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NOTICE

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

"Life is a festival only to the wise. Seen from the nook and chimney-corner of prudence it wears a ragged and dangerous front."—*Emerson*.

PROCEEDINGS

NOVEMBER 17, 1943

INSURANCE RESEARCH
PRESIDENTIAL ADDRESS BY RALPH H. BLANCHARD

The insurance business is based on scientific principles, more or less refined and more or less abused in their application. Often they are ignored or perverted. The business suffers from schizophrenia—it is torn between the desires of the manager, the salesman, and the actuary. The relative effectiveness of the actuary varies enormously. In fire insurance actuarial theory is applied only in the crudest way with a view to aggregate financial success; in life insurance and workmen's compensation insurance it is an effective and recognized tool.

But in all fields of insurance except life actuarial science has been used almost entirely as a means to immediate ends. Its extensive development and application in workmen's compensation insurance and its considerable use in other important casualty lines have been brought about largely by the necessity of justifying rates and reserves and by competitive compulsion. In general, insurance practices and, later, theories are adjusted to the world outside insurance by gradual yielding to pressure; one hears much of "meeting competition," and proposals are frequently held to be without merit because "there is no demand." Little has been attempted and less accomplished in the way of investigation for the purpose of learning more about insurance without reference to pressing practical problems.

Misinformation and irresponsible reasoning are used both by those who attack and those who support the present insurance structure, usually in complete conviction of righteousness. "Why be a hypocrite when it is so easy to deceive yourself?" Discussion of major insurance problems proceeds in a cloud of dust with unsatisfactory results. Many very vocal disputants seem to resent the intimation that, whatever one's conclusions may be, one's facts should be accurate. And *post-hoc-propter-hoc* reasoning is accepted as logical demonstration.

In other words, although much is said of insurance as a science, the scientific approach has not been generally accepted. The process of meeting problems with unstudied figures and loose, even if temporarily effective, reasoning means that the same problems are recurrent. They may be forced under cover from time to time but if they are not attacked with accurate

and full information and with sound reasoning, they are not solved and will appear again to plague us. Aspirin will not cure a headache that results from underlying organic maladjustments.

I suggest that insurance interests would do well to set up a research organization whose function would be to study thought and practice in all phases of insurance and to report facts and conclusions. Such an organization should not be available for the solution of current problems nor for accumulation of ammunition to support preconceived positions. Its spirit should be that of the scientist, rather than that of the executive whose prime interest is in current results. This is not to say that research should be impractical—its only justification would be that of usable results for insurer and insured. My point is that its value should not be tested by immediate practical usefulness nor should it be called upon to support competitive or other controversial activity.

To be practical in the long run—to achieve significance and results in terms of information, thought, and practice—a research organization should concern itself with much that is impractical over the short term. Its only short-term test should be unbiased and competent study of insurance problems. It should be critical in the sense of seeking accurately to evaluate data and conclusions from data. It should be constructive in the sense of being always bent on eliminating the unsound and promoting adoption of the sound. Its primary purpose should be to keep insurance in advance of or at least in tune with the times.

The methods of social science are more applicable to insurance than are those of physical science. Insurance phenomena can not be isolated and controlled in the laboratory—insurance and the hazards on which it is based are constantly changing, and the research student in this field must study trends and the preponderance of the evidence. Most facts will be the result of complicated sets of causes in a state of flux rather than the carefully arranged combinations of the exact scientist. But just as the "impractical" investigations of a Faraday or a Steinmetz have led to highly "practical" applications, so the ruminations and calculations of an insurance research worker should lead to useful improvements in insurance. And just as General Electric and General Motors have the good will of the public largely because they anticipate demand, so the insurance business might achieve greater acceptance as a beneficial institution.

But insurance needs something more than merely improvements of its methods and its product; it needs to convey to the public (and its representatives) in understandable terms what it is doing. The term "public relations" is used to cover a vast area and is at the moment in high repute. Public-relations efforts are often only attempts to talk the public into acceptance of an idea or product without too much consideration of the effect of the

idea or of the product itself on its long-run acceptability. I believe that research could improve the methods of insurance carriers and their product and develop the analysis which would furnish a basis for making these improvements understandable.

The success of a research organization would depend quite as much on the executive and operating personnel of the insurance business as on the persons in direct charge of research. His quasi-autonomous position and his function as an associate rather than as a cog in the machine must be generally recognized. Above all he must be encouraged in independence of investigation and thought, for his carrying out of the principal purpose of his organization should lead him to discover what he believes to be defects in the methods of his employers and of the business generally. Such discoveries or recommendations for change, whether accepted or not, should be received sympathetically rather than antagonistically.

Insurance companies have built up a magnificent financial structure and have contributed largely to the development and safety of American business and of personal investments. But their very success seems to have bred distrust of change, an almost religious faith in things as they have been. Rightly or wrongly the notion has got abroad that they are possessed of a negative attitude; that they may be depended upon to resist innovations and encroachments. The extent to which opinions rather than facts rule the business is a matter of common observation. It would be the function of research to build up a body of significant statistical data, to study specific problems, to replace impressions with factual conclusions, maintaining at all times a scientifically critical attitude.

Let me outline one problem which might well be assigned to a research organization, that of analysis of disbursements. The present analysis into losses, expenses, and surplus and the breakdown of those items into their component parts is serviceable as a guide to rate determination and to operative policy, but it fails to convey any functional analysis of insurance service. Would it not be desirable to analyze disbursements in terms of (1) payments for the benefit of the insured, which would include losses, adjustment expenses in whole or in part, and expense of services, (2) selling (as distinguished from service) expense, and (3) surplus. The ratios now available are misleading to the uninitiated (and to some of the initiated). It is essential to know what has produced the ratios. Reduction of losses often leads to increase in expense ratios, but with an over-all saving to the public. Yet a high expense ratio or its companion, a low loss ratio, is often used as presumably clear evidence of the unworthiness of the insurance institution. A study of the sort I have outlined should provide a basis for sound discrimination between risks and classes of risks in calculating the expense portion of the premium. Graded-rate schemes should provide adequate in-

come to meet the justified expenses of carriers and middlemen. They should not involve "sacrifices" by anyone other than sacrifice of the advantages of an inaccurate rating system.

Exploration of the possibilities of research in insurance would exhaust my time and your patience. They seem to me to be limitless. I mention a few without elaboration: the financial results of individual exclusion clauses in policy contracts; all-risk insurance on fixed property; bases for selecting agents; new fields for extension of coverage; remuneration of middlemen; the function of government in relation to insurance.

A program of research such as I have suggested should be entered into with the understanding that it may take several years to demonstrate its value. None has yet been organized, though I understand that three research departments are in contemplation. There is no blue print for it, and it would have to proceed by experimentation. Considerable time would be necessary to develop background and organization, and little in the way of findings should be expected in the near future. Its adoption would, I believe, contribute greatly to the development and perhaps the preservation of the interests sponsoring it.

SOME BACKGROUNDS TO AMERICAN SOCIAL SECURITY*
BY
W. R. WILLIAMSON

At the last meeting of the Society, social insurance was the subject of the presidential address. The philosophical approach of the joint paper by Mr. Jarvis Farley and Mr. Roger Billings raised certain questions as to the definition and the scope of the social insurances. It is a tradition that a presidential address is safe from discussion, though I believe I recall something very like a debate between ex-President Greene and Secretary Fondiller concerning a social insurance problem of governmental experimentation. This paper is suggested by all of these Society discussions; is not a direct reply to any of them, but is something that seems called for since social insurance responsibilities had heretofore apparently pressed rather lightly on our consciences.

Since the last meeting there has appeared "The Beveridge Report," one of the most constructive discussions of social insurance yet published. To read it is slow work, but in Parts IV-VI there emerges a clear philosophy, clouded a bit occasionally, not by the author, but by the American vagueness as to this rather recent British tradition of social "insurances," "assistances," and "services." In the appendices there is developed background, understandable, complex, human, British background. Sir William's belief in social budgeting shines forth clearly—the need for a subsistence grant for non-employment, whether it is due to old-age, childhood, disability, or just job absence. The disillusioned years of the long armistice are over. There is plenty of work to be done. We have found that we want to work and can work. Even the loss of "the fathers' savings" doesn't stop our responding to these rediscovered satisfactions. He defines social insurance as the war against want by subsistence grants, no less and no more. It's not "the main show." The main show is employment, organization of the jobs, grooming the job holders, education, training, and retraining, preventing unnecessary work interruptions from preventable sickness, thwarting the tendency towards chronic idleness, righting the balance by a maximum of work, a minimum of waste. In it are the voices of Bunyan and Milton, Emerson and Longfellow—"Life is real, life is earnest." But to feel all this develops also a sense of the national differences between their democracy and ours. The roots lie deep in the British tradition. We have to dig deeply to find them, and some of them are a bit alien.

Of course, back of American social insurance lie the experiments of Great Britain, of Germany and France, the optimism of Czechoslovakia, the forth-

* The opinions as expressed in this article are those of the author and do not necessarily represent the views of the Social Security Board.

right whole-cloth Soviet plans, the cautious planning of Sweden and Denmark—all the Europe that has been. But shaping the American schemes, too, is an American tradition—and none of the other plans is essentially ours. Our beginnings in social security carry too much of alien influences, not adequately understood, too little of our American way. It is time here, too, for understanding. These comments are not an American counterpart of Sir William's analysis. They are merely one of the many American attempts to look backward as a prologue to the forward glance.

Whereas social insurance has most frequently been called *insurance*, other programs and factors have contributed to the determination of its existing structure, its detailed organization of premiums (taxes or contributions), over-all financing, the benefit formulas, and its integration into our State and national governments. It is partly because these backgrounds are not exclusively *insurance* backgrounds that the absence of an acceptable definition of social insurance has been so pronounced.

I have selected, not as complete, but as significant, ten items of the American background, and have omitted the foreign precedents which have also helped to shape much of our existing legislation. These American factors are:

1. Savings, ranging from bank savings to outright speculation;
2. Insurance;
3. The Family;
4. The Labor Movement;
5. The Employer, with his various insurance, retirement, and other welfare plans;
6. Politics and Government;
7. Subsidy;
8. Relief;
9. Conservation and Prevention;
10. The Basic Self-Sufficiency and Dignity of the American Citizen.

The present Social Security Act (as amended in 1939) includes (a) old-age provision, (b) benefits to needy dependent children and their mothers, (c) unemployment compensation, (d) a small amount of health consideration, through its aid to the needy blind, its furnishing of services to crippled children, and general aid through the existing public health services, (e) provision for vocational rehabilitation, (f) a few miscellaneous items. Preceding the Social Security Act we had the State workmen's compensation acts, many of them now having been in force for about 30 years. An increasing interest in legislation for compulsory automobile liability insurance, or an insistence upon evidence of financial responsibility in respect to potential automobile accidents is in evidence.

Experiments in encouraging employment have included the Employment Service under the successive management of the Labor Department, the

State Unemployment Compensation Agencies, the Social Security Board, and the Manpower Commission. We have had public work provision from P.W.A., W.P.A., C.W.A., the C.C.C., the N.Y.A. The Farm Security Administration and the many programs of training for the war emergency are part of our concern with jobs.

A combination of savings and insurance viewpoints has consistently appeared in the administration of Old-Age and Survivors Insurance, which deals with only part of the provision for the aged, the children and their widowed mothers. A relief viewpoint accompanies the furnishing of benefits to the needy children (without specifically designating the widowed mothers as co-beneficiaries) and in the handling of grants for the needy aged. Dealing with the unemployed, we have a mixture of advance savings and insurance within the various State programs. Provision of work, in the sense of conservation or prevention, has seemed at times but an appendage to unemployment compensation. It is the basic purpose of all the other work agencies. We have dealt with most of the unemployed, however, through straight-out *relief*. *Subsidy* marks the Federal grants to State administrations.

The aid to the needy blind is conducted as *relief* by the States, with a *subsidy* from the Federal Government. Much of the Public Health Service is similarly State-administered, "encouraged by" Federal subsidy. Vocational Rehabilitation, handled within the Office of Education, involves Federal subsidy to State organizations. It is a preventive or conservation type of service.

The employer welfare programs (one of the background elements) have made a very large use of employer subsidy to translate the employer contribution from relief into a subsidized thrift relationship. Herbert Agar's comment on the protective tariff may be pertinent:

> "A high protective tariff such as the United States has had since the Civil War is a far-reaching act of paternalism of Government, and interference with private business and with the so-called laws of our economic system. The tariff creates an irresistible demand for further acts of paternalism—farm subsidies, compulsory tobacco or cotton guarantees, minimum wage bills. All of these are merely extensions to other groups of a sort of special favor which the tariff confers on business. The extensions become politically inevitable once the theory which underlies the tariff has been accepted as proper. If business can grow rich with the help of Government favors, so can the farmer, the factory hand, and so can everybody also. In the end, we come to the spectacle of a nation trying to lift itself by its own bootstraps. Everybody is paying a subsidy to everybody else, and is being paid a subsidy by everybody else; all the Peters are robbed in order to pay all the Pauls, and the system, ironically, is still called capitalism."[1]

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[1] Agar, Herbert, *A Time for Greatness*, 1942, pp. 33-34.

