than we have been in many years.

CLARENCE W. HOBBS.

Also received:

Triumph of Mediocrity in Business. Horace Secrist. Northwestern University Business Studies. Bureau of Business Research, Northwestern University, 1933. Pp. xxix, 468.

Reviews of the following appear in *Transactions* of the Actuarial Society of America, Vol. XXXIV, Part One:*

The Purchase of Medical Care Through Fixed Periodic Payment. Pierce Williams, assisted by Isabel C. Chamberlin. National Bureau of Economic Research, Inc., New York, 1932. Pp. 308.

Medical Care for the American People. (The Final Report of the Committee on the Costs of Medical Care.) University of Chicago Press, Chicago, 1932. Pp. 213.

Alcohol and Man. Haven Emerson, M.D., Chief Editor, six Associate Editors, and 23 Authors. Macmillan Company, New York, 1932. Pp. 462.

Industrial Pension Systems in the United States and Canada. Murray Webb Latimer. Industrial Relations Counselors, Inc., New York, 1932. Two volumes, Pp. 1195, xxi.

Trade Union Pension Systems and other Superannuation and Permanent and Total Disability Benefits in the United States and Canada. Murray Webb Latimer. Industrial Relations Counselors, Inc., New York, 1932. Pp. 205, xvi.

The World War Veterans and The Federal Treasury. National Industrial Conference Board, Inc., New York, 1932. Pp. 77.

* Arrangements have been made with the Actuarial Society of America and the American Institute of Actuaries for exchange of book reviews. Reviews appearing in the *Transactions* or the *Record* may occasionally be reprinted in the *Proceedings* but it is believed that reference to the former publications will, in most cases, be sufficient.—BOOK REVIEW EDITOR.

Reviews of the following appear in *The Record* of the American Institute of Actuaries, Vol. XXII, Part I:

Trade Union Pension Systems. Murray W. Latimer. Industrial Relations Counselors, Inc., New York, 1932. Pp. xvi, 205.

The Problem of Old Age Dependency. Social Insurance Monographs, No. 13. Metropolitan Life Insurance Company, New York, 1932. Pp. 47.

Royal Commission on Unemployment Insurance. Final Report, Cmd. 4185. H. M. Stationery Office, London, 1932. Pp. 529.

The Principles of Financial and Statistical Mathematics. Maximilian Philip. Prentice Hall, Inc., New York, 1932. Pp. xx, 405.

A Standard Classified Nomenclature of Disease. Compiled by The National Conference on Nomenclature of Disease. Edited by H. B. Logie, M.D. The Commonwealth Fund, New York, 1933. Pp. xvii, 702.

Unemployment Insurance and Relief in Germany. Vaso Trivanovitch for the National Industrial Conference Board. National Industrial Conference Board, Inc., New York, 1932. Pp. xiv, 107.

Essentials of a Program of Unemployment Reserves. National Industrial Conference Board, Inc., New York, 1933. Pp. 68.

Public Old-Age Pensions and Insurance in the United States and in Foreign Countries. (Bulletin of the United States Bureau of Labor Statistics, No. 561). United States Government Printing Office, Washington, D. C., 1932. Pp. 367 and Charts.

Industrial Pension Systems. Murray W. Latimer. Industrial Relations Counselors, New York, 1932. Two Vols., Pp. xxi, 1195.

British Experience with Unemployment Insurance. A Summary of Evidence Taken by the Royal Commission on Unemployment Insurance, Part Five: Financial Aspects. Social Insurance Monographs, No. 11. Metropolitan Life Insurance Co., New York, 1933. Pp. 47.

British Experience with Unemployment Insurance. A Summary of Evidence Taken by the Royal Commission on Unemployment Insurance, Part Six: Economic and Social Effects. Social Insurance Monographs, No. 12. Metropolitan Life Insurance Co., New York, 1933. Pp. 54.

Measures to Alleviate Unemployment in Connecticut. Connecticut Unemployment Commission, 1932. Pp. 205 and chart inserts.

Report on Old Age Relief. Connecticut Commission to Investigate the Subject of Old Age Pensions, 1933. Pp. 125 plus 82 pages of tables.

CURRENT NOTES

A. N. MATTHEWS, CURRENT NOTES EDITOR

Oklahoma State Insurance Fund

The Oklahoma legislature recently passed a law providing for a State Fund for workmen's compensation insurance, which Fund will start with an appropriation of $25,000 from the state but will eventually return this to the state and become self-supporting. The $25,000 grant will be repaid at the rate of 10 per cent. of collected premiums and the law also provides that the Fund shall set aside 10 per cent. of earned premiums each year to form a surplus. After the surplus reaches $250,000, the amount set aside each year will be 5 per cent.

The expense of the Fund, according to the law, must not exceed 20 per cent. of earned premiums. For the purpose of paying losses the Fund shall be considered one and indivisible, but for the purpose of accounting and declaration of dividends the Fund is to be divided into separate groups. The Fund will write at rates to be fixed by the State Insurance Board.

The State Fund, according to the law, "is created for the purpose of insuring employers against liability for compensation under this Act and for assuring for the persons entitled thereto compensation provided by the Workmen's Compensation Law". The Oklahoma Compensation Law does not provide for payment of death benefits. Insurance companies writing in the state have covered fatalities under employers' liability, but since the law makes no mention of death benefits it is assumed that the State Fund will not provide insurance for losses in fatal cases.

Automobile Claim Investigations

An investigation of fraudulent automobile claims is being conducted in Massachusetts and has already produced gratifying results of a very definite nature. Several hundred claims have already been investigated and nine attorneys have been disbarred

and four more suspended. Several arrests for defrauding insurance companies have also been made and a large percentage of convictions obtained. It was found, for example, that many fake claims against various insurance companies were being presented by one gang and the activities of this gang were finally checked by the use of the Boston Index Bureau.

Indirect results of the investigation are reflected in a decrease in the number of automobile suits and in a decrease in the loss ratio on Massachusetts automobile business.

Similar investigations in other territories have been organized by Mr. William P. Cavanaugh, Manager of the Claim Department of the National Bureau of Casualty and Surety Underwriters. The Northwestern Index Bureau and the Southeastern Index Bureau will operate in a manner similar to that of the Boston Index Bureau in keeping records of claimants against insurance companies, to the end that the same injury may not be used more than once as a means of collecting damages.

1933 Compensation Rate Making Program

The compensation rate making program for 1933 is outlined in the following letter sent to the several Insurance Commissioners by Clarence W. Hobbs, Special Representative of the National Convention of Insurance Commissioners:

April 19, 1933.

"To the Members of The National Convention of Insurance Commissioners:

I transmit herewith copy of a vote passed by the Rates Committee of the National Council on Compensation Insurance, determining the rating policy for the ensuing year.

The carriers have adopted a single set of rates for all carriers, thus avoiding the difficulties which arose in the 1932 revision.

The following points as to the features of the proposed rate revision may be briefly noted:

(1) The general plan resembles closely that used in the rate revision of 1931. Rate levels are to be based upon the loss ratios of policy year 1931, the latest complete year available. Medical loss ratios are to be projected as in

that revision, and the emergency loading of 2.5 per cent. is retained; but no factor is to be introduced, as in 1932, to compensate for the effect of reductions in wage level.

(2) The loss ratios used are to be taken from Schedule 'Z'. Since this will be a first reporting, a development of the loss ratio, in accordance with the developments of preceding years will be made. This is more conservative than the use made in both 1931 and 1932 of loss ratio data, which have proven to run a trifle higher than the loss ratios shown on either the first or second reportings of Schedule 'Z'.

(3) The projection of medical loss ratios on account of the constant advance in these ratios will be for a period of 2 years instead of 2½ years as in the last two revisions. This again is a move in the direction of conservatism.

(4) The increases in rate will not be flat increases, but will be accompanied by a revision of classification rates on the basis of the last five years of experience. It is proposed further to compute rate level changes separately for (a) contracting, (b) manufacturing and (c) all other risks, which are proven to have shown differences in rate of loss ratio development. This method would appear to be more just than a flat rate level factor applied to all groups.

(5) The exact amount of the change cannot be determined until the filing of Schedule 'Z'. The adoption of the wage factor last year produced, for those states which accepted it, loss ratios strikingly close to the permissible; and in those states the rate change should be slight. An encouraging number of states upon the preliminary indications would seem not to require a rate increase, and the average rate increase, nation-wide, based on these preliminary indications is far smaller than in either of the past two years.

(6) It seems undesirable to encumber this preliminary notice with figures. Such as are available will be inserted in the report which will be made at the June meeting of the convention. They will have to be received with caution, inasmuch as Schedule 'Z' is yet to be reported and audited. It should be mentioned too that there is pending before the National Congress legislation looking towards a reduction of the working week. This if put into effect would necessitate some modification of the program in order to meet the resulting increase in compensation loss ratios. There is under way also a very praiseworthy action of the National Government seeking cooperation of the states in establishing minimum wage standards. This, if adopted

and put into effect in any state, would have a beneficial effect upon the compensation business in that state.

(7) The elimination of the wage factor used last year is due to the difficulties of computing such a factor, and the extremely uncertain condition of the economic field. The use of the factor last year appears justified in view of the fact that the preliminary indications show that those states in which it went into effect experienced loss ratios very close to the permissible—with but one or two exceptions, slightly above the permissible. The reports of the National Government seem to indicate that the shrinkage in wage levels has outrun the drop in commodity indexes. The National Council is doubtless wise in declining to speculate further on probable future movements in wage levels; but this factor remaining uncertain, the need of the emergency loading is apparent.

(8) Expense loadings have been retained without change at 40%. This is conservative in view of the abnormal expense ratios experienced during the last two years.

(9) The rate filings will be made as soon after the filing and auditing of Schedule 'Z' as is practicable. It is anticipated the filing dates will be spread over the latter half of the year.

The program as outlined betokens an encouraging tendency of underwriters to view the situation sanely and to begin to turn towards the conservative side. The compensation situation can hardly be regarded as healthy until there is some evidence of industrial revival and above all, some evidence of an increase in wage levels. That the National administration is striving to bring this about, and that it is at the moment in a far more favorable position to obtain congressional support for its policies than for some years past can hardly be doubted. It is most sincerely to be hoped that we are measurably close to the point where we can definitely say that the worst is behind us."

CLARENCE W. HOBBS.

NEW NORTH CAROLINA DEPOSITORY LAW

A North Carolina law effective April 1, 1933 requires that all casualty and surety companies doing business in the state deposit $25,000 either in United States bonds or in North Carolina bonds or mortgages. Companies with a premium income from North

Carolina business of more than $100,000 are required to make a deposit of $50,000.

As a result of this law, according to Commissioner Dan C. Boney, more than twenty multiple line casualty companies withdrew from the state altogether and others ceased writing all lines except accident and health.

Personal Notes

Edmund S. Cogswell is now First Deputy Commissioner of Insurance, State of Massachusetts, in Boston.

Harilaus E. Economidy is now Senior Examiner of the Texas Board of Insurance Commissioners in Dallas.

William F. Poorman is now Vice-President and Actuary of the Central Life Assurance Society in Des Moines.

Thomas O. Carlson is now Assistant Actuary of the National Bureau of Casualty and Surety Underwriters in New York.

Norton E. Masterson is now Vice-President and Actuary of the Hardware Mutual Casualty Company in Stevens Point, Wisconsin.

Hiram O. Van Tuyl is now Chief Accountant of the London Guarantee & Accident Company in New York.

W. Harold Bittel is now Assistant Actuary of the Peoria Life Insurance Company in Peoria, Illinois.

Hartwell L. Hall is now Associate Actuary of the Connecticut Insurance Department in Hartford.

Scott Harris is now Vice-President of Joseph Froggat & Company in New York.

Dorothy M. Jamison is now Actuary of the George Washington Life Insurance Company in Charleston, West Virginia.

LEGAL NOTES

BY
SAUL B. ACKERMAN
(OF THE NEW YORK BAR)

ACCIDENT

Coverage: [Muse *vs.* Interstate Life and Accident Co., 166 S. E. 219.]

An insured had an accident policy which contained a clause providing that: "No benefits will be paid for . . . death resulting . . . from any . . . gunshot or stab wounds". The insured died as a result of a pistol wound.

The Court held that the beneficiary could not recover on the policy. A "gun" is defined as a "metal tube for firing projectiles by the force of gunpowder or other explosives together with its stock, carriage or other attachments". When it is mounted on a carriage it is called a cannon, and when it is mounted on a stock requiring the use of both hands it is commonly called a rifle. It is also called a pistol or revolver. A pistol is a small firearm usually mounted on a hand-grip which can be fired with one hand. As used in common and ordinary language the word "gun" is used interchangeably with the word pistol. Thus the words "gunshot . . . wounds", as used in this policy includes a wound produced by a pistol or revolver shot.

AUTOMOBILE

Coöperation Clause: [Tuder *vs.* Commonwealth Casualty Co., 163 A. 27.]

A company issued to the assured an automobile liability policy with the usual coöperation clause. An accident occurred and a pedestrian was injured. The pedestrian brought an action and the company assumed the defense. A week before the trial the company's investigator notified the assured's family that the assured would have to appear in court. On the day of the trial the assured failed to appear and the company's investigator, upon making inquiry was informed that the assured had absconded.