So the welfare programs of employers—partially to meet, partially to postpone the danger of meeting, certain demands of the labor movement—have used subsidy almost everywhere as an inherent precedent-following, precedent-setting technique. It may be moving a trifle away from admitted relief, but subsidy still bears some of the stigma of relief. It seems to give something not completely paid for by the whole group of recipients.

"The labor movement" discussion runs into all the other subjects because basic needs underlie all these classifications. The labor movement intends to meet or deal with virtually every basic need, and tends to use any of the expedients which have worked elsewhere. The family, in its coordination to deal with individual needs, forms one of the small, but highly important, groupings, and must be recognized as very functional in any of our discussions of providing for need. It is the family and its relationships which lie back of almost every aspect of insurance. It is, to a large extent, concern for the family which stimulates savings. It is the family which must be understood in employment relationships, with which relief workers have to deal when savings and insurance are inadequate and individuals or families need help.

Had individual savings and insurance been more satisfactorily teamed up, more comprehensive in their effectiveness, the employer presumably would less frequently have felt obligated to furnish relief outlay or, in order to guard his employees against the indignity of relief, to build such supplementary schedules of employer-subsidized insurance and savings. Or had the family been a somewhat more soundly integrated unit, with all of its members adequately trained and adequately cooperative, the employer would not, perhaps, so frequently have adopted his own special programs for his employees.

1. Savings

Savings programs include (a) bank savings, (b) general bond purchases, including mortgage bonds, (c) the currently important War Bonds, (d) the savings features tied so closely into level premium life insurance and deferred annuities, (e) the purchase of shares of stock representing individual equities in real but commonly owned property, (f) real estate or the savings which appear in the gradual reduction of the mortgage against the mortgaged home, (g) many other thrift arrangements. It is conceivable and even basically sound practice within the family to think of saving through one's children. This may represent a non-contractual, but highly significant, choice of better training for the children rather than larger alternative savings for the parents. When family solidarity survives, this investment may be one of the soundest of them all.

Millions of American citizens have so successfully woven their thrift energies together as to feel generally secure. From their current income they have consciously, and sometimes most intelligently, allocated for future potential needs—their own and their families'—a tangible proportion of their current incomes. Other millions have intended to make such provision, but have never started. Possibly millions more have had no such intentions; certain guides and mentors have even told them that they should hardly expect to do anything about it because of their low incomes, already insufficient for current living costs.

General features of the savings programs are (a) the advance nature of the provision and the delayed utilization of the savings, (b) the steadily rising asset value of the combined programs, (c) the character-building qualities of effective harnessing of the individual desire and will, (d) the availability of funds in times of special need, without recourse to friends, neighbors, the employer, or the community as a whole, (e) flexibility, with both its advantages and disadvantages—particularly the disadvantage of too frequent discontinuance of the plans, (f) contribution toward constructive use of investments in behalf of the community, (g) general definiteness in the bank savings as to the individual's assets, this changing as the investment element enters and speculative gains and losses appear.

2. INSURANCE

Insurance deals with the clearly current risks such as disability, term life insurance, and the element of basic current protection for life contingencies within the level-premium life and annuity contracts. The largest portion of this insurance coverage has been secured by the individual through the operation of insurance agents, with contracts drawn between the individual and the insurance company. A large and growing proportion has been developed through contracts made between the employer and the insurance company, under which employees have customarily contributed toward the total cost, with a subsidy from the employer. The employer has sometimes assumed the whole cost, or, on the other hand, has sometimes limited his participation only to his services in pay-roll deduction for contracts paid for in toto by the employee. The employer's cooperation has extended to life insurance, provision for "permanent total disability" benefits, provision for temporary disability benefits, hospitalization benefits, accidental death and dismemberment benefits, and retirement allowances. (Employers have also run subsidized thrift and profit sharing programs, and sometimes have offered the facilities of pay-roll deduction for non-subsidized savings programs.)

Insurance fundamentally differs from savings in its pooling of the provision of a large group in behalf of contingencies which, as to any one member, may or may not eventuate. Pure insurance carries no cash values, provides current protection. In term life insurance, an insurance premium of $10 may result in paying a beneficiary $1,000, but to do so it must have the equivalent of 99 other insured lives, each paying $10 and receiving no cash benefits—only the guaranteed protection for the period covered. It seems that nowhere outside of America has life insurance been so effectively used and understood. Nowhere is it so common to say after an automobile accident, a fire, or the death of the wage earner, "There is insurance." More than through savings, are benefits paid through insurance *in needed funds* when catastrophes occur.

3. The Family

The family as a cooperative unit is a well recognized, working enterprise. On the farm, the head of the family runs the farm; his wife runs the house; the children contribute in actual work both on the farm and in the house. There is frequently also an employer-employee relationship with one or more assistants in both departments. These are sometimes part-time, sometimes seasonal, sometimes year-round workers. In most urban and in many rural homes the head of the family earns his wage or salary income outside the home; the wife runs the home; and the children, though to a lesser extent than in the dual enterprise of farm and home, are expected to contribute something to the common enterprise. In most homes there is no clear employer-employee relationship. There are, however, many homes where there is more than one wage earner in the family, and where, with the wife also engaged outside the home, there is a sort of compensatory passing down of housekeeping responsibilities to an employee who does much of the house work. There is also some survival of the middle-class ideal of a family unit with a wage earner, a non-wage-earning, virtually non-housekeeping wife, children with no household responsibilities, and all the service performed by employees. In this situation, the wife is manager of the household, but in a much different way than on the farm or in the customary urban home. There is also a survival here and there of Society in the Social Register meaning, where a woman would lose "her amateur status" should she work either for money or, for the love of her family, in the management of her own home. (Wartime conditions have currently reduced this survival.)

Again, as in methods of thrift, in types of insurance there is a wide range of household cooperation, and yet there has persisted very strongly a real sense of family solidarity, a real understanding that the members of the family are tied together not only by blood relationship, but by common

interests and actual cooperation. This is a more natural, a more spontaneous, a more basic organization than the labor movement, than the skilled management of insurance, than the skilled management of the savings bank or the brokerage house. It is recognized by all the relief agencies. The granting of relief nearly always keys in with the family's over-all needs. There may be categorical assistances, but the recipients must outline their family relationships completely and the claims which they have upon other members of the family.

As a unit, the family is presumed to be above the level of need, and I hope it is still true that the majority of American families consider the acceptance of relief a humiliating experience. There is pooling of resources. The family is most sensitive to public opinion and to legal restraints. Both its thrift activities and its reliance upon other family members may turn out to be speculative. Yet in the depths of the long depression of the 1930's, existence of the functioning family unit drastically reduced the potential area of relief. There is general economic acceptance of the family as a working organization, as in the family motivation of most life insurance policies, in military family allotment arrangements, in the need of better housing, and generally throughout our whole economic organization.

4. The Labor Movement

Industrial civilization is probably younger than the insurance business, since life insurance is over 200 years old in its British operation, and most of our industrial development has occurred within the last century. It has become trite to say that "we are in the process of moving from an agricultural to an industrial economy." The factory wage earner is a much newer phenomenon than the farmer, than the business man, or the housekeeper. "The labor movement" probably stems largely from the factory system. It marks the insistence that through selling one's labor to an employer there is apt to be an unequal bargain (especially when as in most of the recent past years the supply exceeded the demand), and that only through the cooperation of laborers can this inequality be corrected. There are, of course, many labor movements, and as wide a range of aiming for particular goals as there is under savings or under insurance. Of particular significance to the social security program is the establishment under the Versailles Treaty of the League of Nations and the International Labour Office. The purpose of the International Labour Office is "to promote social justice in all the countries of the world. To this end it collects facts about labour and social conditions, formulates minimum international standards, and supervises their national application. It thus helps to eliminate social unrest and international rivalries due to bad social conditions, and makes social progress more general

and more sure. One of its principal tasks at present is to prepare for post-war reconstruction."

The connotations of the movement are most varied. There is a tendency to think the class warfare is needed to secure from grudging capitalism logical concessions to labor. The common interests of labor and capital tend to be overlooked. As Sumner Slichter has pointed out in his conclusions in discussing post-war prosperity (Harvard Business Review, Autumn 1942, pages 1 to 40), our very survival as a prospering nation depends upon a reorientation from a feeling of class conflict to an appreciation of common interests of the two parties. Demands made by the labor movements seem frequently to have been aimed very high, under the apparent belief that to get 50 cents it is essential to ask for a dollar and be prepared to compromise. In many recent instances organized labor seems to have got 75 cents of the dollar it demanded or the whole dollar rather than the 50 cents it expected. So, as in the use of subsidies, we seem to be accumulating evidence of an increasing readiness to make demands, not because the demands are wise or logical, but because they will probably be granted.

Labor has been stating the hopes of working men, has through cooperation among working men aimed at the goal of better working conditions, better training, better opportunities for advancement in earnings and leisure time. Labor is growing in an understanding of basic economics. Whether an individual thinks of himself as a working man, a citizen, or the father of a family, he presumably wants only a fair deal and a sounder understanding of both his responsibilities and his privileges.

The I.L.O., having been organized with a very limited budget, has been developing its social insurance perspective with a limited staff, has, as must every practical man, functioned well under the limitations surrounding its activities. It has run into the danger of having to give advice before it has adequately studied the problem. It seems to have been an international expression of the labor movement, to have been on the side of the laboring man. Yet it has maintained triple representation in its governing body from labor, from employers, and from government.

Its understanding of the extent of American achievement in savings and in insurance seems rather limited. It may be that in its international role it wishes to avoid stressing the relative disadvantages of other countries. It functioned during the long armistice in those European countries whose very existence has been persistently threatened. It has attempted to set up standards of fair dealing, or security—so far as security might be possible under those conditions. Its decisions have been motivated by the basic sense of insecurity throughout Europe. More recently, the International Labour Office has been revising its advices in the South American countries, where the establishment of thrift and insurance facilities for the common man

seems to have been inordinately long postponed. The study of what has been done with the sponsorship of labor in Bismarck's Germany and Lloyd George's England, in popular front France, in sturdy little Czechoslovakia, is helpful to America, but has limited significance in relation to our own social insurance program.

The labor movement in its relationship to social security is noteworthy for its sound recognition of need and of the risk of becoming needy, for its strong emphasis upon the thorough-going pooling of risk and the sharing the costs, for its understanding of the immediacy of the problem of meeting needs. It has been (even as has been the employer who subsidizes insurance) quite ready to toy with the element of subsidy or relief in getting programs for labor. It is apt to divide the citizens into labor's camp and all other camps. It tends to extend labor's share in the special privileges from government. It seems at times to have thought more highly of strategy than of research. There may be something gallant in going into combat, even when unprepared. A few such experiences may be exhilarating, but eventually preparation counts.

5. THE EMPLOYER, HIS INSURANCE, PENSION, AND WELFARE PROGRAMS

The other side of the labor movement is the employer function of furnishing work to the laborer. Over 2 million employers have their employees included within the Old-Age and Survivors Insurance plan to which the employers also contribute. Another large number of employers representing households and farms employ a smaller number of employees. Not only has most of the progress in the labor movement developed since the last war, but it is in this period that employers' over-all programs of insurance, pension, and general welfare have been established. During the last war, the preliminary development of group insurance was greatly sped up. It seemed good sense to assure the employees that through this simple medium of group insurance the family would have approximately a year's income should the wage earner die; through the medium of disability insurance that a sizable proportion of the weekly pay envelope would be continued over a period of disability, should accident or sickness take him away from his job; through the medium of retirement programs the employee could expect at least a subsistence income should he be separated from his work because of old age or chronic disability. The entrance of the employer into these programs was possibly accelerated by a certain distrust of the "socialistic" government-administered social insurance programs of Europe. Reluctantly, employers admitted that their employees had not effectively enough used the existing savings and insurance programs, had not been led into adequate personal provision through existing labor movements or family solidarity.

There are estimated to be some 15 million wage earners carrying group life insurance, some 18 million separate personal coverages called group disability, furnishing, respectively, temporary disability benefits, additional death and dismemberment benefits, hospitalization benefits, and surgical benefits to workers and members of their families. There are a million employees working for corporations carrying group annuity programs. Employers have handled pension plans themselves. Others have used trustees for their funds. A considerable number have recently been organizing pension trusts, using individual policies and pooled funds rather than the group annuity programs. There is the cooperation between employers and their employees under the Blue Cross programs for hospitalization. There is the Henry Kaiser plan for a broader provision of medical care among employees and their families. There have been a limited number of plans offering facilities for straightforward banking, other plans for the cooperative purchase of bonds or securities through the facility of payroll deduction. Virtually all the leading employers are now cooperating with the United States Government in helping to market War Bonds, with the payment therefor deducted from the employee's pay. There have been employer-sponsored housing programs which seem to me to be at their best when the employee buys the house with the advantage of the economies of quantity production under the employer's direction, but without any employer subsidy. His monthly contributions then cover tax payment, insurance, interest, and principal repayment, all handled by pay-roll deduction. There are recreational facilities with quantity economy offered by employers, usually with a very strong subsidy element present. There are efforts to offer special study courses, either purely academic or specifically connected with job training. There is the cooperation between the employer and the community to aid the employee in making his personal contribution towards such community enterprises as Community Chest, Red Cross, local hospital drives, etc.

The employer is so close to the body of employees through the pay envelope and is so well equipped to aid the employee in making the most of his own thrift impulses, that one of the most constructive services which employers have furnished to employees is the arrangement for the purchase of individual life and annuity policies by pay-roll deduction. Here we have neither compulsion by the employer nor an inflexible formula which, designed for a lowest common denominator of need, adequately services only a rather slender number of the employees. The employer in the United States has done so much, and is capable of doing so much that had it not been for the depression, it is most doubtful as to whether the unmet needs of the employees of small employers would have secured the attention they deserved through any existing employer-sponsored program of insurance or thrift.

Considering solely the employees of the larger employers, social insurance might have *seemed* unnecessary.

The employer has set patterns through the conscious use of an employer subsidy in behalf of life insurance, disability protection, pensions, etc., as against the labor movement's more limited essays into the insurance area, where the laboring man paid his own share of the total cost without subsidy from an employer. These particular programs have been marked by a recognition of presumptive need in event of certain catastrophes, but a utilization of the insurance methods of pooling for known costs has in the life and disability area given immediate rather than deferred protection. Frequently in the pension plans there is immediate provision for retired employees. This has tended to make some of the programs more akin to insurance than savings. In others advance provision is more nearly savings than insurance. Employers have tried to avoid stressing the relief element by substituting the subsidy element; while actually dominating the programs, have frequently offered employee cooperation, have secured pretty general acceptance of the economic utility of the schemes from the community as a whole, but have tended to somewhat exaggerate the degree of attachment of the employees to the particular employer. Group insurance as handled by employers, retirement programs as handled by employers, were definite influences in the shape and structure of the original Social Security Act of 1935, and were still influential in the 1939 amendments.

6. POLITICS AND GOVERNMENT

Each nation has certain political, demographic, and geographic features which are of importance to social insurance. In the United States we have a federation of sovereign States. When this federation was formed, it was clearly understood that only certain responsibilities of the State Government would be delegated to the Federal Government.

In the national development of industry, agriculture, and commerce, a certain amount of specialization has developed within individual States, such as the automobile industry which is very largely located in Michigan, and much of the textile industry in Rhode Island. The age distribution of the population State-by-State differs radically. The proportion of persons over the age of 65 is possibly three times as large in Vermont, New Hampshire, and Maine, as it is in certain of the other States. The proportion of the children under the age of 18 to the State population shows a considerable range, the greatest proportion being in the Southeastern States.

Those who remember the introduction of the income tax 30 years ago recall what a revolution this now thoroughly accepted implement of taxation caused at the time of its introduction. Since that day the trend toward

greater and greater Federal control has been persistent, though accompanied by vigorous, but intermittent defenses of State rights. In a country which includes subtropical and temperate zone conditions, there is considerable variation in the method of living between the South and the North. This affects housing, food, clothing, and other factors of individual living standards. The range of per capita income from the States like Mississippi, Arkansas, to others like Nevada, New York, and Connecticut, shows possibly triple the per capita income in these so-called wealthy States, as against the low income level States. While there are fewer elderly people in the low income States than in the higher income States there are many more children in the low income States than in the high income States. If we had a comprehensive social insurance program based more fully upon the sharing philosophy, the low income States would seem to be getting the best of the bargain. Their contribution would be much lower in dollars per capita than the contribution of the wealthier States. Their benefits would be larger per capita (of population, not of recipients) than in the cases of the wealthier States—at least for children, and probably even for the aged. The existing social security programs have only old-age and survivors insurance as a national program, have introduced unemployment compensation as State programs, and the major part of the care for the aged, the blind, and the children is still State administered, though with about half of the funds Federal.

In the discussion preceding the enactment of the Social Security Act of 1935, there was some concern as to whether the Federal Government could legally handle an insurance program involving linked premiums and benefits. The "premiums" were carefully labeled "tax." Title I provided for certain State standards for old-age assistance. Title II covered old-age benefits, while "premiums" were carefully separated and provided for under Title VIII. In State unemployment compensation Title III covered certain standards, and Title IX levied a Federal tax. This use of a *tax* to accomplish certain desirable objectives had been frowned upon in reference to child labor aspirations. It was approved for social insurance.

Not only in the United States, but in other countries, centralization and decentralization under social security programs have been discussed from the beginning. Mr. Kulp, in his pioneering work on the organization of social insurance in Germany and England suggests that we are not alone in the features of States vs. Federal administration, though both England and Germany have probably gone further in centralizing their plans than seemed reasonable in the United States in 1935.

Any attempt in 1943 or 1944 to develop a united all-purpose social security plan will have to face this factor of Federal-State inter-relationship and the considerable propensity to self-perpetuation which State agencies already

administering public assistance and unemployment compensation will undoubtedly exhibit.

7. SUBSIDY

As against the alternative of outright relief, the movement to substitute a partial subsidy has seemed to many a step in the right direction. Thus, when employers established group insurance, many of them gave group life insurance outright to the employees without expecting from them any contribution toward the costs. Other employers felt that it had a more constructive effect upon the employees to share premium payment with them. Such sharing was a reform from what seemed to the reformers the too paternalistic, so-called free group insurance. (Since the employer usually still spent as much as he would have spent on the free insurance, protection was increased.) It substituted the cooperative sharing of cost between the employer and the employee with the possibility of a residue of uninsured employees who did not "elect" coverage. As compared with individual insurance administered through salary allotment orders for the payment of premiums, where the employee pays all the cost, the subsidized insurances set precedents which sometimes implied that the employee's income was too small to meet all the cost of these outlays, that for these particularly important provisions he would act only under financial assistance from outside his family. It implied that only through the employer could he expect to secure a minimum protection. The purpose of the employer's subsidy was good—but as Agar says, it had the danger of precedent-setting in other directions. Incidentally, while Americans were putting subsidies into their employer-administered group insurances, social insurances in Europe were putting *two* subsidies into most of their programs—this subsidy from the employer, and a further subsidy from the State. The mechanism of the subsidy disturbs part of our democratic citizenship, sometimes because it selects only special favorites for its beneficence, sometimes because it seems so alien to our basic attitude of self-reliance.

Recently both the Hoover and the Roosevelt administrations have so commonly used the subsidy that its strangeness has largely vanished. Farmers have been subsidized for conserving parts of their farms from current utilization. The aviation transportation industry is subsidized; the employee is subsidized; the local community is subsidized by the State, and the State by the Federal Government.

One of the disadvantages of subsidies is their blurring of the over-all cost outlines. In old-age assistance, the local community is impressed with the *smallness* of its contribution to the relief of its needy aged. Formerly they met all of the then much smaller cost through the poor farm and "outdoor" relief. Now the State meets a good share of a much larger bill, and

the Federal Government the rest. Rarely are the administrators convinced that basically all the communities together still meet the costs of these relief programs, though they would not deny that when a community gets a subsidy, it gets it from other communities. Eventually community after community will ask, "Am I getting or giving a subsidy?" The tremendously complicated accounting ramifications of subsidy constitute a major background to social insurance.

As with other elements, the use of subsidy recognizes needs, indicates a basic desire to meet them promptly. Its advocates believe in pooling provision; it is doubtless aimed at the greater good; it has wide economic acceptance; its successful application requires wide popular acceptance. It can be applied not only to the administration of relief, but also to the promotion of thrift. Its methods are varied, from the cases where prosperous employers have matched the savings of its employees, to the intricate use of employer contribution to pension programs where the subsidy can be isolated and otherwise explained. It is a major factor in the labor movement's various attempts to secure more than higher wages, and possibly in some instances more than the equitable share to which the laborer is entitled.

8. RELIEF

The tradition of relief has run unbroken from the England of Queen Elizabeth to the popular front governments of the pre-war days. It was its pragmatic recognition that catastrophes may happen, that there is a broad social solidarity within the community which cannot see the citizen starve or lack clothes or shelter. To these basic requirements of food, clothing, and housing, Stuart Chase and others have recently added medical care and education. It tries directly to measure specific cases of need and to furnish provision to meet that need. Basically, instead of suggesting that, *when* we shall have saved up to meet future needs, we will *then* deal with such needs, *it goes to work at once* on current needs. It is apparently a final recourse; when individual savings and insurance programs have been absent or insufficient, when the family, the labor union, and the employer, both as driving forces behind the individual and as reenforcements, have failed in their adequacy, then relief steps in. Back of the need for relief may be abnormal conditions of the war, an earthquake, a tornado, a flood, or a depression. It may simply function all the time in recognition of the inadequacies in the motivations of our over-all economy. In the American tradition, relief is not only a last resort, but a last resort we prefer not to use. Fear of being indebted to the community or the love of self-sufficiency has been a sound incentive to the citizens to help them avoid such situations as would require relief. During the last dozen years it has become easy to *say*

that our civilization has been so complex that the individual has been helpless to maintain his personal dignity, his personal responsibilities. The too ready acceptance of the inability of the individual to meet his basic responsibilities can result in his continuous choice of extra current satisfactions instead of a reasonable allotment of his income against potential future needs. In our social insurance program, there has been an element of this acceptance of personal *incapacity*, even in situations when it is clear that the individual could have done a much better budgeting job. From now on he must do a much better job in order to maintain his sense of personal integrity and his pride in his will power. He is commonly having the satisfactions of doing just that in the challenges of this war.

Categorical assistance may be designed to make the acceptance of relief a little less distasteful, but categorical assistance legally remains relief. The determination of need involves relief criteria. Approximately 2,175,000 elderly people are receiving old-age assistance; many of them are not in need in the sense of old "Associated Charities' " definitions. Many of them have cut loose from a sense of dependence upon the family, but have retained a sense of dependence upon the community. In accepting 2,175,000 individuals under relief gratuities, the aggregate local communities have been influenced by the ready availability of subsidies. In many States the qualifications seem steadily swinging from the strict needs test towards the overall non-needs-test functioning of the Old-Age and Survivors Insurance program. Relief has a way of specifically meeting needs which neither the formulas of insurance nor the accumulations of savings has yet equaled. The goals in social insurance must be so wide and basic a recognition of presumptive need that relief recipients are reduced to an absolute minimum in number, the rare special cases who have not been cared for by any other more constructive agency.

9. CONSERVATION AND PREVENTION

In the early functioning of workmen's compensation, that slender subdivision of the area to which social insurance can minister, a marked emphasis on individual rate-making was rationalized by an inspiriting doctrine. It was stated that it was the employer's responsibility to avoid accidents, to improve the safety organization within his plant, to make conscientious and effective efforts to keep his employees uninjured. This was surely better than to pay them or their relatives compensation for unnecessary or avoidable injury, disability, or death. The employer, as a responsible element in our economy, might have resented the implication that he had to be bribed through potential rate reductions in his workmen's compensation costs, to function as a decent citizen and to do the best he could in this connection.

There is, therefore, an intricate web of occupational and industrial classification worked into schedule rating, into retrospective and prospective experience rating, so that one of the end products of an effective safety campaign can be smaller contribution to the over-all meeting of the costs of industrial accidents. It is not and cannot be the major end product. That purpose is the protection of life and limb.

I believe that the sense of human responsibility would continue to make employers, as good citizens, work for accident prevention, were there less of individual equity and more of over-all insurance sharing in the workmen's compensation financial provision. They are vigorously working for accident prevention in behalf of the war effort. They could continue to do it when the peace is won.