Without further investigation, the company dropped the defense and judgment was rendered against the assured by default. The assured failed to pay the judgment, and the injured sued the company. The company set up the lack of coöperation of the assured as its defense.

The court held that the mere fact that the company was informed that the insured had absconded is insufficient to relieve the company from liability. The company in order to have its defense of lack of coöperation upheld must prove that the assured actually did abscond. If there was collusion between a financially unresponsible assured and the insurer the defense the company desires to maintain could be interposed with ease and an injured person would be deprived of his right to have his judgment satisfied by the company.

BURGLARY

Books: [National Surety Co. *vs.* Earl Park State Bank, 63 F. (2d) 825.]

A burglary insurance policy covered a bank for loss by burglary of money and securities feloniously abstracted from its premises during the day or night. The bank suffered a burglary loss. Cash and bonds belonging to customers were carried away by the burglars. The insurance company disclaimed all liability on the ground that the bank failed to keep records of the bonds in its possession in accordance with the terms of the policy. The bank contends that any records from which the loss can be determined no matter how informal, are substantial.

The Court held that the bank's records were not kept as they would have been kept as in a large city bank. The method of recording the withdrawal or replacement of the bonds was crude. However, a substantial compliance with this requirement is all that is necessary. The bank's books showed the names of the owners and of the denomination of each government bond. The record had been preserved and had been placed in evidence. The bank's bookkeepers testified that the bonds belonging to the different owners were placed in different envelopes with the names of the owners written thereon. The records show the par value of the bonds. Many of them at least showed the number of the

bond, as well as the government designation of the issue. Written in pencil opposite the name of seven bonds was the word "out". Opposite the figures of several bonds was the designation "x". These designations were satisfactorily explained. Considering all the evidence, the court had no hesitancy in stating that the jury was amply justified in finding that records were kept as required by the policy.

FIDELITY

Six Month Clause: [Hood, Bank Commissioner ex rel, First Bank & Trust Company *vs.* Rhodes, 167 S. E. 558.]

A fidelity bond provided that the right to make any claim thereon should expire six months after its termination. One year after the bond had terminated, the assured discovered that he had been defrauded during the lifetime of the policy. The company refused to accept the assured's proof of loss.

The courts have held, that where the liability of the company is expressly limited in a fidelity bond to losses occasioned and discovered during a specified time, there is no liability unless the loss is discovered within the prescribed period. The mere fact that the discovery is prevented by the concealment of the defaulter will not extend the period of indemnity. The assured in this case made a valid contract limiting the time in which it could present its claim. The fact that the claim was not presented in the prescribed time relieved the company of liability on its bond.

LIABILITY

Reinsurance: [Geenman *vs.* General Reinsurance Co., 262 N. Y. S. 569.]

A claimant, having suffered serious injuries in an automobile accident, had judgment against the owner who was insured against liability. The owner being insolvent the claimant brought an action against the insurer and judgment was rendered against it. The insurer went into liquidation without paying the judgment. The insurer, prior to insolvency, reinsured the risk with another company. The claimant sued the reinsurer.

The Court held that an assured may recover from a reinsurer only when the language of the reinsurance policy indicates an intent upon the part of the reinsurer to become directly liable. This occurs in cases where a company is going out of business and transfers its risks to another which agrees to pay; or where all risks are assumed. It would be a strained construction of the usual form of reinsurance contract to find a direct obligation to the insured. The insolvency of the insurer does not change the nature of the obligation.

ROBBERY

Waiver: [Community Stores of La. *vs.* Associated Indemnity Co., 144 So. 909.]

An insured, under a robbery policy, notified the local agent of the insured company of the insured's intention to remove to a new location. The agent told the insured not to worry about the necessary endorsement for change of location. In a subsequent letter, the agent acknowledged notice of the change and stated that the general agents of the company had been informed of the removal.

The policy contained a waiver clause which provided that no provision of the policy could be waived or altered except by an endorsement signed by the President and Secretary of the company.

The insured suffered a loss at the new location, which location was not endorsed on the policy.

The Court held the company not liable. The theory upon which the decision rested was that an insurance company, like any individual, may limit the authority of its agents. Wherever direct notice of such limitations or any notice which a prudent man is bound to regard, is brought home to the assured, he is bound by it. Where the agent exceeds the limit of his authority and the insured relies on such acts, he does so at his peril.

Of course, if a custom can be shown wherein the agent frequently exceeded his authority with the express or implied consent of the insurer, the assured could rely justifiably on the agent's acts. Here no such custom was proved.

Workmen's Compensation

Cancellation: [Hughes *vs.* Lewis, 166 S. E. 909.]

A workmen's compensation policy was obtained by the assured through his local agent. The company cancelled the policy by giving the assured notice in the manner provided. The unearned premium was returned to the agent. The agent paid part of the sum he received to the assured. A loss occurred. The assured maintained that the company was liable because the entire unearned premium was not returned to him.

The Court held that a tender or payment to the assured was not a condition precedent to the cancellation of the policy. The premium on a standard workmen's compensation policy is not definite. In order to ascertain the amount of unearned premium an audit of the assured's payroll is necessary. The company, therefore, need not remit unearned premiums in order to effectively cancel a workmen's compensation policy.

REPORT OF THE COMMITTEE ON REMARRIAGE TABLE

The following is the report of the Committee on Remarriage Table which includes a brief summary of the work of the Committee, together with the 12 listed tables which are attached.*

		Symbol
Table I	Number Living Unmarried at beginning of age x	l_x^r
Table II	Number Remarrying during age x	m_x^r
Table III	Number Dying Unmarried during age x	d_x^r
Table IV	Probability of Remarriage during age x	r_x^r
Table V	Probability of Dying Unmarried during age x	q_x^r
Table VI	Probability of Surviving Unmarried during age x	p_x^r
Table VII	Complete Expectation of Unmarried Life at age x	$\mathring{e}_x^r$
Table VIII	Commutation Columns, 3½%	D_x^r
Table IX	Commutation Columns, 3½%	N_x^r
Table X	Commutation Columns, 3½% (Payable continuously)	$\overline{N}_x^r$
Table XI	Commutation Columns, 3½%	$\overline{M}_x^r$
Table XII	Ultimate Values (beyond age at entry 73)	

Origin of Committee

The Committee was organized in May 1929 for the purpose of determining a remarriage table based upon American experience. A preliminary committee appointed to report on the feasibility of the preparation of this table had recommended that ". . . this Committee (on Remarriage Table) be organized by the Society and be endowed with broad powers to determine for itself the cooperating organizations, the degree of cooperation, the procedure in gathering and compiling the material, and the final form of the table".

* The tables are printed as part of the paper entitled "An American Remarriage Table". See page 279, this number.

Source, Volume and Compilation of Data

The basic data were obtained from individual case reports submitted by insurance carriers, both private and state funds, in compliance with a call issued by the Committee through the National Council. The reports were limited to widows who, through the death of their husbands, became beneficiaries under workmen's compensation laws in states where their status as beneficiaries changes on remarriage. The reports filed covered the experience for policy years 1911 to 1929 inclusive. In many companies the claim files on cases arising during earlier periods contained the data on open cases only, the corresponding data on closed cases having been destroyed. As the inclusion of such cases as were reported during these earlier years would give a false basis of exposure and tend to distort the results and as the number of cases reported for these earlier years was relatively small, the Committee decided to omit the data for the earlier years. The tables are based upon the data reported for policy years 1921 to 1929 inclusive and represent a total exposure of 37,040 years based on 10,699 cases.

The data were collected and compiled by the National Council on Compensation Insurance in accordance with the general plan outlined by the Committee. A Sub-Committee supervised the compilation in greater detail. The Pennsylvania data for all carriers were prepared by the Pennsylvania Compensation Rating and Inspection Bureau under the supervision of Mr. Gregory C. Kelly who in turn submitted the reports to the National Council.

Development of Tables

A review of the data showed that the remarriage rate varied more with the year of widowhood during the first few years than with the age of the widow. Therefore, it was decided to prepare a select table showing remarriage rates by age of widow for each of the first six years of widowhood, the values for the sixth year being considered as ultimate. Experience beyond the sixth year of widowhood was very limited and it was decided to exclude this from the calculations.

From a further review of the data, it became obvious that the experience was too limited to give dependable remarriage rates when each year of widowhood was separated into individual ages.

It was decided to calculate remarriage rates for each individual age by using, under each year of widowhood, a five-age moving average centered about the mid-age of the five-age period.

After reviewing the rates so determined, this procedure was modified in the following manner. The five-age data referred to above were combined for the first six years of widowhood so as to permit the calculation of average remarriage rates by age for the six-year period. The rates developed from the combined data were graduated by various methods. The closeness of fit obtained by the several methods employed was tested by observation of the deviations of the ungraduated rates from the graduated. The most satisfactory graduation was obtained by the use of the third degree equation $r'_x = a + bx + cx^2 + dx^3$, where $r'_x =$ yearly probability of remarriage or the remarriage rate per unit exposure at age x, x represents the widow's age at husband's death, and a, b, c and d are constants to be determined. After these constants were determined by the method of least squares using the exposure by age as weights, the general equation became

$$r'_x = .013431 - .0011977\,y + .000061384\,y^2 - .0000011336\,y^3$$

$y = x - 45$ being substituted for convenience of calculation.

Remarriage rates for each year of widowhood were obtained by applying to the graduated average rate of the six-year period determined from the above formula, the ratio, based on all ages combined, of the average ungraduated remarriage rate for each year of widowhood to the average ungraduated remarriage rate for the six-year period. The ratios referred to above were corrected so that the total expected remarriages for each year of widowhood, obtained by applying the remarriage rates to the exposure, would reproduce the total number of remarriages. These corrected differentials are:—

Year of Widowhood	Ratio of Remarriage Rate of Year of Widowhood to Rate for Six-Year Period
First	.6102
Second	1.4948
Third	1.1793
Fourth	1.1502
Fifth	.6991
Sixth	.4942

During the course of this investigation, the Committee studied the effect of the number of dependent children upon remarriage.

The exposure by year of widowhood, when sub-divided according to the number of dependent children, was found too small to give reliable results. There appears to be a slight tendency for the rate to vary inversely with the number of children, but there is so much variation in the results obtained from the small exposure that no definite conclusion can be drawn. The Committee is of the opinion that remarriage rates ignoring the possible effect of dependent children are satisfactory, at least until such time as it is possible to obtain a broader exposure.

The Committee also attempted to study the influence of differences in racial stock, social and economic conditions and also the influence of a lump sum allowance or dowry on remarriage, to the extent that such factors would be reflected in differences in remarriage rates by state. The data were divided geographically into New York, Pennsylvania and All Other States. The Pennsylvania data were subdivided into experience for Coal Mines and experience for All Other classifications. Remarriage rates calculated for each sub-division showed substantial agreement and the variation could be accounted for as chance fluctuation due to small exposure. It was decided that no material difference existed and that a single set of remarriage rates was satisfactory for country-wide use. At some future time when more experience is available, it may be desirable to introduce added refinements which are not practical at present.

Having determined the remarriage rates the next step was to develop appropriate tables. The combined mortality and remarriage table has been determined by combining the remarriage rates with the mortality rates for white females as obtained from the United States Life Table for 1910. The 1910 Table is the latest one of this type containing mortality rates for each age, a complete mortality table based upon the 1920 census having not been calculated.

Commutation column values assuming an interest rate of $3\frac{1}{2}\%$ have also been calculated and are included in the attached tables.

A paper by W. F. Roeber, Chairman of the Committee, and R. M. Marshall, who had direct supervision of the compilation in the National Council, describing in detail the development of the tables, will be presented to the members of the Society at the May meeting.

The Committee expresses its appreciation of the services of

Mr. H. W. Yount, Actuary of the Liberty Mutual Insurance Company, who very conscientiously and efficiently carried on the work begun by Mr. R. A. Wheeler as a member of both the Committee on Remarriage Table and the Sub-Committee.

Respectfully submitted,

COMMITTEE ON REMARRIAGE TABLE

PAUL DORWEILER
WILLIAM LESLIE
RICHARD M. PENNOCK
CHARLES G. SMITH
THOMAS F. TARBELL
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May 1, 1933.

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MAY 26, 1933

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ABSTRACT FROM THE MINUTES OF THE MEETING
MAY 26, 1933

The semi-annual (fortieth regular) meeting of the Casualty Actuarial Society was held at the Hotel Pennsylvania, New York, on Friday, May 26, 1933.