Prevention of catastrophe and conservation of the sound, constructive efforts of mankind are, of course, a dominant factor in American life. The whole organization of banking and investment is a *conservation* of that portion of current income segregated against the contingencies of potential dependency. We develop sound business enterprise so as to *conserve* employment and maintain the economic machinery at full-tilt, utilizing the working efforts of the entire nation. This too is instinctive—so instinctive that isolating the factor in this paper may seem an artifice. The life insurance companies in their organized war effort have been stressing the value of sound health for the better meeting of that war effort. With possibly inadequate medical facilities, the conservation of health and the complete healthy utilization of one's capacities are not alone in the interests of avoiding unnecessary or premature death, but a direct contribution to the war effort. Labor wants to conserve its "hard-won victories," but it believes in and works for the conservation of the best working capacity of its members. It is essential to the conservation of the dignity of the working man to have at all times adequate employment and a minimum reliance upon relief. The family wants to strengthen and increase the ties that bind the members together as a symbol of the larger family which is the church or the lodge or the community. Today "the community" seems to have widened tremendously. We do not gain healthful relations within the larger family until the basic ties between the individual members of the smaller family are soundly functioning.

The employer must be moved by a long-range sense of responsibility, believe, and practice his belief, that there are mutual interests between the employees and the employer. In the long run the employer does not profit by unfair, cheap, or unwise practices. He must conceive the goods of sound management, he must be fair in his employer-employee relationships; he must be intelligent and wise and understanding in his basic relationships. Then in the larger area of the growing community he may understand the

value of the precedents he sets. Conservation in its widest and soundest form will mean a minimizing of all that is unwise and unsound and unsatisfactory in subsidy, and in the *conservation* of self-respect, an elimination of subsidy wherever possible at the earliest possible moment. Conservation will set levels of relief high enough to meet basic needs, low enough to conserve and strengthen the will to work and the desire for self-sufficiency.

Accident prevention, prevention of unemployment, postponement of death, minimizing of sickness, education for work, retraining and rehabilitation— all these require a more thoroughly effective cooperation in the use of the educational plant, the engineering and medical services, improved sanitation, better public health. Conservation and the safety movement have been widely accepted elements in the American community. They are basic to social insurance.

10. The Basic Self-Sufficiency and Dignity of the American Citizen

At least up to the time of the First World War the American tradition of the pioneer had remained strong. About that time, various out-of-balance elements made themselves felt. Among them was a possible reflection of Europe's serious malady. Yet, as the programs of social insurance were devised for Continental Europe and for England, over and over again we have had restatements that the American way of life, the American spirit, the American inventiveness and ingenuity, constitute realities which differentiate American methods from foreign methods.

In the old countries on the other side of the Atlantic, class lines were very sharp. There seemed less opportunity for a worker to advance beyond his class than with us. We had always been the land of opportunity to which immigrants came, expecting, and commonly finding, the chance to better themselves.

While the activities of employers in organizing the group insurances, salary allotment programs, and the like, seem to raise a little question as to the complete self-sufficiency of the citizens affected, even here there was frequently a stated opinion that these programs were limited to a relatively small portion of the working classes, and that still the American citizens as a whole could take care of themselves. Members (frequently key men) of the American Federation of Labor, when interviewed as to their desire for social insurance, frequently said they wanted to get their full wage in the pay envelope, that with the full wage they would be responsible for all insurance needs themselves.

In 1942 the *Saturday Evening Post* ran a series of inspirational advertisements on the American way of life. Other corporations have similarly stressed such national strength, boasting that our citizens expect to work to

earn what they want, that they will not be dependent upon any dictator to give them largess.

During the long depression, many a citizen became discouraged over the slowness with which recovery was taking place. Many reforms were initiated, voicing not the optimistic conviction as to individual competence, self-sufficiency, and ambition, but rather the pessimism engendered by the depression.

The arguments in favor of social insurance were all too frequently earmarked by the tendency to accept the temporary out-of-balance condition of those depression years as the typical long-run situation.

The sense of optimism has risen again with the added responsibilities of the war, with the production achievement. It is to be hoped that more of the essential steps under which skilled processes have been broken down into their component parts so as to utilize relatively unskilled workmen on work heretofore regarded as skilled operations may possibly after the war be modified so as to give the craftsmen more skilled processes, more sense of personal satisfaction in increased quality of accomplishment, or at least to develop more skilled supervisors and service men who know all the operations. The possibility of higher earnings on labor subdivision might compensate for job monotony by encouraging constructive avocations.

During the last war, whenever social insurance was mentioned, and for many years afterwards, it was rather popular to state that the Teutonic parentage of social insurance was an adequate reason to leave it alone. It may be significant that the American legislation was depression-born and that only during the depression did "the regimentation" of the German schemes seem palatable.

Yet almost every savings program, all insurance programs, count upon a wide community of interest, for which men sink their individual divergences of opinion in favor of some comprehensive cooperation. Many people put their money together in the bank, that so pooled it encourages an over-all investment program; many people put their money together in an insurance company for mutual protection against specified contingencies, and whenever the funds grow in magnitude the insurance company makes investments in the interests of the organization.

Well organized social insurance, in a very similar way, can be recognized as the coordination of a broader grouping of members, whether the group be limited to the employees of a series of industries or open to the entire citizenship of the country. The emphasis upon the dignity of the citizen and his personal self-sufficiency may have postponed the adoption of social security for a good many years. The emphasis is so constructive that it is to be hoped that this influence has not been absent from the shaping of existing programs, and that it will grow in importance as further programs are

adopted. It does not minister to dignity to feel that men alien to our way of life are regimenting our citizens, nor does it add to our sense of self-sufficiency to be highly subsidized. If this virile motive power can be recognized and used to the full, the scope and drive of our American cooperation will be a signal force in world sanity. Social insurance has already been invigorated by it, but it must function more openly and with more directness.

SOCIAL INSURANCE

In its approaches to social insurance, each country naturally examines the precedents set by other countries, naturally tends to misjudge the importance of certain temporary expedients adopted by those countries, and, in the short time customarily permitted in the drafting of a new social security program, may be too much influenced by the expedients which these other countries have used. Thus the registration numbering system in our old-age and survivors insurance plan, our segregation of the assistances from the so-called insurances, our stressing the elements of individual equity after the savings bank pattern, and numerous other factors, have been introduced into our American social security program from other countries. While those points have been insufficiently discussed in other places, the American backgrounds have been still less adequately outlined.

The Social Security Act of 1935 was mapped out by the Committee on Economic Security, a Cabinet committee made up of the Secretary of Labor, the Secretary of Agriculture, the Secretary of the Treasury, the Federal Emergency Relief Administrator, and the Attorney General. Dr. E. E. Witte of the University of Wisconsin was the executive director. The staff was drawn from a wide range of individuals, but with three elements possibly dominant: (a) the public relations representatives from the Industrial Relations Counselors organized by the Rockefeller Foundation, (b) the University of Wisconsin and its humanistic background, (c) the Labor Department with its interpretation of social insurance as one of the methods for enlarging the rights of labor (possibly by wresting them from management and capital). Less adequately represented on the working staff of the Committee on Economic Security were the thrift organizations for savings, investment, and insurance. Possibly the representation of relief administrators was inadequate too. Indirectly there must have been a great deal of influence along subsidy lines from the examples set by the group insurances and the labor movement's ideas on getting more for the laboring man, whether it required subsidy or relief. The employer and his insurance, retirement, and welfare programs were presumably thought to be sufficiently represented through the Industrial Relations Counselors.

A large conference was held at the Hotel Mayflower during the course of the studies of the staff of the Committee on Economic Security. To this conference was invited a broad cross-section of American liberal thinking. There were social workers, economists, Dr. Rubinow and Mr. Epstein, who had made a profession of working for social insurance. Mayor LaGuardia represented municipal government. The public was represented by economics professors and social workers and free citizens. A few employers attended, but there was a marked absence of the representatives of the insurance and thrift businesses.

The Social Security Act of 1935 was the outgrowth of this advance work. It is only fair to state that there were numerous consulting groups, representing the medical profession, representing each phase of the whole social security program. Among them was the committee of actuaries, including Professor Mowbray, Professor Rietz, Professor Glover, and one representative of the established insurance business, Mr. Linton. They came twice to discuss the program in 1 or 2-day sessions.

There was thorough-going, conscientious, dignified effort to develop a program in the interests of "the worker," a rather narrower field than that represented by the citizenship of the United States, but one carefully conceived and idealistically envisioned.

In Old-Age Benefits (the more restricted initiation of the Old-Age and Survivors Insurance of 1939), the *savings* element was recognized in the unimportant and awkward provision that in every case there would be a return to his beneficiary or his estate of a little more than the taxes paid by the employee, should he die without having received old-age benefits, or should he reach the age of 65 and retirement without having qualified for a monthly income. The savings element, which has dominated so many retirement programs, was to build certain reserves so as to "get ahead" of presumptive future need and (to the extent of the interest which the reserve would receive) to make it easier for the community of the future to meet its costs.

Savings also appeared in the concept of unemployment compensation—that payments from the employers (and occasionally from the employees) should be put into trust funds and built up into reserve funds vaguely similar to the old-age reserve fund. It was thought that, while the old-age reserve fund might hit $50 billion, the chances were very much against the combined State unemployment reserve funds exceeding $5 billion.

The investment of the reserves was a subject discussed over a period of several years by the International Labour Office, with a sort of tacit assumption that the reserve method was indigenous to the social security systems. The use of that other connotation of savings, the individual bank account, called for the development and maintenance of elaborate records. After some changes, a quarterly wage record was adopted both for old-age benefits and

unemployment compensation. In old-age benefits the cumulative records must be built up during the entire working lifetime of the individual beginning with 1937 (over fifty years of employment there are two hundred quarters); in unemployment compensation, in most of the States, records are determined for a base year of but four quarters, and when the base year has retreated far enough into the past, the entire year's record of individual earnings can be dispensed with and another set substituted. A dual record-keeping system, largely for the same individuals, is thus in operation, both portions influenced very largely by the individual equity concepts of the savings side of our system. The individual equity idea is also present in much preliminary discussion of "permanent total disability" and of temporary disability.

The term *"insurance"* has appeared in the names of the programs of old-age and survivors *insurance* and in the New York program of Unemployment *Insurance*. Although the term "compensation" has commonly been copied from workmen's compensation in our designation of unemployment insurance, both programs are constantly designated *insurance* programs. They *are* insurance in their sense of over-all sharing; in the collection of the essential funds from which to pay the benefits; they *are* insurance in their emphasis upon presumptive rather than actual need, in their use of formula determination for the amount of benefit, in their growing understanding that it is the family, and not alone the individual, being served in the basic record compilation for the sake of sound statistical control. They are not insurance in the sense of current coverage which so strikingly belongs to all the insurance business. They have copied, strangely enough, much more of the savings aspects of the level premium life and annuity business than they have of the protection aspects under which my agent puts the company "on my automobile liability risk" from the time I tell him my contract is to be renewed since he advances my premium and sends me a receipted bill. They are not at all insurance in the group life insurance sense of promptly covering the entire body of employees with the signature on an application, the payment of a binding premium, and the acceptance of the risk at the home office. They carry the delays and postponements which go with the accumulation of an effective amount of savings. Some of the staff of the Committee on Economic Security had become too much convinced of the importance of the *savings* side of the group annuity contract, and were instrumental in copying into our Social Security Act many limitations which went with those contracts, quite alien to a possible broad insurance service designed to give universal and immediate protection to our citizens.

It would be so simple to think of insurance of the whole body of citizens as effective from today after the fashion of a group life binder. We would promptly recognize that not alone is *the man of 65 about to retire* part of

the program, but that *the man of 65 or 70 or 75 who has retired* is equally part of our program. New Zealand has caught the view somewhat more thoroughly than we have, having had the advantage of studying both the American and the British organizations of benefit structure, though they are still using means tests and have yet to reach full grants as a right. Insurance could merge the major part of those who would otherwise be relief recipients in with those who would otherwise be savings accumulators, and construct the middle ground of insurance for old age, even as it can furnish insurance for all the orphan survivors, for those disabled and for those unemployed.

The family was rather short-changed in the old-age benefit structure in the 1935 Act, but was more definitely recognized in the revision of 1939. The amendments took into account the structure of the family of the re- tired employee, the structure of the family of the man who died, and gave benefits to fit in more directly with the constitution of the family group. The 1939 amendments still too closely followed the individual bank account concept of the period of contribution and the wages which had been taxed, but it made a start away from too much predilection for savings and too little for insurance.

The *family* was not specifically recognized in the unemployment compen- sation program (save in the District of Columbia), and there is a great deal of talk of going from a set of benefits normally paid only to the individual, apparently for his own personal use, over to a benefit structure which deals with the worker as a family man and varies the benefits by size of family. In the administration of the assistances for old age, for dependent children, for the needy blind, the social worker reports on the entire family situation and, while the benefit is nominally allocated to an individual, it is expected to reflect family needs.