President Dorweiler called the meeting to order at 10:10 A. M., daylight saving time. The roll was called showing the following 37 Fellows and 12 Associates present:

FELLOWS

AULT	GRAHAM, C. M.	MOORE
BARBER	GRAHAM, T. B.	ORR
BLANCHARD	GRAHAM, W. J.	PERKINS
CARLSON	GREENE	PERRYMAN
COMSTOCK	HAUGH	ROEBER
CRANE	HULL	SCHEITLIN
CRAIG	HUNT	SMITH, C. G.
DAVIS	KULP	TARBELL
DEKAY	LINDER	VALERIUS
DORWEILER	MARSHALL	VAN TUYL
FONDILLER	MATTHEWS	WAITE, A. W.
GINSBURGH	MAYCRINK	YOUNG, C. N.
	MCMANUS	

ASSOCIATES

BUFFLER	HIPP	ROBBINS
CONSTABLE	KORMES	SINNOTT
GETMAN	OVERHOLSER	ST. JOHN
HARRIS	PENNOCK	WEINSTEIN

Mr. Dorweiler read his presidential address.

The minutes of the meeting held November 18, 1932 were approved as printed in the *Proceedings*.

The Secretary-Treasurer (Richard Fondiller) read the report of the Council and upon motion it was adopted by the Society. Upon recommendation of the Educational Committee (Clarence A. Kulp, Chairman), it was decided that commencing with 1934 "examinations will be held on the third Wednesday and follow-

ing Thursday during the month of May", and the syllabus of examinations was modified so that the Associateship and the Fellowship examinations were each divided into four parts.

The report of the Committee on Remarriage Table (Mr. William F. Roeber, Chairman), was read, and in accordance with the Council's recommendation was accepted and the report was ordered printed in the *Proceedings*.

The new papers printed in this number were read.

The discussion of papers read at the last meeting of the Society was begun.

Recess was taken for lunch at the hotel until 2:15 P. M.

The discussion of papers read at the last meeting of the Society was then concluded.

The following topics for which speakers had been selected was informally discussed.

The Probable Effects of Currency Inflation on Casualty Insurance.

> Assuming that there will be a material inflation of the currency in the near future, what effects may be anticipated for the various lines of casualty insurance in such elements as premium volume, outstanding premiums, accident frequency, claim costs, reserves, loss ratios, rate adequacy and expenses?

Upon motion the meeting adjourned at 4:40 P. M., Daylight Saving Time.

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1933 YEAR BOOK

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(Addendum to Volume XIX of the *Proceedings*)

Corrected to February 1, 1933 **No. 12**

FOREWORD

The Casualty Actuarial Society was organized November 7, 1914 as the Casualty Actuarial and Statistical Society of America, with 97 charter members of the grade of Fellow. The present title was adopted on May 14, 1921. The object of the Society is 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.

Prior to the organization of the Society comparatively little technical study was given to the actuarial and underwriting problems of most of the branches of casualty insurance. With the passage of legislation providing for workmen's compensation insurance in many states during 1912, 1913 and 1914, the need of actuarial guidance became more pronounced, and the organization of the Society was brought about through the suggestion of Dr. I. M. Rubinow, who became the first president. The problems surrounding workmen's compensation were at that time the most urgent, and consequently many of the members played a leading part in the development of the scientific basis upon which workmen's compensation insurance now rests.

The members of the Society have also presented papers to the *Proceedings* upon the scientific formulation of standards for the computation of both rates and reserves in accident and health insurance, liability, burglary, and the various automobile coverages. The presidential addresses constitute a valuable record of the current problems facing the casualty insurance business. Other papers in the *Proceedings* deal with acquisition costs, pension funds, legal decisions, investments, claims, reinsurance, accounting, statutory requirements, loss reserves, statistics, and the examination of casualty companies. After three years' work the Committee on Compensation and Liability Loss Reserves submitted a report which has been printed in *Proceedings* No. 35 and 36. At the present time the Committee on Remarriage Table is engaged in important research work which will redound to the benefit of the casualty business.

There are two grades of membership in the Society: Fellows and Associates; while admission to either grade is in rare cases by election, in all other cases qualification is by examination, with the additional requirement of satisfactory experience in casualty insurance work. Examinations have been held every year since organization; they are held on the last Wednesday and Thursday in May, in various cities in the United States and Canada. The membership of the Society consists of actuaries, statisticians, and executives who are connected with the principal casualty companies and organizations in the United States and Canada. The Society has a total membership of 306, comprising 178 Fellows and 128 Associates. The annual meeting of the Society is held in New York in November and the semi-annual meetings are held in May, usually in Baltimore, Boston, Hartford or Philadelphia. The Society twice a year issues a publication entitled the *Proceedings*, which contains original papers presented at the meetings of the Society. The *Proceedings* also contain discussions of papers, reviews of books and publications, current notes and legal notes. This Year Book is published annually by the Society and "Recommendations for Study" is a pamphlet which outlines the course of study to be followed in connection with the examinations for admission. These two booklets may be obtained free upon application to the Secretary-Treasurer, 90 John Street, New York.

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

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* Deceased.

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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	
*Nov. 21, 1930	AINLEY, JOHN W., The Travelers Insurance Co., 700 Main St., Hartford, Conn.
*Nov. 13, 1931	AULT, GILBERT E., Assistant Actuary, Colonial Life Insurance Co., 921 Bergen Ave., Jersey City, N. J.
May 23, 1924	BAILEY, WILLIAM B., Economist, The Travelers Insurance Co., 700 Main St., Hartford, Conn.
*Nov. 20, 1924	BARBER, HARMON T., Assistant Actuary, Casualty Actuarial Department, The Travelers Insurance Co., 700 Main St., Hartford, Conn.
*Nov. 18, 1932	BARTER, JOHN L., Superintendent, Liability Department, Pacific Coast Department, Hartford Accident & Indemnity Co., 720 California St., San Francisco, Calif.
*Nov. 13, 1931	BATHO, ELGIN R., Assistant Actuary, Ontario Equitable Life & Accident Insurance Co., Waterloo, Ontario, Canada.
†	BENJAMIN, ROLAND, Treasurer, Fidelity & Deposit Company of Maryland and American Bonding Co., Baltimore, Md.
†	BLACK, S. BRUCE, President, Liberty Mutual Insurance Co., Park Square Building, Boston, Mass.
Apr. 20, 1917	BLANCHARD, RALPH H., Professor of Insurance, School of Business, Columbia University, New York.
May 24, 1921	BOND, EDWARD J., JR., First Vice-President, Maryland Casualty Co., Baltimore, Md.
May 19, 1915	BRADSHAW, THOMAS, Vice-President and General Manager, Massey-Harris Co., Limited, 915 King St., Toronto, Canada; President, North American Life Assurance Co. of Canada, Toronto, Canada.
†	BREIBY, WILLIAM, Consulting Actuary, Fackler & Breiby, 25 Church St., New York.
*Nov. 18, 1927	BROWN, F. STUART, Comptroller, Fireman's Fund Indemnity Company, 116 John St., New York.
Oct. 22, 1915	BROWN, HERBERT D., Chief of U. S. Efficiency Bureau, 408 Winder Bldg., 17th and F Sts., N. W., Washington, D. C.
Oct. 22, 1915	BROWN, WILLIAM H., Second Vice-President and Secretary, Columbian National Life Insurance Co., 77 Franklin St., Boston, Mass.
June 5, 1925	BROSMITH, WILLIAM, Vice-President and General Counsel, The Travelers Insurance Co. and The Travelers Indemnity Co., 700 Main St., Hartford, Conn.
†	BUCK, GEORGE B., Consulting Actuary for Pension Funds, 150 Nassau St., New York.

FELLOWS

Date Admitted	
†	BUDLONG, W. A., Superintendent of Claims, Commercial Travelers Mutual Accident Association, Utica, N. Y.
*Nov. 18, 1932	BURHANS, CHARLES H., Standard Accident Insurance Co., 640 Temple Ave., Detroit, Mich.
Apr. 20, 1917	BURHOP, WILLIAM H., Secretary, Employers Mutual Liability Insurance Co., Wausau, Wis.
*Nov. 23, 1928	BURLING, WILLIAM H., The Travelers Insurance Co., 700 Main St., Hartford, Conn.
Feb. 19, 1915	BURNS, F. HIGHLANDS, President, Maryland Casualty Co., Baltimore, Md.
*Nov. 19, 1929	CAHILL, JAMES M., The Travelers Insurance Co., 700 Main St., Hartford, Conn.
†	CAMMACK, EDMUND, E., Vice-President and Actuary, Aetna Life Insurance Co., Hartford, Conn.
*Nov. 18, 1932	CAMERON, FREELAND R., American Surety Co., 100 Broadway, New York.
*Nov. 21, 1930	CARLSON, THOMAS O., National Bureau of Casualty and Surety Underwriters, 1 Park Ave., New York.
†	CARPENTER, RAYMOND V., Actuary, Metropolitan Life Insurance Co., 1 Madison Ave., New York.
*Nov. 15, 1918	COATES, BARRETT N., Coates and Herfurth, Consulting Actuaries, 114 Sansome St., San Francisco, Calif.
*Nov. 17, 1922	COATES, CLARENCE S., Federal California Underwriters, Insurance Center Building, San Francisco, Calif.
Oct. 27, 1916	COGSWELL, EDMUND S., Second Deputy Commissioner of Insurance, State House, Boston, Mass.
Feb. 19, 1915	COLLINS, HENRY, Manager and Attorney, Ocean Accident & Guarantee Corporation and President, Columbia Casualty Co., 1 Park Ave., New York.
*Nov. 23, 1928	COMSTOCK, W. PHILLIPS, London Guarantee & Accident Co., 55 Fifth Ave., New York.
†	COPELAND, JOHN A., Consulting Actuary, Candler Building, Atlanta, Ga.
*Nov. 18, 1925	CORCORAN, WILLIAM M., Office of S. H. and Lee J. Wolfe, Consulting Actuaries, 116 John St., New York.
†	COWLES, WALTER G., Vice-President, The Travelers Insurance Co., 700 Main St., Hartford, Conn.
†	CRAIG, JAMES D., Actuary, Metropolitan Life Insurance Co., 1 Madison Ave., New York.
*Nov. 19, 1926	CRANE, HOWARD G., Comptroller, General Reinsurance Corporation, 90 John St., New York.
*Nov. 18, 1932	DAVIES, E. ALFRED, Budget Supervisor, Liberty Mutual Insurance Co., Park Square Building, Boston, Mass.
*Nov. 18, 1927	DAVIS, EVELYN M., Partner in the firm of Woodward, Fondiller, Ryan & Sharp, Consulting Actuaries, 90 John St., New York.
†	DAWSON, MILES M., Consulting Actuary and Counsellor at Law, 500 Fifth Ave., New York.
†	DEARTH, ELMER H., Detroit Athletic Club, Box 2, Detroit, Mich.
†	DEKAY, ECKFORD C., President, Industrial Service Corporation, 84 William St., New York.
*Nov. 17, 1920	DORWEILER, PAUL, Actuary, Accident and Liability Department, Aetna Life Insurance Co., Hartford, Conn.

FELLOWS

Date Admitted	
May 19, 1915	DUNLAP, EARL O., Assistant Actuary, Metropolitan Life Insurance Co., 1 Madison Ave., New York.
†	EGBERT, LESTER D., Director, Brown, Crosby & Co., Inc., Insurance Brokers, 96 Wall St., New York.
*Nov. 17, 1922	ELSTON, JAMES S., Assistant Actuary, Life Actuarial Department, The Travelers Insurance Co., 700 Main St., Hartford, Conn.
†	FACKLER, EDWARD B., Consulting Actuary, Fackler & Breiby, 25 Church St., New York.
†	FALLOW, EVERETT S., Actuary, Accident Actuarial Department, The Travelers Insurance Co., 700 Main St., Hartford, Conn.
†	FARRER, HENRY, Chief Accountant, Insurance Company of North America, 111 John St., New York.
Feb. 19, 1915	FELLOWS, CLAUDE W., President, Associated Indemnity Corporation, Associated Fire & Marine Insurance Co., Associated Insurance Fund, Inc., Associated Insurance Building, 332 Pine St., San Francisco, Calif.
Feb. 19, 1915	FLANIGAN, JAMES E., Agency Manager, Bankers Life Co., 225 Broadway, New York.
†	FLYNN, BENEDICT D., Vice-President and Actuary, The Travelers Insurance Co., 700 Main St., Hartford, Conn.
Feb. 19, 1915	FONDILLER, RICHARD, Woodward, Fondiller, Ryan & Sharp, Consulting Actuaries, 90 John St., New York.
†	FORBES, CHARLES S., Treasurer, Smyth, Sanford and Gerard, Inc., Insurance Brokers, 68 William St., New York; Actuary, Service Mutual Liability Insurance Co., Park Square Building, Boston, Mass.
Nov. 19, 1929	FOSTER, R. LEIGHTON, Superintendent of Insurance, Province of Ontario, Parliament Building, Toronto, Canada.
†	FRANKLIN, CHARLES H., Assistant to First Vice-President, Continental Casualty Co., 910 South Michigan Ave., Chicago, Ill.
*Nov. 18, 1927	FREDRICKSON, CARL H., Actuary, Canadian Automobile and Casualty Underwriters Association, 200 Bay St., Toronto, Canada.
Feb. 25, 1916	FROGGATT, JOSEPH, President, Joseph Froggatt & Co., Insurance Accountants, 74 Trinity Place, New York.
†	FURZE, HARRY, Treasurer, Globe Indemnity Co., 150 William St., New York.
Feb. 19, 1915	GARRISON, FRED S., Secretary, The Travelers Indemnity Co., 700 Main St., Hartford, Conn.
*Nov. 20, 1924	GINSBURGH, HAROLD J., Assistant Secretary, American Mutual Liability Insurance Co., 142 Berkeley St., Boston, Mass.
*Nov. 21, 1930	GLENN, J. BRYAN, The Travelers Insurance Co., 700 Main St., Hartford, Conn.
May 19, 1915	GLOVER, JAMES W., University of Michigan, 620 Oxford Road, Ann Arbor, Mich.
*Nov. 13, 1931	GODDARD, RUSSELL P., The Travelers Insurance Co., 700 Main St., Hartford, Conn.
†	GOODWIN, EDWARD S., Goodwin-Beach & Riley, Stock Brokers, 94 Pearl St., Hartford, Conn.
†	GOULD, WILLIAM H., Consulting Actuary, 130 William St., New York.