The family was also recognized in OASI by arranging that, in the absence of grants to surviving children and widow, the deceased wage earner could then have as a potential beneficiary a needy parent whom he was wholly supporting. (The definition of "wholly" varies from time to time.) This arrangement brought in a *relief* element rather alien to the old-age and sur- vivors program. It dealt, however, with this elderly person more as a resid- ual legatee in the absence of other basic beneficiaries. It neither dealt with all parents on the same basis, nor did it adequately recognize that anyone who could qualify under this arrangement would usually be able to qualify for benefits under old-age assistance. A sense of dignity was lost. A de- cided complexity was added. The family's interest might have been even more conserved by arranging that in all cases, rather than cases with no im- mediate monthly benefits payable, a small death benefit should be paid. This would have recognized the universal desire for funds for last sickness

expenses, burial, and family readjustment, put it on the basis of presumptive and not actual need, and would have made the insurance structure more consistent.

The group programs subsidized by *employers,* which had often divided cost between the employer and the employee, served as a very real model for the division of cost between the employer and the employee in the social insurances. Whereas many group cases fixed a rigid employee contribution, leaving the employer bearing the residual cost which could not be specifically predicted year after year, other cases, especially group annuities, took the simple statement that the employer and the employee roughly "went 50-50 on the cost of the program." In the inherent structure of the group annuity and the group life insurance contracts, this was a very difficult thing to accomplish because costs varied from year to year, and a strict insistence on the 50-50 arrangement threw aside the simplicity of uniform rates of contribution by the employees in favor of this emphasis upon a specific and rather artificial type of sharing. Generally the 50-50 arrangement was used only crudely, but it frequently had to be defended and explained.

So in old-age benefits the contribution rate started in 1937 with 1% charged against the employee, 1% charged against the employer, with no tax beyond the first $3,000 of earnings from any one employer. These tax rates were to rise by uniform steps up to a 3% and 3% contribution in 1949. There was at once lost the definiteness and stability of a fixed rate of contribution for employees. There was introduced the question as to just when rates of tax should be advanced. There had not been a resolution of the conflict between savings and insurance thinking, and the reserve problem, which was common to both non-insurance savings and insurance savings, has remained under debate ever since.

Whereas the employer contribution was frequently defined as the investment of the employer in an improved employee morale or was based upon that mechanical and largely fallacious argument that thus the employer recognized human depreciation, the demand by the Government that the employer withdraw from his reserves for other purposes very tangible amounts of contributions to be added to the employee contribution when the employer has no choice in the matter submits a completely different situation. The argument for employer contribution has lost most of the validity it held in a voluntary welfare program. Once more old-age benefits copied rather perfunctorily the technique built up under a voluntary arrangement (also present is the influence of foreign practice) and established something seriously open to question from the standpoint of economic realism. The employer subsidy seems open to question also from the standpoint

of use of a compulsory subsidy required from an employer without reference to economic capacity to pay.

Since employer contribution can be explained as an increase in the total pay-roll of the employer, there is present in the social security program a premonition of further wage adjustments made under the direction of the National Labor Relations Board and other labor organizations within the Governmental structure. Since those wage-approving bodies are functioning so zealously, this additional method of wage advance seems superfluous now. The whole subsidy suggestion stems from the belief that more wage should be paid.

Subsidy has been present, as we have noted in the old-age and survivors plan, first by establishing an employer subsidy and, second, by certain suggestions that eventually there will be a Governmental subsidy. It is present in unemployment compensation in the suggestion that workmen's compensation precedents should be followed, making the failure to maintain employment the fault of the employer and assessing against him the penalty of the contribution toward unemployment compensation benefits. This penalty concept is very strongly carried forward in its coordination with experience rating and the promise that a well organized employer plan for the prevention of new unemployment will reduce the share of the employer in the pooled provision for the unemployed. In the otherwise strictly relief areas of categorical assistance, we have a subsidy as between Governmental levels. In the suggestions of adding health insurance, it is assumed that this too would adopt the employer, and possibly the Governmental subsidy which exists or has been suggested in old-age and survivors insurance.

The *relief* element still remains in most of the public assistance programs, though the administration of the program constantly tends away from relief and to an admitted gratuity to be maintained without much regard to the need of those receiving the benefit. Presumptive need is quite a different thing as it appears in old-age and survivors insurance and unemployment compensation. Relief is present also in the administration of all the rest of the assistance outside of the three categorical assistances. A suggestion of Federal subsidy has been made for residual relief, introducing more complexity into the pattern—but moving slowly to a Federal share in virtually all payments.

There was a slender element of *conservation* and *prevention* in the vocational rehabilitation provisions of the Social Security Act. These have been greatly increased in effectiveness as a result of the man-power needs of the war, and rapid courses are being given all over the country to bring into working effectiveness men who had been long unemployed, men who had considered themselves disabled. This practical current functioning which I

have mentioned as so much present in pure insurance is one of the most helpful forces developed by the war. It gives evidence that this conservation factor will have a dominant position in the social security program of the future.

A great deal of credit was given to this sense of *personal dignity* and *personal responsibility* in arguing that the limited program which we had adopted was itself in keeping with the values we had set upon personal self-sufficiency and personal dignity. So determining the benefits in old-age and survivors insurance, and again in unemployment compensation as to make them dependent upon the wages earned, was said to be a recognition of American methods and in keeping with the American tradition. It was further emphasized that in certain backward sections of the country achievements had been rather limited, and that it would be unwise to hold down benefits in better sections in order to establish a level suitable for the backward sections.

In emphasizing this sense of individual equity which determines all benefits upon wages, extensive record-keeping operations have been built up as well as a rather complicated set of eligibility requirements. While practically limiting the coverage to employees of industry and commerce, the American freedom of movement leaves a large number of citizens working part of the time in these covered employments and part of the time in other employments. We build extensive records, then, which do not represent the record of total personal accomplishment even in earnings, but only that limited part of the accomplishment which is within "covered employment." It may be rather doubtful whether the anomalies within the system seem more of an affront or more of a compliment to responsible people.

It is noteworthy that in the much more comprehensive system now being recommended in England and in the much more comprehensive system already adopted in New Zealand, this same point of personal dignity is quoted as the reason for uniformity of treatment. Sir William Beveridge believes that a level amount of old-age income, even though a man belongs to the upper classes, is a sounder technique than to use the Federal machinery in order to give the upper-class citizen more from joint Federal funds than the lower-class citizen. So with us, as we study the various portions of our established program, it may be that the shaping background which has initially had one result may later have a very different result in the mechanism of the more broadly effective benefit program.

It is also worth while to indicate that some of the most striking developments among employers have been in those corporations where the management believed in guiding the employees into increased self-reliance rather than into a diminution of self-reliance. In almost all management-inspired

programs, there has been a conscious effort to so shape the benefit structure as to stimulate the employees to greater and more effective self-reliance. It may be that Government programs have unconsciously copied certain limitations of these programs rather than their more essential and more basic elements.

I will not attempt to gather together the implications which develop from this statement of backgrounds. The paper previously presented to this Society on "Social Budgeting," however, does suggest the way in which we could move forward from the complicated, incomplete, inadequate—though individually frequently too generous—program of benefits we now possess to one more consonant with the dignity of the American people and more apt to foster full employment and to minimize residual unsatisfactory relief.

There has been some evidence that, in addition to the catalog of factors here discussed, there is the further factor of inherent, vigorous employment, well directed by men more skilled in management, financed by that inspired altruism called capitalism, which has much of the credit for the enviable material position of the American people. Social security, dealing so largely with the catastrophes within our individual life histories, is, of course, subordinate to the basic working genius of the nation. It can apparently, particularly in the abnormal conditions of a depression or a war, represent the thinking of a very limited group of people, and in those abnormal times any failure to represent the entire people may go temporarily unchallenged. As the nation outgrows war-like conditions, as it outgrows those continuing controls of the early postwar years, having social security represent any fractional part of the community is unthinkable. It must reflect the essential American backgrounds from which it has sprung and the essential American pioneering spirit which has been the strength of the country from its inception.

Social security hasn't been just a Governmentally administered, Governmentally subsidized form of protection; it has been developed from many factors, most of them non-governmental. Its further improvements require a more complete understanding of how it came to be as it is. Its further growth will require knowledge, understanding, and a very practical idealism.

SAMPLING THEORY IN CASUALTY INSURANCE

PARTS III THROUGH VII

BY

ARTHUR L. BAILEY

Introduction

It has been the intent of the writer to develop a fairly complete mathematical theory of the variations in casualty insurance statistics as well as to develop such mathematical aids as are necessary to the computations involved in the use of the theory; but to leave to others any interpretation of the results of application of the theory. In accordance with this intent, only light and superficial treatment by way of illustration has been given in Parts III and VII to the application of the theory to underwriting and to the description of two kinds of credibility. The discussion in Part VI of the use and computation of excess pure premium ratios covers considerable detail felt to be advisable at this time because of the recent extension of rating procedures based on such ratios. The reading of this part at least should bring about a realization that the figures in a table of excess pure premium ratios are by no means exact and are at best only rough approximations.

It will be noted, in Part IV covering the modification of the formulae of Part I to recognize various types of fluctuation other than chance, that the individual observations are in each case weighted to obtain the various averages. This weighting process will appear to the reader either as obviously necessary or as a completely unnecessary and arbitrary complexity. The writer can only state that some very erroneous results were at first obtained when the weighting procedure was omitted.

It will be recognized by some that one of the most important types of variation to be found in casualty insurance statistics has not yet been covered. This is the variation in the accuracy of the data or in the underlying conditions with the passage of time. The effects of such variation will have to be investigated prior to the application of the theories to rate making and experience rating. It is hoped that this can be presented in a subsequent part, together with the applications to rate making, experience rating, and the problems of excess and deductible coverages.

In view of the contemporary work of Mr. Satterthwaite, it seems advisable for the writer to say a few words in defense of having taken a very circuitous route to reach results which to many will appear to be the same as those reached immediately by Mr. Satterthwaite. From the earliest days of statistical theory, there have been two schools of mathematical statistics. One of these is broadly spoken of as the Pearsonian school, being identified by its development of concise algebraic formulae by means of highly advanced and very elegant mathematical processes and by its insistence, in the application

of these formulae, that the data fit the formula rather than that the formula fit the data. The other school is known as the Scandinavian or "sledge hammer" school. This latter term describes rather well the processes used by it in the development of formulae. The essential difference, however, is that the entire effort of this latter school is aimed at obtaining formulae which will describe the actual data, with the description being made in terms of symbols having specific interpretations. It will be obvious to anyone who has glanced through either Parts I or IV of this paper that the writer most certainly has used the sledge hammer method as contrasted to the neat development of the "Generalized Poisson Distribution" and the "Hyper-geometric Distribution" by Mr. Satterthwaite. This procedure has been necessary, however, in order to obtain, instead of algebraic formulae with indefinite parameters, a mathematical description of the moments of the various casualty insurance statistics in terms of fundamental statistics subject to exact or approximate determination from actual data.

Attention is called to the proofreading error on page 73 of Part I, where, in the fourth line

$$U_{2:R'} = \frac{H}{E'}\ U_{2:m} \text{ should read } U_{2:R'} = \frac{H}{E'} + U_{2:m}.$$

Thanks to the assistance of several individuals, Miss Eva Dorenstreich in particular, the following parts are presented with somewhat more confidence as to their algebraic accuracy than were the first two.

III.

USE OF SAMPLING THEORY IN INDIVIDUAL RISK UNDERWRITING

The tables of the normal sampling range due to chance fluctuations only which were developed in Part II are designed to be used in the evaluation of past individual risk experience in the determination of the future desirability of the risk. The use of these tables can best be explained by their application to individual risks as examples. The examples do not attempt to cover all possible cases but are given only to illustrate that definite answers to specific questions can be provided from the tables of sampling distributions due to chance fluctuations only. Actual problems will frequently require the testing of the risk experience for individual years to point out any trends and will usually involve the separate analysis of the experience of more than one line or type of insurance. Although large risks are used in the examples, the tables are equally applicable to small risks. Likewise, the tables are equally applicable to the combined experience of all risks in a territory, class, or production office; and it is in this application that much of their value can be realized by a carrier.