FELLOWS

Date Admitted	
*Nov. 19, 1926	GRAHAM, CHARLES M., Assistant Actuary, State Insurance Fund, 625 Madison Ave., New York.
Oct. 22, 1915	GRAHAM, GEORGE, Vice-President, Central States Life Insurance Co., 3663 Lindell Blvd., St. Louis, Mo.
Oct. 22, 1915	GRAHAM, THOMPSON B., Assistant Secretary, Metropolitan Life Insurance Co., 1 Madison Ave., New York.
†	GRAHAM, WILLIAM J., Vice-President Equitable Life Assurance Society, 393 Seventh Ave., New York.
May 25, 1923	GRANVILLE, WILLIAM A., Director of Publications, Washington National Insurance Co., 1737 Howard St., Chicago, Ill.
†	GREENE, WINFIELD W., Vice-President and Secretary, General Alliance Corporation and General Reinsurance Corporation, 90 John St., New York.
†	HAMILTON, ROBERT C. L., Comptroller, Hartford Accident & Indemnity Co., Hartford, Conn.
†	HAMMOND, H. PIERSON, Actuary, Life Actuarial Department, The Travelers Insurance Co., 700 Main St., Hartford, Conn.
†	HANSEN, CARL M., President, International Reinsurance Corporation, Pacific Finance Bldg., Los Angeles, Calif.
Oct. 27, 1916	HARDY, EDWARD R., Secretary-Treasurer, Insurance Institute of America, Inc., 80 John St., New York.
Oct. 22, 1915	HATCH, LEONARD W., Member, State Industrial Board, 80 Centre St., New York.
*Nov. 19, 1926	HAUGH, CHARLES J., JR., Actuary, National Bureau of Casualty & Surety Underwriters, 1 Park Ave., New York.
Nov. 17, 1920	HEATH, CHARLES E., Vice-President and Secretary, Standard Surety & Casualty Company of New York, 80 John St., New York.
Nov. 21, 1919	HENDERSON, ROBERT, Vice-President and Actuary, Equitable Life Assurance Society, 393 Seventh Ave., New York.
May 17, 1922	HERON, DAVID, Secretary and Chief Statistician, London Guarantee & Accident Co., Ltd., 20 Lincoln's Inn Fields, London, W. C. 2, England.
†	HILLAS, ROBERT J., (Retired) 2 Whippany Road, Morristown, N. J.
May 23, 1924	HOBBS, CLARENCE W., Special Representative of the National Convention of Insurance Commissioners, National Council on Compensation Insurance, 151 Fifth Ave., New York.
Nov. 19, 1926	HODGES, CHARLES E., President, American Mutual Liability Insurance Co., Allied American Mutual Automobile Insurance Co., American Policyholders' Insurance Co., 142 Berkeley St., Boston, Mass.
Oct. 22, 1915	HODGKINS, LEMUEL G., Secretary, Massachusetts Protective Association and Massachusetts Protective Life Assurance Co., Worcester, Mass.
†	HOFFMAN, FREDERICK L., Consulting Statistician, Prudential Insurance Co., Research Consultant, Babson Institute, Wellesley Hills, Mass.; Director of Research, Aviation Business Bureau, Inc., 72 Wall St., New York.
Oct. 22, 1915	HOLLAND, CHARLES H., 75 Maiden Lane, New York.
Nov. 18, 1932	HUEBNER, SOLOMON S., Professor of Insurance, University of Pennsylvania, Philadelphia, Pa.

FELLOWS

Date Admitted	
†	HUGHES, CHARLES, Auditor and Actuary, New York Insurance Department, 80 Centre St., New York.
Nov. 19, 1929	HULL, ROBERT S., 21 Calumet St., Hastings-On-Hudson, N. Y.
†	HUNT, BURRITT A., Assistant Secretary, Accident and Liability Department, Aetna Life Insurance Co., Hartford, Conn.
†	HUNTER, ARTHUR, Vice-President and Chief Actuary, New York Life Insurance Co., 51 Madison Ave., New York.
Nov. 18, 1921	HUTCHESON, WILLIAM A., 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.
*Nov. 19, 1929	JACKSON, HENRY H., Actuary, National Life Insurance Co., Montpelier, Vt.
May 19, 1915	JOHNSON, WILLIAM C., Vice-President, Massachusetts Protective Association and Massachusetts Protective Life Assurance Co., Worcester, Mass.
Nov. 23, 1928	JONES, F. ROBERTSON, General Manager, Association of Casualty and Surety Executives; and Secretary-Treasurer, Bureau of Personal Accident and Health Underwriters, 1 Park Ave., New York.
*Nov. 19, 1926	KELTON, WILLIAM H., Assistant Actuary, Life Actuarial Department, The Travelers Insurance Co., 700 Main St., Hartford, Conn.
†	KING, WALTER I., Ganse-King Estate Service, 1 Federal St., Boston, Mass.
*Nov. 21, 1919	KIRKPATRICK, A. LOOMIS, W. A. Alexander & Co., Insurance Brokers, 134 So. La Salle St., Chicago, Ill.
†	KOPF, EDWIN W., Assistant Statistician, Metropolitan Life Insurance Co., 1 Madison Ave., New York.
Nov. 23, 1928	KULP, CLARENCE A., Professor of Insurance, University of Pennsylvania, Logan Hall, 36th St. and Woodland Ave., Philadelphia, Pa.
Feb. 19, 1915	LAIRD, JOHN M., Vice-President, Connecticut General Life Insurance Co., 55 Elm St., Hartford, Conn.
Nov. 13, 1931	LA MONT, STEWART M., Third Vice-President, Metropolitan Life Insurance Co., 1 Madison Ave., New York.
Nov. 17, 1922	LAWRENCE, ARNETTE R., Special Deputy Commissioner of Banking and Insurance, 1203 Military Park Building, 60 Park Place, Newark, N. J.
†	LEAL, JAMES R., Vice-President and Secretary, Interstate Life and Accident Co., Interstate Building, 540 McCallie Ave., Chattanooga, Tenn.
†	LESLIE, WILLIAM, Associate General Manager, National Bureau of Casualty & Surety Underwriters, 1 Park Ave., New York.
*Nov. 20, 1924	LINDER, JOSEPH, Office of S. H and Lee J. Wolfe, Consulting Actuaries, 116 John St., New York.
Nov. 18, 1921	LITTLE, JAMES F., Second Vice-President and Associate Actuary, Prudential Insurance Co., Newark, N. J.
Nov. 23, 1928	LUNT, EDWARD C., Vice-President, Great American Indemnity Co., 1 Liberty St., New York.
†	MAGOUN, WILLIAM N., General Manager, Massachusetts Rating and Inspection Bureau, 89 Broad St., Boston, Mass.

FELLOWS

Date Admitted	
*Nov. 23, 1928	MARSHALL, RALPH M., National Council on Compensation Insurance, 151 Fifth Ave., New York.
*Nov. 18, 1927	MASTERSON, NORTON E., Actuary, Hardware Mutual Casualty Co., Stevens Point, Wis.
*Nov. 19, 1926	MATTHEWS, ARTHUR N., The Travelers Insurance Co., 700 Main St., Hartford, Conn.
May 19, 1915	MAYCRINK, EMMA C., Examiner, New York Insurance Department, 80 Centre St., New York.
*Nov. 16, 1923	MCCLURG, D. Ralph, Secretary and Treasurer, National Equity Life Insurance Co., Little Rock, Ark.
May 23, 1919	MCDOUGALD, ALFRED, Ellerslie, Beddington Gardens, Wallington Surrey, England.
*Oct. 31, 1917	MCMANUS, ROBERT J., Statistician, Casualty Actuarial Department, The Travelers Insurance Co., 700 Main St., Hartford, Conn.
Feb. 19, 1915	MEAD, FRANKLIN B., Executive Vice-President, The Lincoln National Life Insurance Co., Fort Wayne, Ind.
†	MICHELBACHER, GUSTAV F., Vice-President and Secretary, Great American Indemnity Co., 1 Liberty St., New York.
†	MILLER, DAVID W., Assistant Treasurer, S. W. Strauss & Co., Investment Bonds, 565 Fifth Ave., New York.
†	MILLIGAN, SAMUEL, Third Vice-President, Metropolitan Life Insurance Co., 1 Madison Ave., New York.
†	MITCHELL, JAMES F., Assistant U. S. Manager, General Accident Fire and Life Assurance Corporation, Ltd., 414 Walnut St., Philadelphia, Pa.
†	MOIR, HENRY, President, United States Life Insurance Co., 156 Fifth Ave., New York.
*Nov. 18, 1921	MONTGOMERY, VICTOR, Secretary and General Manager, Pacific Employers Insurance Co., 928 So. Figueroa St., Los Angeles, Calif.
Nov. 19, 1926	MOONEY, WILLIAM L., Vice-President, Aetna Life Insurance Co., Hartford, Conn.
†	MOORE, GEORGE D., Comptroller, Standard Surety & Casualty Company of New York, 80 John St., New York.
†	MORRISON, JAMES, Vice-President, Independence Indemnity Underwriters of International Reinsurance Corporation, 90 John St., New York.
†	MOWBRAY, ALBERT H., Consulting Actuary, 806 San Luis Road, Berkeley, Calif.
*Nov. 17, 1920	MUELLER, LOUIS H., Resident Executive, United Air Lines, 320 Geary St., San Francisco, Calif.
†	MULLANEY, FRANK R., Secretary, American Mutual Liability Insurance Co., and American Policyholders' Insurance Co., 142 Berkeley St., Boston, Mass.
May 28, 1920	MURPHY, RAY D., Vice-President, Equitable Life Assurance Society, 393 Seventh Ave., New York.
†	NICHOLAS, LEWIS A., Assistant Secretary, Fidelity & Casualty Co., 80 Maiden Lane, New York.
†	OLIFIERS, EDWARD, Actuary and Managing Director, Previdencia do Sul, Caixa Postal F6, Porto Alegre, Brazil.

FELLOWS

Date Admitted	
Nov. 18, 1927	O'NEILL, FRANK J., President, Royal Indemnity Co. and Eagle Indemnity Co., 150 William St., New York.
†	ORR, ROBERT K., President, Wolverine Insurance Co., Lansing, Mich.
†	OTIS, STANLEY, L., Counsellor at Law, Manager, Otis Service, 90 John St., New York.
*Nov. 21, 1919	OUTWATER, OLIVE E., Actuary, Benefit Association of Railway Employees, 901 Montrose Ave., Chicago, Ill.
Nov. 19, 1926	PAGE, BERTRAND A., Vice-President, The Travelers Insurance Co., 700 Main St., Hartford, Conn.
*Nov. 18, 1921	PERKINS, SANFORD B., Assistant Secretary, Compensation and Liability Department, The Travelers Insurance Co., 700 Main St., Hartford, Conn.
Nov. 15, 1918	PERRY, W. T., Deputy Manager, Ocean Accident and Guarantee Corporation, 36 Moorgate, London, E. C. 2, England.
*Nov. 21, 1930	PERRYMAN, FRANCIS S., Actuary and Assistant Secretary, Royal Indemnity Co., 150 William St., New York.
Nov. 19, 1926	PHILLIPS, JESSE S., Chairman of Board, Great American Indemnity Co., 1 Liberty St., New York.
*Nov. 17, 1922	PINNEY, SYDNEY D., Associate Actuary, Casualty Actuarial Department, The Travelers Insurance Co., 700 Main St., Hartford, Conn.
*Nov. 13, 1931	PRUITT, DUDLEY M., Actuary and Assistant Treasurer, Pennsylvania Indemnity Corporation, Atlantic Building, Philadelphia, Pa.
May 13, 1927	REID, A. DUNCAN, President and General Manager, Globe Indemnity Co., 150 William St., New York.
†	REMINGTON, CHARLES H., Insurance Counselor and Advisor, Suite 1801-1805, French Building, 551 Fifth Ave., New York.
May 23, 1919	RICHARDSON, FREDERICK, U. S. Manager and Director, General Accident Fire and Life Assurance Corporation, 414 Walnut St., Philadelphia, Pa.
*Nov. 19, 1926	RICHTER, OTTO C., American Telephone & Telegraph Co., 195 Broadway, New York.
May 24, 1921	RIEGEL, ROBERT, Professor of Statistics and Insurance, University of Buffalo, Buffalo, N. Y.
*Nov. 16, 1923	ROEBER, WILLIAM F., General Manager, National Council on Compensation Insurance, 151 Fifth Ave., New York.
†	RUBINOW, ISAAC M., Secretary, Independent Order of B'nai B'rith, 40 Electric Bldg., Cincinnati, O.
†	SCHEITLIN, E., Assistant Treasurer, Globe Indemnity Co., 150 William St., New York.
†	SENIOR, LEON S., General Manager, Compensation Insurance Rating Board, 370 Seventh Ave., New York.
*Nov. 13, 1931	SILVERMAN, DAVID, Associate Actuary, Woodward, Fondiller, Ryan & Sharp, Consulting Actuaries, 90 John St., New York.
*Nov. 19, 1929	SKELDING, ALBERT Z., Assistant Actuary, National Council on Compensation Insurance, 151 Fifth Ave., New York.
*Nov. 19, 1929	SKILLINGS, EDWARD S., Associate Actuary, Woodward, Fondiller, Ryan & Sharp, Consulting Actuaries, 90 John St., New York.
*Nov. 18, 1932	SMICK, JACK J., National Council on Compensation Insurance, 151 Fifth Ave., New York.