The A Laundry Company

Let us consider the A Laundry Company, for which the automobile property damage premium for the exposure of the past three years at present manual rates is $4,531. The permissible loss ratio for this premium is .517, and the average claim cost for the classification in the entire state experience of all companies is $32. To compare with this, we have from the experience of the risk during these three years 8 claims incurred, with a total loss of $356 and an average claim cost of $44.50. Testing this average claim cost first, we refer to Table 11, to find that a ratio of $\frac{\$44.50}{\$32.00} = 1.39$ would not be an unusual ratio for a risk having 8 claims. The table shows us that a ratio of 1.991 would even be quite normal for a risk having 10 claims. We thus find that any unusual element of the risk must lie in the claim frequency of the risk. To test this we refer to Table 5 and enter it with the expected number of claims of $\frac{\$4,351 \times .517}{\$32.00} = 73$, to find that a ratio of $\frac{8}{73} = .11$ is entirely below the normal range. This indicates that at manual rates the A Laundry Company is a very desirable risk to put on the books.

In an extreme case of this kind, this same conclusion would undoubtedly be reached by any underwriter without reference to tables of any kind; and a certain amount of competitive rating would probably be encountered on such a risk. We thus have the problem of determining just how much rate recognition can safely be given to the experience of such a risk. Before doing this, let us examine the results produced under the New York State Automobile Experience Rating Plan, which in this case would produce a credit of 46%, or a rate modification of .54. With such a modification, the expected number of claims would be $73 \times .54 = 39$, and the ratio of actual to expected claims would be $\frac{8}{39} = .21$. Referring again to Table 5, we find that the risk is still far below the level of claims expected, even with a 46% credit.

In an open state, where risks are "equity" rated, competition might well be offering such a risk more than a 46% credit; and we must decide for our company how great a credit we are willing to offer such a risk with a reasonable assurance that the risk will continue to be a good risk and not immediately deteriorate. The first decision must be as to the level of significance that our company will adopt as its standard of excellence, the $P = .005$, $P = .025$, $P = .050$, or some other level. Having adopted a particular significance level as our standard, we would find a chart prepared from Table 5 to be of considerable assistance. Figure 2 is illustrative of such a chart and shows for the $P = .050$ and $P = .950$ levels the relationship between actual and expected numbers of claims. Referring to Figure 2, we find for the A Laundry Company that the 8 observed claims would represent a $P = .050$

FIGURE 2

NORMAL SAMPLING RANGE OF EXPECTED NUMBER OF CLAIMS CORRESPONDING TO THE ACTUAL NUMBER OF CLAIMS
PROBABILITY LEVELS OF .050 AND .950

0-10 ACTUAL CLAIMS

Actual Claims	Expected Claims .050 Level	.950 Level
0	2.6	—
1	4.9	—
2	6.4	.3
3	7.8	.7
4	9.2	1.3
5	10.6	2.0
6	11.9	2.6
7	13.2	3.2
8	14.5	4.0
9	15.8	4.7
10	17.0	5.4

10-100 ACTUAL CLAIMS

100-1000 ACTUAL CLAIMS
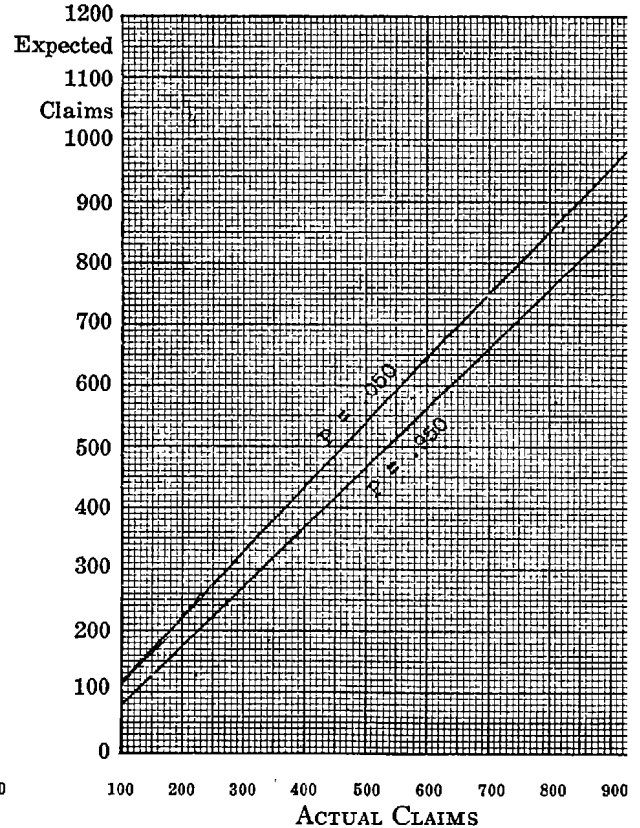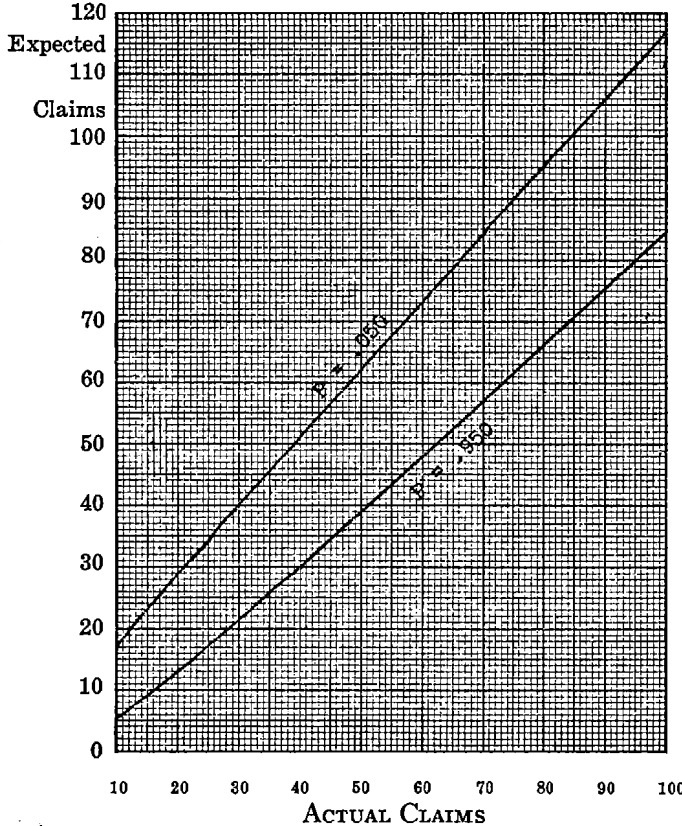
level when the expected number of claims was 14.5. Thus we can give this risk a modification of $\frac{14.5}{73} = .20$, or an 80% credit. Obviously, a discount of more than 80% would make such a risk just an ordinary risk instead of a good one.

The B Brewery

Our next risk is the B Brewing Company, with a premium at present rates for the past three years of $16,996, a permissible loss ratio of .517, and an expected average claim cost of $27, from which we calculate the expected total loss as $16,996 \times .517 = \$8,787$ and the expected number of claims as $\frac{\$8,787}{\$27} = 325$. The experience of this risk for this three-year period included 544 claims totaling $13,389 and averaging $24.61 per claim. Testing the average claim cost in Table 11, we find that a ratio of $\frac{\$24.61}{\$27.00} = .91$ is a normal occurrence when 544 claims actually occurred. For the claim frequency, however, we find from Table 5 that the ratio of $\frac{544}{325} = 1.67$ is definitely above the normal range. For this risk the Experience Rating Plan would produce a 30% debit, and with such a debit the expected number of claims would be $325 \times 1.30 = 423$. Re-entering Table 5 with 423 expected claims and a ratio of $\frac{544}{423} = 1.29$, we still find the risk to be definitely above the normal claim frequency range.

Before considering how much greater debit than 30% our company would require before feeling safe to write this risk, let us assume that we knew nothing of the number of claims actually occurring and only knew the total losses of the risk during the past three years. To test these total losses, we enter Table 10 with 325 expected claims and a ratio of actual to expected total losses of $\frac{\$13,389}{\$8,787} = 1.52$, reaching exactly the same conclusion as before, that the risk's loss level is considerably above the range to be normally expected. Considering the 30% debit of the Experience Rating Plan, however, we would enter Table 10 with 423 expected claims and a ratio of $\frac{\$13,389}{\$8,787 \times 1.30} = 1.17$, to find the risk to be just about on the $P = .950$ level, indicating that the risk is probably, but not definitely, bad. This exercise illustrates only that if we want to obtain all of the information from the available data, we must use all of it and not take the easiest way, thereby getting only part of the answer from part of the available data.

The $P = .950$ line on Figure 2 will assist us in determining the minimum

debit modification which a carrier with the $P = .950$ level of deficiency for bad risks would require in order to write the risk. For the B Brewing Company we find, for a deficiency level of $P = .950$, that the 544 actual claims correspond to expected claims of 505. Thus the modification would be $\frac{505}{325} = 1.55$, and we would require a 55% debit or more applicable to the present rates in order to make worth while the chances involved in insuring this risk. Even under these conditions it would be indicated that the B Brewing Company would be a fertile field for some effective safety engineering service.

The C Bus Line

The C Bus Line has in the past been self-insured and is now making application for full coverage insurance. It has provided our carrier under affidavit with lists of equipment used during the past three years and summaries of the losses which it has incurred under its self-insurance. Applying the present manual rates to this risk, we find that it would have developed $14,832 of premium during the past three years in a classification having a permissible loss ratio of .607 and an average claim cost of $43. Thus total expected losses of $9,003 and 209 expected claims would be indicated. Their statement of loss experience shows that 179 claims, totaling $4,395 and averaging $24.55 per claim, were incurred by them. Testing the claim frequency from Table 5, we enter it with 209 expected claims and a ratio of $\frac{179}{209} = .86$, to find the risk at just about the $P = .025$ level. The Experience Rating Plan applicable to this risk produces a 26% credit, so that we return to Table 5 with expected claims of $209 \times .74 = 155$ and a ratio of $\frac{179}{155} = 1.15$, finding that the application of the 26% credit has shifted the risk from the $P = .025$ level to the $P = .975$ level and that, from a loss frequency point of view, the risk may no longer be desirable.

Entering Table 11 to test the average claim cost with 179 actual claims and a ratio of $\frac{\$24.55}{\$43.00} = .57$, we find that the average claim cost is far below the level to be normally expected. For this risk we have the average claim cost in one direction and the frequency in the other direction, and it thus behooves us to review the total losses. We enter Table 10 with the expected number of claims of 155; and with the ratio of actual to expected losses after experience rating of $\frac{\$4,395}{\$9,003 \times .74} = .66$, to find that the risk is apparently a desirable one, being just below the $P = .005$ level of significance. Review-

ing our findings, we conclude that the desirability of this risk hinges entirely on its low average claim cost; and that because this low average claim cost may have been the result of a fictitious deflation accomplished by the elimination from the report of experience of a few large losses, and because there is a certain doubt in our minds that this low average claim cost can be continued with the settlement of claims transferred to our company as a third party, a review of the risk's claim folders in considerable detail is advisable and a continuous check on the average claim cost of our own losses for the risk should be maintained.

The D Distributing Company

The D Distributing Company is a combined local and long haul truckman written on a gross receipts basis. On the basis of its currently developed gross receipts rate, including a 57% experience rating credit, the premium for the past three years would be $34,587 in a classification having a permissible loss ratio of .617 and an average claim cost of $41, indicating expected total losses of $34,587 × .617 = $21,340 and an expected number of claims of $\frac{\$21,340}{\$41.00} = 520$. The experience of these years shows 441 claims incurred, totaling $15,791 and averaging $35.81. Reference to Table 11 for 441 actual claims and a ratio of $\frac{\$35.81}{\$41.00} = .87$ shows the average claim cost to be on about the $P = .025$ level. Reference to Table 5 for 520 expected claims and a ratio of $\frac{441}{520} = .85$ shows the claim frequency below the $P = .005$ level. Apparently this risk could be afforded a greater credit than the 57% provided by the Experience Rating Plan.

A chart similar to Figure 2 but prepared for New York commercial automobile—property damage coverage—total losses from Table 10, would show us that, for actual losses of $15,791 equivalent to $\frac{\$15,791}{\$41} = 385$ claims of the expected average amount, the expected number of such normal sized claims would be 450 for a level of significance of $P = .050$. Thus a further modification of $\frac{450 \times \$41.00}{\$21,340} = .86$, or a total modification of .86 × .43 = .37 (a credit from manual rates of 63%), could be safely afforded the risk.

IV.

Modifications of the Basic Formulae for the Distribution of Casualty Insurance Statistics to Recognize Diversity of Risks, Hazard Levels of Classifications and Ratemaking Errors

A. Diversity of Risks in the Same Classification

The formulae of Part I were developed for application to individual risks and involved statistics of the expected number of claims and the distribution of losses by size of loss for the individual risk. It is necessary to modify these formulae for application to all risks of a classification when only the average statistics for the classification as a whole are known. It will be recognized that, although the individual risks grouped into a classification may be similar, only in very rare instances are they identical in all respects. The differences between the individual risk and the average of the classification, on a percentage basis, will be spoken of as the risk diversities.