FELLOWS

Date Admitted	
Apr. 20, 1917	SMITH, CHARLES G., Manager, State Insurance Fund, 625 Madison Ave., New York.
Nov. 18, 1927	STONE, EDWARD C., U. S. Manager, Employers' Liability Assurance Corporation, Limited, and President, American Employers' Insurance Company, 110 Milk St., Boston, Mass.
Feb. 25, 1916	STRONG, WENDELL M., Associate Actuary, Mutual Life Insurance Co., 32 Nassau St., New York.
Oct. 22, 1915	STRONG, WILLIAM RICHARD, No. 4 "Sheringham," Cotham Road, Kew, Victoria, Australia.
†	SULLIVAN, ROBERT J., Vice-President, The Travelers Insurance Co., and The Travelers Indemnity Co., 700 Main St., Hartford, Conn.
*Nov. 17, 1920	TARBELL, THOMAS F., Actuary, Casualty Actuarial Department, The Travelers Insurance Co., 700 Main St., Hartford, Conn.
†	THOMPSON, JOHN S., Vice-President and Mathematician, Mutual Benefit Life Insurance Co., 300 Broadway, Newark, N. J.
Nov. 18, 1921	TOJA, GUIDO, Director General, Institute Nazionale Delle Assicurazioni, Rome, Italy.
†	TRAIN, JOHN L., Secretary and General Manager, Utica Mutual Insurance Co., 185 Genesee St., Utica, N. Y.
Nov. 17, 1922	TRAVERSI, ANTONIO T., Consulting Actuary and Accountant, London Bank Chambers, Martin Place, Sydney, Australia.
*Nov. 23, 1928	VALERIUS, N. M., Accident & Liability Department, Aetna Life Insurance Co., Hartford, Conn.
*Nov. 21, 1919	VAN TUYL, HIRAM O., London Guarantee & Accident Co., 90 Maiden Lane, New York.
*Nov. 17, 1920	WAITE, ALAN W., Chief Underwriter, Accident and Liability Department, Aetna Life Insurance Co., Hartford, Conn.
*Nov. 18, 1925	WARREN, LLOYD A. H., Professor of Mathematics, University of Manitoba, 64 Niagara St., Winnipeg, Manitoba, Canada.
May 23, 1919	WELCH, ARCHIBALD, A., President, Phoenix Mutual Life Insurance Co., Hartford, Conn.
†	WHITNEY, ALBERT W., Associate General Manager, National Bureau of Casualty & Surety Underwriters, 1 Park Ave., New York.
*Nov. 13, 1931	WITTICK, HERBERT E., Assistant Secretary, Pilot Insurance Co., 159 Bay St., Toronto Canada.
†	WOLFE, LEE J., Consulting Actuary, 116 John St., New York.
May 24, 1921	WOOD, ARTHUR B., Vice-President and Managing Director, Sun Life Assurance Company of Canada, Montreal, Canada.
*Nov. 17, 1920	YOUNG, CHARLES N., 229 East Benedict Ave., Upper Darby, Pa.

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	
May 23, 1924	ACKER, MILTON, Manager, Compensation and Liability Department, National Bureau of Casualty and Surety Underwriters, 1 Park Ave., New York.
*Nov. 15, 1918	ACKERMAN, SAUL B., Associate Professor of Insurance, New York University, 90 Trinity Place, New York.
Apr. 5, 1928	ALLEN, AUSTIN F., Vice-President, Texas Employers Insurance Association and Employers Casualty Co., Dallas, Texas.
*Nov. 15, 1918	ANKERS, ROBERT E., Secretary and Treasurer, Continental Life Insurance Co., District National Bank Building, Washington, D. C.
(1)*Nov.21,1930	ARCHIBALD, A. EDWARD, Associate Actuary, Woodward, Fondiller, Ryan & Sharp, Consulting Actuaries, 90 John St., New York.
(1)*Nov.23,1928	BATEMAN, ARTHUR E., Liberty Mutual Insurance Company, Park Square Building, Boston, Mass.
*Nov. 18, 1925	BITTEL, W. HAROLD, Peoria Life Insurance Co., 410 Main St., Peoria, Ill.
Nov. 17, 1920	BLACK, NELLAS C., Superintendent Statistical Division, Maryland Casualty Co., Baltimore, Md.
*Nov. 23, 1928	BOWER, PERRY S., Great West Life Assurance Company, Winnipeg, Manitoba, Canada.
Nov. 20, 1924	BROUGHTON, THOMAS W., General Superintendent, Zurich General Accident and Liability Insurance Co., Eastern Department, 80 John Street, New York.
*Nov. 15, 1918	BRUNNQUELL, HELMUTH G., Assistant Actuary, The Northwestern Mutual Life Insurance Co., Milwaukee, Wis.
*Oct. 22, 1915	BUFFLER, LOUIS, District Manager, Utica Mutual Insurance Co., 907 Chrysler Building, New York.
*Nov. 20, 1924	BUGBEE, JAMES M., Maryland Casualty Co., Baltimore, Md.
Mar. 31, 1920	BURT, MARGARET A., Office of George B. Buck, Consulting Actuary, 150 Nassau St., New York.
Nov. 17, 1922	CAVANAUGH, LEO D., Vice-President and Actuary, Federal Life Insurance Co., 166 N. Michigan Blvd., Chicago, Ill.
*Nov. 18, 1927	CHEN, S. T., Actuarial Department, China United Assurance Society, 34 Bubbling Road, Shanghai, China.
*Nov. 18, 1927	CONROD, STUART F. Secretary and Actuary, Western Empire Life Assurance Co., Somerset Block, Winnipeg, Canada.
*Nov. 18, 1921	CONSTABLE, WILLIAM J., Resident Secretary, Lumbermen's Mutual Casualty Co., 260 Tremont St., Boston, Mass.
(1)*Nov.18,1932	COOK, E. A., Statistician, Interboro Mutual Indemnity Insurance Co., 50 Union Square, New York.
May 23, 1929	COWEE, GEORGE A., Vice-President, Liberty Mutual Insurance Co., Park Square Building, Boston, Mass.

ASSOCIATES

Date Enrolled	
*Nov. 18, 1932	CRIMMINS, JOSEPH B., Metropolitan Life Insurance Co., 1 Madison Ave., New York.
*Nov. 18, 1925	DAVIS, MALVIN E., Assistant Actuary, Metropolitan Life Insurance Co., 1 Madison Ave., New York.
May 25, 1923	ECONOMIDY, HARILAUS E., Post Office Box 285, Galveston, Texas.
(1)*Nov.13,1931	EDWARDS, JOHN, Casualty Actuary, Ontario Insurance Department, 91 Arundel Ave., Toronto 6, Ontario, Canada.
June 5, 1925	EGER, FRANK A., Comptroller, Insurance Company of North America and Affiliated Companies, 1600 Arch St., Philadelphia, Pa.
*Nov. 23, 1928	FAITH, EDWARD L., Missouri State Life Insurance Co., 1501 Locust St., St. Louis, Mo.
*Nov. 16, 1923	FITZ, L. LEROY, Consulting Actuary, 176 Federal St., Boston, Mass.
(1)*Nov.18,1927	FITZGERALD, A. H., Assistant Actuary, The Prudential Insurance Company of America, Newark, N. J.
*Nov. 16, 1923	FLEMING, FRANK A., Actuary, American Mutual Alliance, 60 East 42nd St., New York.
Nov. 20, 1924	FROBERG, JOHN, Superintendent, California Inspection Rating Bureau, 216 Pine St., San Francisco, Calif.
(1)*Nov.19,1926	FULLER, GARDNER V., Assistant Secretary, National Council on Compensation Insurance, 151 Fifth Ave., New York.
(1)*Nov.19,1929	FURNIVALL, MAURICE L., Assistant Actuary, Accident Actuarial Department, The Travelers Insurance Co., 700 Main St., Hartford, Conn.
Mar. 21, 1930	GALLON, RICHARD W., Vice-President, New Amsterdam Casualty Co., 227 St. Paul St., Baltimore, Md.
(1)*Nov.13,1931	GARWOOD, MORRIE L., Kemper Insurance Organization, Mutual Insurance Building, Chicago, Ill.
(1)*Nov.18,1932	GETMAN, RICHARD A., Life Actuarial Department, The Travelers Insurance Co., 700 Main St., Hartford, Conn.
*Nov. 17, 1922	GIBSON, JOSEPH P., JR., General Manager, Excess Underwriters, Inc., 90 John St., New York.
*Nov. 16, 1923	GILDEA, JAMES F., The Travelers Insurance Co., 700 Main St., Hartford, Conn.
Nov. 19, 1929	GORDON, HAROLD R., Executive Secretary, Health & Accident Underwriters Conference, 176 West Adams St., Chicago, Ill.
*Nov. 18, 1927	GREEN, WALTER C., Office of Coates and Herfurth, Consulting Actuaries, 114 Sansome St., San Francisco, Calif.
*Nov. 18, 1921	HAGGARD, ROBERT E., Superintendent, Permanent Disability Rating Department, Industrial Accident Commission, State Building, San Francisco, Calif.
*Nov. 17, 1922	HALL, HARTWELL L., Assistant Actuary, Connecticut Insurance Department, Hartford, Conn.
(2)*Nov.18,1925	HALL, WILLIAM D., Managing Underwriters Corp., 1130 Penobscot Bldg., Detroit, Mich.
Mar. 24, 1932	HARRIS, SCOTT; Secretary, Joseph Froggatt & Co., Inc., 74 Trinity Place, New York.
(1)*Mar.25,1924	HART, WARD VAN BUREN, Assistant Actuary, Connecticut General Life Insurance Co., Hartford, Conn.
Nov. 21, 1919	HAYDON, GEORGE F., General Manager, Wisconsin Compensation Rating & Inspection Bureau, 312 East Wisconsin Ave., Milwaukee, Wis.

ASSOCIATES

Date Enrolled	
Nov. 17, 1927	HIPP, GRADY H., Actuary, State Insurance Fund, 625 Madison Ave., New York.
*Oct. 31, 1917	JACKSON, EDWARD T., Statistician, General Accident Fire & Life Assurance Corporation, 421 Walnut St., Philadelphia, Pa.
Nov. 19, 1929	JACOBS, CARL N., President, Hardware Mutual Casualty Co., Stevens Point, Wis.
(1)*Nov.18,1927	JAMISON, DOROTHY M., Associate Actuary, George Washington Life Insurance Co., 1014 Kanawha St., Charleston, W. Va.
(2)*Nov.18,1921	JENSEN, EDWARD S., Actuary, Great Republic Life Insurance Co., 8th and Spring Sts., Los Angeles, Calif.
Nov. 21, 1930	JONES, H. LLOYD, Comptroller, London Guarantee & Accident Co., 55 Fifth Ave., New York.
*Nov. 21, 1919	JONES, LORING D., Assistant Manager, State Insurance Fund, 625 Madison Ave., New York.
*Nov. 17, 1922	KIRK, CARL L., Actuary, Zurich General Accident & Liability Insurance Co., 431 Insurance Exchange, Chicago, Ill.
*Nov. 19, 1926	KORMES, MARK, Assistant Actuary, Compensation Insurance Rating Board, 370 Seventh Ave., New York.
May 9, 1930	LANGE, JOHN R., Chief Actuary, Wisconsin Insurance Department, Madison, Wis.
*Nov. 18, 1932	LEWIS, HOWARD A., Casualty Actuarial Department, The Travelers Insurance Co., 700 Main St., Hartford, Conn.
*Nov. 23, 1928	LIPKIND, SAUL S., Reliance Life Insurance Company, Pittsburgh, Pa.
(1)*Nov.13,1931	LYONS, DANIEL J., Assistant Actuary, Columbian National Life Insurance Co., 77 Franklin St., Boston, Mass.
(1)*Nov.13,1931	MACKEEN, HAROLD E., The Travelers Insurance Co., 700 Main St., Hartford, Conn.
Mar. 24, 1932	MAGRATH, JOSEPH J., Chief of Rating Bureau, New York Insurance Department, 80 Centre St., New York.
*Nov. 18, 1925	MALMUTH, JACOB, Examiner, New York Insurance Department, 80 Centre St., New York.
Mar. 24, 1927	MARSH, CHARLES V. R., Comptroller and Assistant Treasurer, Fidelity & Deposit Co. and American Bonding Co., Baltimore, Md.
*Nov. 17, 1922	MCIVER, ROSSWELL A., 1404 Central St., Evanston, Ill.
(1)*Nov.17,1922	MICHENER, SAMUEL M., Assistant Actuary, Columbus Mutual Life Insurance Co., 580 East Broad St., Columbus, Ohio.
(1)*Nov.13,1931	MILLER, HENRY C., Comptroller, State Compensation Insurance Fund, Civic Centre, San Francisco, Calif.
(1)*Nov.21,1930	MILLER, JOHN H., Associate Actuary, Woodward, Fondiller, Ryan & Sharp, Consulting Actuaries, 90 John St., New York.
*Nov. 19, 1926	MILNE, JOHN L., Actuary, Presbyterian Ministers' Fund for Life Insurance, 1805-7 Walnut St., Philadelphia, Pa.
Nov. 17, 1922	MONTGOMERY, JOHN C., Secretary and Assistant Treasurer, Bankers Indemnity Insurance Co., 15 Washington St., Newark, N. J.
May 25, 1923	MOORE, JOSEPH P., President, North American Accident Insurance Co., 275 Craig St., W., Montreal, Canada.
(2)*Nov.21,1919	MOTHERSILL, ROLAND V., Secretary, Anchor Casualty Co., Anchor Insurance Building, St. Paul, Minn.