Because of the necessity of weighting the statistics of individual risks to obtain averages for the classification, we shall find it necessary to introduce the symbols e for exposure and f for claim frequency. Thus $C = ef$. Statistics of the classification as a whole will be denoted by a prime ($'$). The diversities of claim frequencies, average claim costs, and pure premiums will be denoted by p, q, and m respectively, being defined by:

$$f = f'(1 + p), \quad V_{1:x} = V_{1:x'}(1 + q) \quad \text{and} \quad (1 + m) = (1 + p)(1 + q)$$

The moments of p, q, and m will be defined by:

$$V_{n:p} = \frac{\Sigma e \cdot p^n}{\Sigma e}, \quad V_{n:q} = \frac{\Sigma e \cdot f \cdot q^n}{\Sigma e \cdot f}, \quad \text{and} \quad V_{n:m} = \frac{\Sigma e \cdot m^n}{\Sigma e}$$

where it will be noted from the following identities that:

$$V_{1:p} = V_{1:q} = V_{1:m} = 0.$$

$$f' = \frac{\Sigma e \cdot f}{\Sigma e} = \frac{\Sigma e \cdot f' \cdot (1 + p)}{\Sigma e} = f' \frac{\Sigma e (1 + p)}{\Sigma e} = f'\left(1 + \frac{\Sigma e \cdot p}{\Sigma e}\right)$$

$$V_{1:x'} = \frac{\Sigma e \cdot f \cdot V_{1:x}}{\Sigma e \cdot f} = \frac{\Sigma e \cdot f \cdot V_{1:x'}(1 + q)}{\Sigma e \cdot f} = V_{1:x'}\left(1 + \frac{\Sigma e \cdot f \cdot q}{\Sigma e \cdot f}\right)$$

$$f' \cdot V_{1:x'} = \frac{\Sigma e \cdot f \cdot V_{1:x}}{\Sigma e} = \frac{\Sigma e \cdot f' \, V_{1:x'}(1 + m)}{\Sigma e} = f' \, V_{1:x'}\left(1 + \frac{\Sigma e \cdot m}{\Sigma e}\right)$$

1. Number of Claims.

We shall concern ourselves with the development of formulae applicable to risks for which C claims are expected on the basis of the classification claim

frequency. Such risks will have an exposure of C/f' and, as they have a claim frequency of $f'(1+p)$, the true expected number of claims for such a risk will be $C(1+p)$. From the formulae of section B of Part I we can write the first three moments, about the origin, of the actual number of claims occurring for such a risk as:

$$V_{1:n} = C(1+p)$$
$$V_{2:n} = C(1+p) + C^2(1+p)^2$$
$$V_{3:n} = C(1+p) + 3C^2(1+p)^2 + C^3(1+p)^3$$

These moments for individual risks, when weighted by the exposures of the risks and averaged for all risks, will give us the moments of the actual number of claims occurring for all risks in the classification when C claims are expected on the basis of the classification claim frequency. These are:

$$V_{1:n'} = C$$
$$V_{2:n'} = C + C^2(1+V_{2:p})$$
$$V_{3:n'} = C + 3C^2(1+V_{2:p}) + C^3(1+3V_{2:p}+V_{3:p}), \text{ and}$$
$$U_{2:n'} = C + C^2 V_{2:p}$$
$$U_{3:n'} = C + 3C^2 V_{2:p} + C^3 V_{3:p}$$

The moments of r', the ratio of actual to expected number of claims, can then be obtained by dividing by the powers of C as:

$$V_{1:r'} = 1, \quad U_{2:r'} = 1/C + V_{2:p}, \text{ and } U_{3:r'} = 1/C^2 + 3V_{2:p}/C + V_{3:p}$$

2. Total Cost of a Fixed Number of Claims.

We must now deal with a group of risks whose average claim costs are admittedly different but for which we have available only the distribution of losses by size of loss for all risks combined. No progress can be made without some assumption as to the form of the distributions for individual risks. A minimum assumption is that the distributions for all risks in the class have the same coefficient of variation and, for the purpose of developing third moments, also have the same skewness. Indicating the coefficient of variation by (CV) we have:

$$(CV)^2 = \frac{U_{2:x}}{V^2_{1:x}} = \frac{V_{2:x} - V^2_{1:x}}{V^2_{1:x}} = \frac{V_{2:x}}{V^2_{1:x}} - 1$$

$$V_{2:x} = V^2_{1:x}[(CV)^2 + 1] = V^2_{1:x'}[(CV)^2 + 1](1+q)^2$$

but $V_{2:x'} = \dfrac{\Sigma e \cdot f \cdot V_{2:x}}{\Sigma e \cdot f} = \dfrac{\Sigma V^2_{1:x'}[(CV)^2 + 1]e \cdot f(1+q)^2}{\Sigma e \cdot f}$

$$= V^2_{1:x'}[(CV)^2 + 1](1+V_{2:q})$$

so that $V^2_{1:x'}[(CV)^2 + 1] = \dfrac{V_{2:x'}}{1+V_{2:q}}$ and by substituting this we have:

$$V_{2:x} = \frac{V_{2:x'}\,(1+q)^2}{1+V_{2:q}} \quad \text{and} \quad V_{2:x}\cdot V_{1:x} = \frac{V_{2:x'}\cdot V_{1:x'}\,(1+q)^3}{1+V_{2:q}}$$

A similar procedure involving the skewness, $\alpha_{3:x}$, gives us that:

$$V_{3:x} = \frac{V_{3:x'}\,(1+q)^3}{1+3\,V_{2:q}+V_{3:q}}$$

Using these values of $V_{2:x}$, $V_{2:x}\cdot V_{1:x}$, and $V_{3:x}$ in the formulae of section C of Part I we have the first three moments of the actual costs of n claims, for an individual risk, as:

$$V_{1:t} = n\cdot V_{1:x'}\,(1+q)$$

$$V_{2:t} = \left[\frac{n\cdot V_{2:x'}}{1+V_{2:q}} + n\,(n-1)\,V^2{}_{1:x'}\right](1+q)^2$$

$$V_{3:t} = \left[\frac{n\cdot V_{3:x'}}{1+3\,V_{2:q}+V_{3:q}} + \frac{3\,n(n-1)\,V_{2:x'}\,V_{1:x'}}{1+V_{2:q}}\right.$$
$$\left. + n(n-1)(n-2)\,V^3{}_{1:x'}\right](1+q)^3$$

These moments for individual risks, when weighted by the expected number of claims of the risks, $e\cdot f$, to measure the relative number of times such a number of n claims will occur, will give us the moments of the actual amount of losses from n claims of all risks in the classification as:

$$V_{1:t'} = n\cdot V_{1:x'}$$

$$V_{2:t'} = n\cdot V_{2:x'} + n(n-1)\,V^2{}_{1:x'}\,(1+V_{2:q})$$

$$V_{3:t'} = n\cdot V_{3:x'} + 3\,n(n-1)\,V_{2:x'}\cdot V_{1:x'}\left[\frac{1+3\cdot V_{2:q}+V_{3:q}}{1+V_{2:q}}\right]$$
$$+ n(n-1)(n-2)\,V^3{}_{1:x'}(1+3\cdot V_{2:q}+V_{3:q})$$

and $U_{2:t'} = n\cdot U_{2:x'} + n(n-1)\,V_{2:q}\cdot V^2{}_{1:x'}$

$$U_{3:t'} = n\cdot U_{3:x'} + 3\,n(n-1)\,V_{2:x'}\cdot V_{1:x'}\left[\frac{2\cdot V_{2:q}+V_{3:q}}{1+V_{2:q}}\right]$$
$$+ n(n-1)(n-2)\,V^3{}_{1:x'}\left[V_{3:q} - \frac{6\cdot V_{2:q}}{n-2}\right]$$

The moments of a', the average claim cost of a fixed number of claims, can then be obtained by dividing by the powers of n and the moments of s', the ratio of the actual to expected total losses or average claim costs for a fixed number of claims, can be obtained by dividing by the powers of $n\cdot V_{1:x'}$.

3. Total Losses When C Claims are Expected.

Concerning ourselves again with risks for which C claims are expected on the basis of the classification claim frequency, we can write, from the formu-

lae of section D of Part I, the moments of the total actual losses, T, for an individual risk as:

$$V_{1:T} = C \cdot V_{1:x'} \, (1 + m)$$
$$V_{2:T} = C \cdot V_{2:x} \, (1 + p) + C^2 V^2_{1:x'} \, (1 + m)^2$$
$$V_{3:T} = C \cdot V_{3:x} \, (1 + p) + 3 \, C^2 V_{2:x} \cdot V_{1:x} \, (1 + p)^2 + C^3 V^3_{1:x'} \, (1 + m)^3$$

The averaging of these moments, when weighted by the risk exposures, is a straightforward process for the right hand terms of the above values for $V_{1:T}$, $V_{2:T}$, and $V_{3:T}$ involving only powers of m and the constants C and $V_{1:x'}$. The averaging of the left hand terms of the values for $V_{2:T}$ and $V_{3:T}$ involve only the substitutions:

$$\frac{\Sigma e \, (1 + p) \, V_{2:x}}{\Sigma e} = \frac{\Sigma e \cdot f' \, (1 + p) \, V_{2:x}}{\Sigma e \cdot f} = \frac{\Sigma e \cdot f \cdot V_{2:x}}{\Sigma e \cdot f} = V_{2:x'}$$

$$\text{and} \quad \frac{\Sigma e (1 + p) \, V_{3:x}}{\Sigma e} = \frac{\Sigma e \cdot f' \, (1 + p) \, V_{3:x}}{\Sigma e \cdot f} = \frac{\Sigma e \cdot f \cdot V_{3:x}}{\Sigma e \cdot f} = V_{3:x'}$$

No exact symbolic evaluation of the middle term of the value for $V_{3:T}$ can be made except one involving the correlations between powers of p and q. However, under the assumptions of the previous section regarding the individual risk distributions of losses by size of loss, such correlations can be treated as a group and it can be shown that:

$$\frac{\Sigma e \, (1+p)^2 \, V_{2:x} \cdot V_{1:x}}{\Sigma e} = \frac{V_{2:x'} \cdot V_{1:x'} \, (1+V_{2:p})(1+3 \, V_{2:q}+V_{3:q})}{1+V_{2:q}} \pm \frac{G}{3 \, C^2}$$

where G jointly represents all such correlations and is zero when all are zero. The algebraic derivation of this identity becomes very involved and will not be shown. Its accuracy can readily be verified by the erection of a numerical problem that fulfills the conditions of no correlation between any power of p and q.

We thus have for the moments of the actual total losses, for all risks in a classification for which C claims are expected on the basis of the classification claim frequency:

$$V_{1:T'} = C \cdot V_{1:x'}$$
$$V_{2:T'} = C \cdot V_{2:x'} + C^2 V^2_{1:x'} \, (1 + V_{2:m})$$
$$V_{3:T'} = C \cdot V_{3:x'} + 3 \, C^2 V_{2:x'} \cdot V_{1:x'} \left[\frac{(1+V_{2:p})(1+3 \, V_{2:q}+V_{3:q})}{1+V_{2:q}} \right]$$
$$+ C^3 V^3_{1:x'} \, (1 + 3 \, V_{2:m} + V_{3:m}) \pm G$$

$$\text{and} \quad U_{2:T'} = C \cdot V_{2:x'} + C^2 V^2_{1:x'} \cdot V_{2:m}$$

$$U_{3:T'} = C \cdot V_{3:x'} + 3 \, C^2 V_{2:x'} \cdot V_{1:x'} \left[\frac{(1+V_{2:p})(1+3 \, V_{2:q}+V_{3:q})}{1+V_{2:q}} - 1 \right]$$
$$+ C^3 V^3_{1:x'} \cdot V_{3:m} \pm G$$

The moments of R', the ratio of actual to expected losses, can be obtained from these by dividing by the powers of the expected total loss, $C \cdot V_{1:x'}$.

B. Hazard Levels of Classifications to Be Combined

Classifications and territories are made in order to discern and recognize any demonstrable differences in loss costs per unit of exposure. Such of these differences as are due to differences in claim frequencies have no effect on the sampling distributions with which we are concerned. Only such differences as are due to differences in the distributions of losses by size of loss need be considered.