ASSOCIATES

Date Enrolled	
*Nov. 19, 1929	MULLER, FRITZ, Secretary-Treasurer, Agrippina Life Insurance Stock Co., Berlin, W. 30 Motzstr. 3, Germany.
(1)*Oct. 27, 1916	NEWELL, WILLIAM, Assistant Secretary, Sun Indemnity Co., 55 Fifth Ave., New York.
*Nov. 23, 1928	NEWHALL, KARL, Group Department, The Travelers Insurance Co., 700 Main St., Hartford, Conn.
*Nov. 18, 1925	NICHOLSON, EARL H., 731 College Ave., S. E., Grand Rapids, Mich.
*Nov. 13, 1931	OBERHAUS, THOMAS M., Office of Woodward, Fondiller, Ryan & Sharp, Consulting Actuaries, 90 John St., New York.
May 23, 1919	OTTO, WALTER E., Secretary-Treasurer, Michigan Mutual Liability Co., 1209 Washington Blvd., Detroit, Mich.
*Nov. 19, 1926	OVERHOLSER, DONALD M., 803 East 35th St., Brooklyn, N. Y.
Nov. 20, 1924	PENNOCK, RICHARD M., Actuary, Pennsylvania Manufacturers Association Casualty Insurance Co., Finance Building, Philadelphia, Pa.
Nov. 19, 1929	PHILLIPS, JOHN H., Secretary-Actuary, Minnesota Compensation Insurance Board, State Capitol, St. Paul, Minn.
(1)*Nov.13,1931	PICKETT, SAMUEL C., Assistant Actuary, Connecticut Insurance Department, Hartford, Conn.
*Nov. 17, 1920	PIKE, MORRIS, Vice-President and Actuary, Union Labor Life Insurance Co., Machinists Building, Mount Vernon Place, Washington, D. C.
Mar. 24, 1927	PIPER, JOHN W., Superintendent of Statistical Department, Hartford Accident & Indemnity Co., 690 Asylum Ave., Hartford, Conn.
(1)*Nov.23,1928	PIPER, KENNETH B., Associate Actuary, Woodward, Fondiller, Ryan & Sharp, Consulting Actuaries, 90 John St., New York.
*Nov. 18, 1927	POISSANT, WILLIAM A., The Travelers Insurance Co., 700 Main St., Hartford, Conn.
(1)*Nov.17,1922	POORMAN, WILLIAM F., Actuary, Central Life Assurance Society, Fifth and Grand Aves., Des Moines, Iowa.
(1) Nov. 17, 1922	POWELL, JOHN M., President, The Loyal Protective Insurance Co., 38 Newberry St., Boston, Mass.
*Nov. 18, 1925	PRENNER, MYRON R., Actuary, Department of Insurance, Bismarck, N. D.
*Nov. 15, 1918	RAYWID, JOSEPH, President, Joseph Raywid & Co., Inc., 90 William St., New York.
Nov. 19, 1929	RICHARDSON, HARRY F., Secretary-Treasurer, National Council on Compensation Insurance, 151 Fifth Ave., New York.
(1)*Nov.18,1932	ROBERTS, JAMES A., Life Actuarial Department, The Travelers Insurance Co., 700 Main St., Hartford, Conn.
*Nov. 21, 1919	ROBBINS, RAINARD B., Secretary and Actuary for Annuities, Teachers Insurance and Annuity Association, 522 Fifth Ave., New York.
*Nov. 18, 1927	SARASON, HARRY M., Missouri State Life Insurance Co., St. Louis, Mo.
Nov. 16, 1923	SAWYER, ARTHUR, Globe Indemnity Co., 150 William St., New York.
*Nov. 20, 1930	SEVILLA, EXEQUIEL S., Actuary, Office of The Insurance Commissioner, Manila, Philippine Islands.
(1)*Nov.20,1924	SHEPPARD, NORRIS E., Lecturer in Mathematics and Mechanics, University of Toronto, Toronto, Canada.

ASSOCIATES

Date Enrolled	
Nov. 15, 1918	SIBLEY, JOHN L., Assistant Secretary, United States Casualty Co., 80 Maiden Lane, New York.
*Nov. 21, 1930	SINNOTT, Robert V., Hartford Accident & Indemnity Co., 690 Asylum Ave., Hartford, Conn.
*Nov. 18, 1921	SMITH, ARTHUR G., Assistant General Manager and Actuary, Compensation Insurance Rating Board, 370 Seventh Ave., New York.
(1)*Nov.19,1926	SOMERVILLE, WILLIAM F., St. Paul Mercury Indemnity Co., St. Paul, Minn.
*Nov. 18, 1925	SOMMER, ARMAND, Assistant to Vice-President, Continental Casualty Co., 910 So. Michigan Ave., Chicago, Ill.
*Nov. 18, 1927	SPEERS, ALEXANDER A., Actuary, Michigan Life Insurance Co., Detroit, Mich.
*Nov. 15, 1918	SPENCER, HAROLD S., Aetna Life Insurance Co., Hartford, Conn.
Nov. 20, 1924	STELLWAGEN, HERBERT P., Vice-President, Indemnity Insurance Company of North America, 1600 Arch Street, Philadelphia, Pa.
(1)*Nov.18,1932	ST. JOHN, JOHN B., Metropolitan Life Insurance Co., 1 Madison Ave., New York.
*Nov. 16, 1923	STOKE, KENDRICK, Michigan Mutual Liability Company, 1209 Washington Blvd., Detroit, Mich.
*Nov. 21, 1930	SULLIVAN, WALTER F., Associated Indemnity Corporation, 332 Pine St., San Francisco, Calif.
(1)*Nov.19,1929	TAHENY, JOHN J., Vice-President and Counsel, Associated Indemnity Corporation, 332 Pine St., San Francisco, Calif.
Mar. 23, 1921	THOMPSON, ARTHUR E., Chief Statistician, Globe Indemnity Co., 150 William St., New York.
(1)*Nov.21,1919	TRENCH, FREDERICK H., Manager, Underwriting Department, Utica Mutual Insurance Co., 185 Genesee St., Utica, N. Y.
(1)*Nov.20,1924	UHL, M. ELIZABETH, National Bureau of Casualty & Surety Underwriters, 1 Park Ave., New York.
*Nov. 21, 1919	VOOGT, WALTER G., Treasurer, Associated Indemnity Corporation, 332 Pine St., San Francisco, Calif.
(1)*Oct. 27, 1916	WAITE, HARRY V., Statistician, The Travelers Fire Insurance Co., 700 Main St., Hartford, Conn.
May 23, 1919	WARREN, CHARLES S., Secretary, Massachusetts Automobile Rating and Accident Prevention Bureau, 89 Broad St., Boston, Mass.
Nov. 18, 1925	WASHBURN, JAMES H., Consulting Actuary, 2004 West End Ave., Nashville, Tenn.
(1)*Nov.18,1921	WATERS, LELAND L., Secretary-Treasurer, National Accident Insurance Co., Lincoln, Neb.
Nov. 17, 1920	WATSON, J. J., Resident Vice-President, American Indemnity Co., and Texas Indemnity Insurance Co., 1307 Kirby Building, Dallas, Texas.
*Nov. 18, 1932	WEINSTEIN, M. S., Examiner, New York Insurance Department, 80 Centre St., New York.
*Nov. 18, 1921	WELCH, EUGENE R., Associated Indemnity Corporation, 332 Pine St., San Francisco, Calif.
*Nov. 18, 1925	WELLMAN, ALEXANDER C., Vice-President and Actuary, Protective Life Insurance Co., Birmingham, Ala.

ASSOCIATES

Date Enrolled	
(1)*Nov.21,1930	WELLS, WALTER I., Massachusetts Protective Association, Worcester, Mass.
Mar. 21, 1929	WHEELER, CHARLES A., Chief Examiner of Casualty Companies, New York Insurance Department, 80 Centre St., New York.
*Nov. 18, 1927	WHITBREAD, FRANK G., Great West Life Assurance Co., Winnipeg, Manitoba, Canada.
*Oct. 22, 1915	WILLIAMSON, WILLIAM R., Assistant Actuary, Life Actuarial Department, The Travelers Insurance Co., 700 Main St., Hartford, Conn.
*Oct. 22, 1915	WOOD, DONALD M., Childs & Wood, General Agents, Royal Indemnity Co., 175 W. Jackson Blvd., Chicago, Ill.
*Nov. 18, 1927	WOOD, MILTON J., Life Actuarial Department, The Travelers Insurance Co., 700 Main St., Hartford, Conn.
*Oct. 22, 1915	WOODMAN, CHARLES E., Assistant Manager, Ocean Accident & Guarantee Corporation and Comptroller Columbia Casualty Co., 1 Park Ave., New York.
*Nov. 18, 1925	WOOLERY, JAMES M., Assistant Actuary, Kentucky Home Life Insurance Co., Louisville, Ky.
*Nov. 17, 1922	YOUNG, FLOYD E., Vice-President and Actuary, National Fidelity Life Insurance Co., National Fidelity Life Building, Kansas City, Mo.

SCHEDULE OF MEMBERSHIP, NOVEMBER 18, 1932

	Fellows	Associates	Total
Membership, November 13, 1931	177	127	304
Additions:			
By election	1	2	3
By examination	5	7	12
	183	136	319
Deductions:			
By death	2	..	2
By withdrawal	3	3	6
By transfers from Associate to Fellow.	..	5	5
Membership, November 18, 1932	178	128	306

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
William Leslie	1923-1924
G. F. Michelbacher	1924-1926
Sanford B. Perkins	1926-1928
George D. Moore	1928-1930
Thomas F. Tarbell	1930-1932

EX-VICE-PRESIDENTS

	Term
Leon S. Senior	1920-1922
Edmund E. Cammack	1922-1924
Ralph H. Blanchard	1924-1926
Sydney D. Pinney	1928-1930
*Roy A. Wheeler	1930-1932
Winfield W. Greene	1930-1932

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*Deceased

DECEASED FELLOWS

Date of Death	
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.
June 21, 1931	DAWSON, ALFRED BURNETT, Consulting Actuary, New York.
Jan. 18, 1929	DEUTSCHBERGER, SAMUEL, Actuary, New York Insurance Department, New York.
July 9, 1922	DOWNEY, EZEKIEL HINTON, Compensation Actuary, Pennsylvania Insurance Department, Harrisburg, Pa.
Oct. 30, 1924	FACKLER, DAVID PARKS, Consulting Actuary, New York.
July 25, 1931	FRANKEL, LEE K., Second Vice-President, Metropolitan Life Insurance Co., New York.
Aug. 22, 1925	GATY, THEODORE E., Vice-President and Secretary, Fidelity & Casualty Co., New York.
Mar. 18, 1932	HINSDALE, FRANK WEBSTER, Secretary, Workmen's Compensation Board, Vancouver, B. C., Canada.
Mar. 10, 1924	HOOKSTADT, CARL, Expert, U. S. Bureau of Labor Statistics, Washington, D. C.
Feb. 11, 1928	KEARNEY, THOMAS P., Manager, State Compensation Insurance Fund, Denver, Col.
Oct. 15, 1918	KIME, VIRGIL MORRISON, Actuary, Casualty Departments, The Travelers Insurance Co., Hartford, Conn.
Dec. 9, 1927	LANDIS, ABB, Consulting Actuary, Nashville, Tenn.
Mar. 27, 1931	MELTZER, MARCUS, Statistician, National Bureau of Casualty & Surety Underwriters, New York.
Aug. 20, 1915	MONTGOMERY, WILLIAM J., State Actuary, Boston, Mass.
Dec. 19, 1929	MORRIS, EDWARD BONTECOU, Actuary, Life Department, The Travelers Insurance Co., Hartford, Conn.
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.
Nov. 2, 1930	RYAN, HARWOOD ELDRIDGE, Consulting Actuary, 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.
Aug. 26, 1932	WHEELER, ROY A., Vice-President and Actuary, Liberty Mutual Insurance Co., Boston, Mass.
Dec. 31, 1927	WOLFE, S. HERBERT, Consulting Actuary, New York.
May 15, 1928	WOODWARD, JOSEPH H., Consulting Actuary, New York.
Oct. 23, 1927	YOUNG, WILLIAM, Actuary, New York Life Insurance Co., New York.

DECEASED ASSOCIATES

Date of Death	
Feb. 10, 1920	BAXTER, DON. A., Deputy Insurance Commissioner, Michigan Insurance Department, Lansing, Mich.
Mar. 8, 1931	HALL, LESLIE LE VANT, Secretary-Treasurer, National Bureau of Casualty & Surety Underwriters, New York.
Dec. 20, 1920	LUBIN, HARRY, Assistant Actuary, State Industrial Commission, New York.
June 11, 1930	WILKINSON, ALBERT EDWARD, Actuary, Standard Accident Insurance Co., Detroit, Mich.

STUDENTS

Part I and Part II Passed

The following candidates have been successful in completing the examinations for Associate but have not yet been enrolled as Associates of the Society by reason of the terms of examination rule 4 which reads: "Upon the candidate having passed both Parts I and II he will be enrolled as an Associate, provided he presents evidence of at least one year experience in actuarial, accounting or statistical work in casualty insurance offices or in the teaching of casualty insurance science at a recognized college or university, or other evidence of his knowledge of actuarial, accounting or statistical work as is satisfactory to the Council." Upon the completion of the requirements of the Council in respect to each of these candidates they will be enrolled as Associates:

ARTHUR, CHARLES R., Manufacturers Life Insurance Company, 100 Bloor St., E., Toronto, Ontario, Canada.

BAKER, ROBERT W., Manufacturers' Life Insurance Company, 100 Bloor St., E., Toronto, Ontario, Canada.

BATHO, BRUCE, The Franklin Life Insurance Company, Springfield, Ill.

BRERETON, C. R., Department of Insurance, Ottawa, Ontario, Canada.

CAMPBELL, GEORGE C., Metropolitan Life Insurance Company, 1 Madison Ave., New York City.

CANNON, LESLIE A., Great West Life Assurance Company, Winnipeg, Manitoba, Canada.

CHODORCOFF, WILLIAM, Prudential Insurance Company, Newark, N. J.

FELDMAN, ISRAEL, Metropolitan Life Insurance Company, Ottawa, Ontario, Canada.

FOOTE, JEAN VIVIAN, 42 Hochelaga St., W., Moose Jaw, Sask., Canada.

GODDARD, DAVID G., The Travelers Insurance Company, Hartford, Conn.

HIBBARD, DONALD L., One Shaler Lane, Cambridge, Mass.

JONES, CHARLES H., Metropolitan Life Insurance Company, 1 Madison Ave., New York City.

KWASHA, HERMAN, The Travelers Insurance Company, Hartford, Conn.

LAING, CHARLES B., Prudential Insurance Company, Newark, N. J.

LAIRD, W. DARRELL, Great West Life Assurance Company, Winnipeg, Manitoba, Canada.

LEARSON, RICHARD J., John Hancock Mutual Life Insurance Co., 197 Clarendon St., Boston, Mass.

LEHANE, LEO J., Central Life Insurance Company, Chicago, Ill.

LEWIS, BARNETT, 372 St. John's Ave., Winnipeg, Manitoba, Canada.

LOADMAN, ARTHUR E., 665 Elgin Ave., Winnipeg, Manitoba, Canada.

MOORE, HAROLD P. H., 720 West End Avenue, New York City.

MULLANS, G. ROBERT, The Travelers Insurance Company, Hartford, Conn.

MUTH, A. F., Actuarial Department, London Life Insurance Company, London, Canada.

ORLOFF, CONRAD, Federal Reserve Life Insurance Company, Kansas City, Kansas.

PRASOW, ROSE, Actuarial Department, Confederation Life Association, Toronto, Ontario, Canada.

ROBERTSON, ARTHUR G., Government Insurance Department, Ottawa, Ontario, Canada.

ROOD, HENRY F., The Travelers Insurance Company, Hartford, Conn.

SCHWARTZ, RICHARD T., Actuarial Department, New York Life Insurance Co., 51 Madison Ave., New York.

STUDENTS

SHPELLER, S. I., 791 Selkirk Ave., Winnipeg, Manitoba, Canada.

SUTHERLAND, HENRY M., Actuarial Department, Sun Life Assurance Company, Montreal, Canada.

THOMPSON, EMERSON W., The Travelers Insurance Company, Hartford, Conn.

WALL, DEAN, Actuarial Department, Missouri State Life Insurance Company, St. Louis, Mo.

WARD, ROBERT G., Columbian National Life Insurance Co., Boston, Mass.

WILSON, JOHN F., Manufacturers Life Insurance Company, Toronto, Canada.

WOLFMAN, MAURICE, 485 Pritchard Ave., Winnipeg, Manitoba, Canada.

YATES, J. ARNOLD, The Travelers Insurance Company, Hartford, Conn.

The following candidates for the grade of Associate have passed one of the two parts of the examination, during the last three years:

Part I only

BARRON, JAMES, JR., General Reinsurance Corporation, 90 John St., New York.

BERKELEY, ERNEST T., Employers Liability Assurance Corp., 110 Milk St., Boston, Mass.

DRUCKER, ABRAHAM, 303 West 42nd St., New York.

DUNBAR, WILLIAM A., General Reinsurance Corporation, 90 John St., New York.

FOREST, JOSEPH H., Liberty Mutual Insurance Company, Park Square Bldg., Boston, Mass.

GATELY, JOHN J., General Reinsurance Corporation, 90 John St., New York.

HART, AGNES S., 448 Rosedale Ave., Winnipeg, Manitoba, Canada.

ISAAC, WILLIAM J., Northwestern National Life Insurance Company, 430 Oak St., Minneapolis, Minn.

MILLS, JOHN A., Chief Statistician, (American) Lumbermen's Mutual Casualty Company, Mutual Insurance Bldg., Chicago, Ill.

ROSECRANS, GORDON R., 36 Horatio St., New York.

WILLIAMS, HARRY V., JR., National Council on Compensation Insurance, 151 Fifth Ave., New York City.

WOOD, R. GRAHAM, The Travelers Insurance Company, Hartford, Conn.

YOUNT, HUBERT W., Liberty Mutual Insurance Company, Park Square Bldg., Boston, Mass.

Part II only

BERMAN, ALFRED, New York Life Insurance Company, 51 Madison Ave., New York.

BOLTON, ARTHUR L., JR., 34 Remsen St., Brooklyn, N. Y.

CAMPBELL, KENNETH M., Actuarial Department, The Imperial Life Assurance Co., 20 Victoria St., Toronto, Ontario, Canada.

CARROLL, EDWARD F., JR., Williams College, Williamstown, Mass.

CHESTER, GEORGE D., The Travelers Insurance Company, Hartford, Conn.

DIGIULIO, LOUIS, The Travelers Insurance Company, Hartford, Conn.

GODFREY, CLIFFORD T., 399 Harbison Ave., Winnipeg, Manitoba, Canada.

PRINZ, RAYMOND F., Prudential Insurance Company, Newark, N. J.

CONSTITUTION

(As Amended November 23, 1928)

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. The Council shall fill vacancies occasioned by death or resignation of any officer or other member of the Council, such appointees to serve until the next annual meeting of the Society.

ARTICLE V.—*Election of Officers and Council.*

The President, Vice-Presidents, and the Secretary-Treasurer 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 Editor and the Librarian shall be elected annually by the Council at the Council meeting preceding the annual meeting of the Society. They shall be subject to confirmation by majority ballot of the Society at the annual 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 May 21, 1926)

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 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 time stated. The dues shall be five dollars for Associates payable upon entrance and each annual meeting thereafter until five such payments in all shall have been made; beginning with the sixth annual meeting after the admission of an Associate as such the dues of any Associate heretofore or hereafter admitted shall be the same as those of a Fellow. The payment of dues will be waived in the case of Fellows or Associates who have attained the age of seventy years.

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.—*Designation by Initials.*

Fellows of the Society are authorized to append to their names the initials F. C. A. S.; and Associates are authorized to append to their names the initials A. C. A. S.

ARTICLE VI.—*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.

SYLLABUS OF EXAMINATIONS

SUBJECTS

ASSOCIATESHIP: (*Part I: Sections 1 to 4; Part II: Sections 5 to 8*)

Section 1. *Advanced algebra*

Section 2. *Compound interest and annuities certain*

Section 3. *Descriptive and analytical statistics*

Section 4. *Elements of accounting, including double-entry bookkeeping*

Section 5. *Finite differences*

Section 6. *Differential and integral calculus*

Section 7. *Probabilities*

Section 8. *Elements of the theory of life contingencies; life annuities; life assurances*

FELLOWSHIP: (*Part I: Sections 9 to 12; Part II: Sections 13 to 16*)

Section 9. *Policy forms and underwriting practice in casualty insurance*

Section 10. *Investments of insurance companies*

Section 11. *Insurance law and legislation*

Section 12. *Economics of insurance*

Section 13. *Calculation of premiums and reserves for casualty (including social) insurance*

Section 14. *Advanced practical problems in casualty (including social) insurance statistics*

Section 15. *Advanced problems and practical methods of casualty insurance accounting*

Section 16. *Advanced problems in underwriting, administrative and service elements of casualty (including social) insurance*

To assist students in preparation for the examinations, Recommendations for Study have been prepared. This lists the texts, readings and technical material which must be mastered by the candidates. Textbooks are loaned to candidates by the Society.

RULES REGARDING EXAMINATIONS FOR ADMISSION TO THE SOCIETY

(As Amended May 19, 1932)

The Council adopted the following rules providing for the examination system of the Society:

1. Examinations will be held on the last Wednesday and Thursday during the month of May in each year in such cities as will be convenient for three or more candidates.

2. Application for admission to examination should be made on the Society's blank form, which may be obtained from the Secretary-Treasurer. No applications will be considered unless received before the fifteenth day of February preceding the dates of examination.

3. A fee of $5.00 will be charged for admission to examination. This fee is the same whether the candidate sits for one or two parts and is payable for each year in which the candidate presents himself. Examination fees are payable to the Secretary-Treasurer and must be in his hands before the fifteenth day of February preceding the dates of examination.

4. The examination for Associateship consists of 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. Upon the candidate having passed both Parts I and II he will be enrolled as an Associate, provided he presents evidence of at least one year experience in actuarial, accounting or statistical work in casualty insurance offices or in the teaching of casualty insurance science at a recognized college or university, or other evidence of his knowledge of actuarial, accounting or statistical work as is satisfactory to the Council.*

* Candidates who have had no insurance experience, or whose experience is limited exclusively to life insurance companies, or who have not had one year of casualty insurance experience, will not be enrolled as Associates after passing Parts I and II, until they have had one year of casualty insurance experience; however, candidates not having one year of casualty insurance experience may, in accordance with a ruling of the Committee on Admissions, be enrolled as Associates upon passing the examination for Fellowship Part I.

EXAMINATION REQUIREMENTS

5. In the case of applicants in the following classes, the Council may, upon receipt of satisfactory evidence that applicants are within the terms of this rule, waive the passing of both Parts I and II of the Associateship Examination. Such applicants may become Associates upon passing Part I of the Fellowship Examination, and may be admitted as Fellows by examination, provided they subsequently pass Part II of the Fellowship Examination.

(a) Casualty insurance men not less than thirty years of age who have been in the business a number of years and who occupy executive positions.

(b) Fellows and Associates by examination of the Actuarial Society of America or of the American Institute of Actuaries.

6. 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.

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 last 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*.

In order to assist students preparing to take the examinations for Associateship Parts I and II, the answers to the examination questions in past years have been prepared and may be had at cost upon application to the Secretary-Treasurer.

1932 EXAMINATIONS OF THE SOCIETY

MAY 25 AND 26, 1932

EXAMINATION COMMITTEE
HAROLD J. GINSBURGH - - CHAIRMAN

IN CHARGE OF ASSOCIATESHIP EXAMINATIONS
FRANCIS S. PERRYMAN, CHAIRMAN
EDWARD S. SKILLINGS
THOMAS O. CARLSON

IN CHARGE OF FELLOWSHIP EXAMINATIONS
NORTON E. MASTERSON, CHAIRMAN
ARTHUR N. MATTHEWS
ALBERT Z. SKELDING

EXAMINATION FOR ADMISSION AS ASSOCIATE

PART I

1. (a) Find a and b so that $x^3 + ax^2 + 11x + 6$ and $x^3 + bx^2 + 14x + 8$ may have a common factor of the form $x^2 + px + q$.
   (b) Give the tests for determining the nature of the roots of a quadratic equation.

2. (a) Sum $\frac{3}{4}$, $1\frac{1}{2}$, 3, 6, etc. to 8 terms.
   (b) Given $\sqrt{5} = 2.23607$, find the value of
   $$\frac{10\sqrt{2}}{\sqrt{18} - \sqrt{3 + \sqrt{5}}} - \frac{\sqrt{10} + \sqrt{18}}{\sqrt{8} + \sqrt{3 - \sqrt{5}}}$$

3. I have \$1970 with which to buy some shares of stock A at \$50 a share and of stock B at \$80 a share. How many whole shares of each may I buy? Find all the possible solutions.

4. Find the number of permutations of 13 different letters and 8 different integers such that the letters are all in alphabetical order and the integers are all in numerical order.

   Show by reasoning from first principles that the answer must be the coefficient of x^p in $(1 - x)^{-n}$ where p, n are positive integers.

5. Given tables of $(1 + i)^n$, v^n, $a_{\overline{n}|}$, $s_{\overline{n}|}$, at 1%, 2%, 3%, 4%, 5%, for $n = 1, 2, 3, \cdots\cdots 50$, how would you calculate
   (1) Amount of \$100 accumulated for 50 years at 4% convertible half yearly.
   (2) Present value of \$10,000 due 27 years hence at a nominal rate of interest convertible quarterly but equivalent to an effective rate of 3% per annum.
   (3) Amount of an annuity of \$10 per annum payable half yearly for 30 years at 6% per annum convertible half yearly.

(4) Present value of an annuity of \$50 per annum for 46 years payable quarterly, at an effective rate of interest of 5% per annum.

6. A man purchases a house agreeing to pay \$3,000 down and \$12,000 in 40 equal semi-annual installments, the first installment to be paid five years from date of purchase. Two and a half years after purchase he wishes to pay the cash equivalent of the installments at once. How much should he pay then, if money is worth 3% per annum? Given $(1.03)^{-20} = .55368$.

7. Find expressions for the value of an annuity for $3n$ years
of amount 1 at the end of each of the first n years
of amount 2 at the end of each of the second n years
of amount 3 at the end of each of the third n years
and for the total amount of capital redeemed by the end of $2n$ years.

8. A loan of \$10,000 is to be repaid over 30 years by 30 equal annual installments including principal and interest. Interest on the principal outstanding is to be charged at 3% per annum the first 10 years, 4% per annum the second 10 years and 5% per annum the last 10 years.
Find formulas for
(a) the annual payment
(b) the interest included in the 15th payment.

9. A \$10,000 bond bearing interest at the rate of 5% per annum payable semi-annually is redeemable on January 1, 1933 at par.
(a) Find its purchase price if bought on January 1, 1930, to yield a nominal rate of 4% convertible twice a year, and complete an amortization schedule showing the progress of the bond from date of purchase to date of maturity. Given $a_{\overline{6}|}^{2\%} = 5.60143$.
(b) What should have been paid for the bond if sold on April 1, 1930, to yield a nominal rate of 4% convertible twice a year, plus accrued interest?

10. What methods are available for the comparison of frequency distribution of two or more groups of data? What are the advantages and disadvantages of each?

11. The results of an examination were as follows:

Mark	100	95	90	85	80	75	70	60
No. of Pupils	1	4	14	27	24	16	12	3

Compute the mean and standard deviations of the marks, applying the Charlier check to your calculation of the second moment about the arbitrary origin selected.

12. Define correlation. If you were asked to investigate the question whether there is correlation between size of policy and disability rates on a large volume of health experience, how would you proceed?

13. The following are four methods of determining the mode of a moderately asymmetrical distribution:
    1. Smoothing the data
    2. From the ogive
    3. From the mean and median
    4. From curve mathematically fitted to the data.

Explain each of these methods. Which gives the most accurate determination of the mode?

14. The following is a trial balance of the ledger of T. B. Cochran on December 31, 1931:

Cash	$ 850.23	
Accounts Receivable	300.30	
Merchandise Inventory	1,231.00	
Furniture and Fixtures	540.00	
Accounts Payable		$ 620.00
Purchases	8,793.72	
Sales		10,696.51
Sales Returns and Allowances	46.16	
Salary	900.00	
Insurance	32.50	
General Expenses	51.40	
T. B. Cochran, Capital		2,500.00
T. B. Cochran, Personal	1,071.20	
	$13,816.51	$13,816.51

The merchandise inventory of December 31, 1931, showed goods on hand were worth \$1,575.42, unexpired insurance amounted to \$11.40, the depreciation of Furniture and Fixtures was estimated to be 10%, and one Account Receivable of \$51.24 was considered as uncollectible.

Make the adjustment and closing entries in the journal.

15. From data given in question 14, make up a Profit and Loss Statement in Report Form, and compile a Balance Sheet.

16. Outline a system of keeping track of interest collectible by a casualty insurance company. Show what entries would be made on the books of the company and when.

PART II

1. Prove $\frac{du_x}{dx} = \frac{u_{x+m} - u_{x-m}}{2m}$ approximately, where m is small. Give a graphical interpretation of this.

2. Evaluate $\int \frac{dx}{9x^2 - 4}$

3. Find the area bounded by the curve $y = \frac{\log_e x}{x}$, the x-axis and the maximum ordinate.

4. Show that $\Delta \frac{u_x}{v_x} = \frac{v_x \Delta u_x - u_x \Delta v_x}{v_x v_{x+1}}$

   If $x^{(-m)}$ denote $\frac{1}{x(x+1)(x+2)...(x+m-1)}$ find $\Delta^n x^{(-m)}$

5. Using the method of finite differences, sum the first 10 terms of the series whose general term is $n^3 + 2n^2 + 3n$.

6. Find the simplest algebraic expression for $f(x)$ given $f(3) = 24$, $f(4) = 95$, $f(5) = 184$, $f(6) = 285$, $f(7) = 392$, $f(8) = 499$, and check by working out $f(2)$ both by finite differences and by the algebraic formula.

7. The probabilities of the occurrence of three independent events are p, q, r; required the probability of happening:—

   (a) Of one of the events but not more
   (b) Of two but not more
   (c) Of one at least
   (d) Of two at least
   (e) Of one at most
   (f) Of two at most

8. A prize is to be won by A as soon as he throws five with two dice, or by B as soon as he throws ten with three dice. If they throw alternately, A commencing, find their respective probabilities of winning.

9. A coin is tossed till heads and tails have each appeared twice: on the average how many times will the coin have to be tossed?

10. A five figure number consisting of the digits 0, 1, 2, 3, 4 (no repetitions) is chosen at random. What is the chance that it is divisible by 4?

11. It is believed that a part of the expenses on a certain kind of policy is a percentage of the premium and the balance is a constant. An approximate determination shows the following expenses for four different sizes of premiums.

Size of Premium	\$50	\$100	\$150	\$200
Expenses	\$10	\$14.50	\$21	\$24.50

    What are the most probable values of the percentage and the constant?

12. What do you understand by the "force of mortality?" Give a formula for computing it from the life table. Is it usually greater or less in amount than q_x?

13. Interpret the following symbols in words, and express in terms of powers of v and *single* life probabilities,

$$ {}_nE_x|_{yz},\ {}_nE_{\overline{xyz}},\ {}_m|_n a_x $$

14. Give an elementary proof of the approximate formula

$$a_x^{(m)} = a_x + \frac{m-1}{2m}$$

15. What do you understand by a Commutation Table? Explain relation of the columns to each other. What are the commutation tables used for?

16. If $a_{20} = 15.82$
$a_{25} = 15.29$
$a_{30} = 14.72$
$a_{35} = 14.12$
what value would you assign to $\bar{a}_{28}$?

EXAMINATION FOR ADMISSION AS FELLOW

PART I

1. (a) The John Brown Contracting Company is building a factory for the Jones Manufacturing Company for a definite amount specified in the contract. What public liability coverages are necessary to furnish complete coverage to both the contractor and the owner? Upon what are the premiums for these coverages based?

   (b) What would be the difference in coverage if the factory were built on a cost plus basis?

2. (a) Describe the coverage extended under a Non-Ownership Automobile Liability Policy.

   (b) How is the premium for a Non-Ownership Automobile Liability Policy determined?

3. Define, as applicable to Compensation Insurance:
   (a) Governing Class.
   (b) Standard Exception.
   (c) Expense Constant.
   (d) Credibility.
   (e) Per Capita.

4. What casualty coverages should ordinarily be carried by the following establishments:
   (a) Automobile Sales and Service Station.
   (b) Jewelry Store.
   (c) Retail Meat and Grocery Store.

5. (a) State, in general, the wording of the insuring clause of a standard Accident Insurance Policy.
   (b) State briefly seven standard provisions of an Accident Insurance Policy.

6. (a) To what extent can a New York Casualty Insurance Company invest in the stock of another insurance carrier transacting the same kind of business?
   (b) What are the dangers of unrestricted inter-ownership of stocks by Casualty Insurance Companies?

7. Discuss briefly how a prospective investor may determine the desirability of a particular insurance stock as an investment.

8. Under present conditions, what form of investments would you recommend for a casualty company? Give your reasons in each case.

9. What methods of security valuations were used by casualty companies in their 1931 Annual Statements for various states? Explain each method.

10. Explain:
   (a) Bankruptcy and Insolvency Clause.
   (b) Subrogation.
   (c) Omnibus Coverage.
   (d) Contingent Liability.
   (e) Insurable Interest.
   (f) Resident Agent Law.
   (g) Quasi-public Nature of Insurance.
   (h) Warranty.
   (i) Representation.
   (j) Negligence.

11. What are the duties of an Insurance Commissioner? Under what provision of the rating laws has the Insurance Commissioner control over acquisition costs?

12. What are the principal features of the New York Motor Vehicle Financial Responsibility Law?

13. (a) What are retaliatory laws?

    (b) Discuss extra-territoriality with reference to the compensation laws.

14. In what ways can society deal with risks to reduce the cost of uncertainty?

15. Can the principle underlying workmen's compensation laws be applied to automobile liability insurance?

16. Would it be desirable from a social standpoint to have a single workmen's compensation law applicable in all states? Discuss.

PART II

1. Outline the method used and indicate the principle underlying the setting up of reserves for liability losses by the formula prescribed in Schedule P—Part I. What provision is made for incurred but not reported losses? What provision is made for outstanding loss expense?

2. What would be the advantages and disadvantages of including the first six months of the expiring policy period in the experience rating period used in Compensation experience rating?

3. (a) What are the objections to a plan of open competition as compared with rate regulation for insurance price-fixing?

    (b) What types of rate regulation are provided by state laws governing rate-making?

4. Discuss the accuracy of results obtained by the following method of calculating claim expense reserves:

   To the loss reserves apply the ratio of loss expense paid to losses paid during the calendar year.

5. What statistical records can be maintained as the basis for analyses to determine periodically the adequacy of individual case basis loss reserves on the various casualty lines?

6. (a) What is Schedule "W"?

   (b) Discuss the factors which tend to inaccuracy in the preparation of Schedule "W" for a particular state by a multiple line casualty company.

7. Given the following automobile public liability data, as of December 31, 1930, for a certain territory, how would you determine the necessary pure premium for 1932?

Pol. Yr.	No. Cars Written	Premium Written	Losses Incurred	No. of Claims	Pure Prem. (Standard Limits)	Loss Ratio	Excess Losses (Excess Portion)
1926	28,479	1,113,358	523,049	1,750	18.37	.47	----------
1927	31,217	1,233,429	673,937	2,075	21.23	.55	11,255
1928	34,531	1,477,683	694,527	1,946	19.86	.47	8,644
1929	42,800	1,661,534	1,015,978	2,682	23.24	.61	21,358

8. Outline a statistical plan for compiling loss ratio statistics by agencies or branch offices which would be responsive to current trend without sacrificing the accuracy of ultimate development.

9. What information concerning a Casualty Insurance Company can be secured from the New York Casualty Exhibit?

10. What is surplus? Is the change in surplus, by itself, a reliable indication of the current financial condition and efficiency of operation of an insurance company? Discuss.

11. Outline a plan for accounting for expenses suitable for budgetary control and for annual statement requirements.

12. To what extent does the Convention form of financial statement for casualty companies represent the actual financial condition of a company?

13. The latest Schedule "Z" data available for compensation ratemaking is policy year 1929. What information, bearing on policy year 1930, is available for ratemaking purposes? Discuss the procedure to be followed in using these data for policy year 1930 for ratemaking.

14. What factors have contributed to the rising cost of automobile public liability claims during the past ten years?

15. Outline and comment on the plan for unemployment relief suggested by Mr. T. F. Tarbell in his presidential address at the May, 1931, meeting of the Casualty Actuarial Society.

16. If other conditions remain unchanged, what would be the effect of reduced hourly wages on the compensation loss ratio? Of a reduction in the number of hours worked with no reduction in the hourly rate?

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Workmen's Compensation Reserves. Joseph H. Woodward.

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