It frequently occurs that the only available distribution of losses by size of loss includes risks from a wide group of classes. Although it might be reasonable to assume that the coefficients of variation, and even the skewnesses, of the distributions for individual classifications are constant, it would not be reasonable to assume that the average claim costs for all classes are likewise constant. Moreover classification average claim costs are usually available and actually can be taken into consideration. Thus for the purpose of sampling theory the "hazard" of a class or territory will be represented by its average claim cost.

Statistics for a group of classes will be denoted by a double prime ($''$). The symbol B will be used to represent the relative hazard of a classification and will be defined as:

$$V_{1:x'} = V_{1:x''}(1+B) \quad \text{with} \quad V_{n:B} = \frac{\Sigma\, e'\, f'\, B^n}{\Sigma\, e'\, f'}$$

It will be noted that $V_{1:B} = 0$ as:

$$V_{1:x'} = \frac{\Sigma\, e'\, f'\, V_{1:x'}}{\Sigma\, e'\, f'} = V_{1:x''}\frac{\Sigma\, e'\, f'\,(1+B)}{\Sigma\, e'\, f'} = V_{1:x''}(1+V_{1:B})$$

The other difference between classes will be in the diversity of risks within the classes. It will be unreasonable in most cases to assume that the moments of p, q, and m are constant for all of a group of classes. The moment formulae for risks in a group of classes will, therefore involve moment functions of p, q, and m defined as:

$$V_{n:p'} = \frac{\Sigma\, e'\, V_{n:p}}{\Sigma\, e'}, \quad V_{n:q'} = \frac{\Sigma\, e'\, f'\, V_{n:q}}{\Sigma\, e'\, f'} \quad \text{and} \quad V_{n:m'} = \frac{\Sigma\, e'\, V_{n:m}}{\Sigma\, e'}$$

It will be important to note that all powers of B are independent of any moment of p, q, or m as this independence is utilized in evaluating the summations and averages in the following paragraphs.

1. *Number of Claims*

The moments of the actual number of claims occurring when C are expected on the basis of the classification claim frequency of section A-1 of this Part may be averaged for a group of classes, using weights equal to the class exposure, e', to obtain:

$$V_{1:n''} = C$$
$$V_{2:n''} = C + C^2 (1 + V_{2:p'})$$
$$V_{3:n''} = C + 3 C^2 (1 + V_{2:p'}) + C^3 (1 + 3 V_{2:p'} + V_{3:p'})$$

2. *Total Cost of an Actual Number of Claims Whose Expected Total is E*

If E losses are expected for a risk, in a class having an average claim cost of $V_{1:x'}$, because of the actual occurrence of n claims, then n must be $E/V_{1:x'}$. The moments of the actual total losses, of all risks in a classification for which $E/V_{1:x'}$ claims have occurred, may be written from the formulae of section A-2 of this Part as:

$$V_{1:t'} = E$$
$$V_{2:t'} = E \frac{V_{2:x'}}{V_{1:x'}} + E (E - V_{1:x'})(1 + V_{2:q})$$
$$V_{3:t'} = E \frac{V_{3:x'}}{V_{1:x'}} + 3 E (E - V_{1:x'}) \cdot \frac{V_{2:x'}}{V_{1:x'}} \cdot \frac{1 + 3 V_{2:q} + V_{3:q}}{1 + V_{2:q}}$$
$$+ E (E - V_{1:x'}) (E - 2 V_{1:x'})(1 + 3 V_{2:q} + V_{3:q})$$

These moments must then be weighted by $e' f' V_{1:x'}$ or by $e' f' (1 + B)$ to obtain the corresponding moments for risks of all classifications. First it will be necessary to make the substitutions:

$$\frac{V_{2:x'}}{V_{1:x'}} = \frac{V_{2:x''}}{V_{1:x''}} \cdot \frac{1 + B}{1 + V_{2:B}} \text{ and } \frac{V_{3:x'}}{V_{1:x'}} = \frac{V_{3:x''}}{V_{1:x''}} \cdot \frac{(1 + B)^2}{(1 + 3 V_{2:B} + V_{3:B})}$$

This produces:

$$V_{1:t''} = E$$
$$V_{2:t''} = E \frac{V_{2:x''}}{V_{1:x''}} + E^2 (1 + V_{2:q'}) - E \cdot V_{1:x''} (1 + V_{2:q'})(1 + V_{2:B})$$
$$V_{3:t''} = E \frac{V_{3:x''}}{V_{1:x''}} + 3 \frac{V_{2:x''}}{V_{1:x''}} \cdot \frac{1 + 3 V_{2:q'} + V_{3:q'}}{1 + V_{2:q'}} \left[E^2 - E V_{1:x''} \frac{1 + 3 V_{2:B} + V_{3:B}}{1 + V_{2:B}} \right]$$
$$+ (1 + 3 V_{2:q'} + V_{3:q'}) [E^3 - 3 E^2 V_{1:x''} (1 + V_{2:B})$$
$$+ 2 E V^2_{1:x''} (1 + 3 V_{2:B} + V_{3:B})]$$

3. *Total Losses When Losses of E Are Expected*

If E losses are expected for a risk in a class having an average claim cost of $V_{1:x'}$, then C, the expected number of claims on the basis of the classification claim frequency, will be $E/V_{1:x'}$. The moments of the actual total losses, of all risks in a classification for which $E/V_{1:x'}$ claims are expected, may be written from the formulae of section A-3 of this Part as:

$$V_{1:T'} = E$$

$$V_{2:T'} = E\frac{V_{2:x'}}{V_{1:x'}} + E^2(1 + V_{2:m})$$

$$V_{3:T'} = E\frac{V_{3:x'}}{V_{1:x'}} + 3E^2\frac{V_{2:x'}}{V_{1:x'}} \cdot \frac{(1 + V_{2:p})(1 + 3V_{2:q} + V_{3:q})}{1 + V_{2:q}}$$
$$+ E^3(1 + 3V_{2:m} + V_{3:m}) \pm G$$

These moments must then be weighted by $e'f'V_{1:x'}$ or by $e'f'(1 + B)$ and the substitutions of the previous paragraph made to obtain the corresponding moments for all classifications as:

$$V_{1:T''} = E$$

$$V_{2:T''} = E\frac{V_{2:x''}}{V_{1:x''}} + E^2(1 + V_{2:m'})$$

$$V_{3:T''} = E\frac{V_{3:x''}}{V_{1:x''}} + 3E^2\frac{V_{2:x''}}{V_{1:x''}} \cdot \frac{(1 + V_{2:p'})(1 + 3V_{2:q'} + V_{3:q'})}{1 + V_{2:q'}}$$
$$+ E^3(1 + 3V_{2:m'} + V_{3:m'}) \pm G'$$

C. Ratemaking Errors, or Errors in the Available Estimates of Classification Averages

Up to this point the formulae have been developed on the premise that actual averages of classification data were available. In hindsight analysis this is usually the case; while in prospective application it is not. The next step, then, will be to recognize the possibility of errors in the available estimates of classification averages. To do this we shall represent the estimated classification claim frequency by F where $f' = F(1 + P)$, the estimated average claim cost by A where $V_{1:x'} = A(1 + Q)$, and the estimated average pure premium by FA where $f'V_{1:x'} = FA(1 + M)$. Thus P, Q, and M represent percentage errors in classification estimates corresponding to the percentage diversities, p, q, and m, of individual risks.

The moments of P, Q, and M will be defined by:

$$V_{n:P} = \frac{\Sigma e'P^n}{\Sigma e'}, \quad V_{n:Q} = \frac{\Sigma e'FQ^n}{\Sigma e'F}, \quad \text{and} \quad V_{n:M} = \frac{\Sigma e'M^n}{\Sigma e'}$$

so that $V_{1:P}$, $V_{1:Q}$, and $V_{1:M}$ represent the component parts of or the entire error in rate level for the group of classes as a whole.

It will be important to note here that P, Q, and M are independent of the moments of p, q, and m; as this independence will be utilized in evaluating the averages of the following paragraphs.

1. Number of Claims.

The value of C in section A-1 of this Part must be replaced by $C(1 + P)$ before the averaging process of section B-1 is performed, to obtain:

$$V_{1:n''} = C\,(1 + V_{1:P})$$
$$V_{2:n''} = C\,(1 + V_{1:P}) \quad + C^2\,(1 + V_{2:p'})(1 + 2\,V_{1:P} + V_{2:P})$$
$$V_{3:n''} = C\,(1 + V_{1:P}) \quad + 3\,C^2\,(1 + V_{2:p'})(1 + 2\,V_{1:P} + V_{2:P})$$
$$\quad + C^3\,(1 + 3\,V_{2:p'} + V_{3:p'})(1 + 3\,V_{1:P} + 3\,V_{2:P} + V_{3:P}).$$

2. *Total Cost of an Actual Number of Claims Whose Expected Total is E.*

The value of E in the first paragraph of section B-2 of this Part must be replaced by $E\,(1 + Q)$ with the result that the following replacements must be made in the moments of the second paragraph:

$$E\,(1 + V_{1:Q}) \text{ for } E, \quad E^2\,(1 + 2\,V_{1:Q} + V_{2:Q}) \text{ for } E^2, \text{ and}$$
$$E^3\,(1 + 3\,V_{1:Q} + 3\,V_{2:Q} + V_{3:Q}) \text{ for } E^3.$$

3. *Total Losses When Losses of E Are Expected.*

The value of E in the first paragraph of section B-3 of this Part must be replaced by $E\,(1 + M)$ with the result that the following replacements must be made in the moments of the second paragraph:

$$E\,(1 + V_{1:M}) \text{ for } E, \quad E^2\,(1 + 2\,V_{1:M} + V_{2:M}) \text{ for } E^2,$$
$$E^3\,(1 + 3\,V_{1:M} + 3\,V_{2:M} + V_{3:M}) \text{ for } E^3.$$

V.

CALCULATING METHODS TO OBTAIN ESTIMATES OF $U_{2:R''}$

In Part II all of the calculation of the sampling moments based on the formulae developed in Part I involved only the moments of the distribution of claims by size of claim. The formulae developed in Part IV involve these moments together with the moments of p, q, m, P, Q, and M. For these variables we can not determine the moments by any direct means but must always obtain them from data in which these variables are in combination with variations due to chance. Most frequently these moments can be calculated from the moments of R'' and while at times we will use $U_{3:R''}$ we will usually need only $U_{2:R''}$ and the following discussion will be limited to this second moment in order to reduce its length. The methods of approach can be extended to the third moment by the reader as necessary.

Theoretically we can only estimate the value of $U_{2:R''}$ if we have a sufficiently large number of risks or classes with exactly the same expected losses. This is a condition so rarely met in practice that we must investigate the possibilities of obtaining estimates from groups of risks or classes that differ as to their expected losses although being contained within a limited range.

A. The True Value of $U_{2:R''}$

What we want to calculate from the data of individual risks or classes is the value of $U_{2:R''}$ corresponding to the average value of E for a group of risks grouped by size of E. From section C-3 of Part IV we have for $E = V_{1:E}$

$$V_{1:T''} = V_{1:E}(1 + V_{1:M})$$

$$V_{2:T''} = V_{1:E}(1 + V_{1:M})\frac{V_{2:x''}}{V_{1:x''}} + V^2_{1:E}(1 + V_{2:m'})(1 + 2 \cdot V_{1:M} + V_{2:M})$$

$$U_{2:T''} = V_{1:E}(1 + V_{1:M})\frac{V_{2:x''}}{V_{1:x''}} + V^2_{1:E}[U_{2:M}(1 + V_{2:m'}) + V_{2:m'}(1 + V_{1:M})^2]$$

from which

$$V_{1:R''} = 1 + V_{1:M} \text{ and}$$

$$U_{2:R''} = \frac{1 + V_{1:M}}{V_{1:E}} \cdot \frac{V_{2:x''}}{V_{1:x''}} + U_{2:M}(1 + V_{2:m'}) + V_{2:m'}(1 + V_{1:M})^2$$

There will also be times when we shall want these moments of R'' after they have been corrected for the error in the rate level of $(1 + V_{1:M})$. The corrected moments would then be:

Corrected $V_{1:R''} = 1$, and

$$\text{Corrected } U_{2:R''} = \frac{1}{V_{1:E}(1 + V_{1:M})} \cdot \frac{V_{2:x''}}{V_{1:x''}} + V_{2:m'}$$

$$+ (1 + V_{2:m'}) \cdot \frac{U_{2:M}}{(1 + V_{1:M})^2}$$

B. Calculations from Individual Values of R''

The most obvious procedure would be to calculate the value of R'' for each risk in the group and to proceed from these to calculate $V_{1:R''}$ and $U_{2:R''}$. Let us then see what the results of this calculation will produce. For a particular value of E we would have:

$$V_{1:R''} = 1 + V_{1:M}$$

$$V_{2:R''} = \frac{1 + V_{1:M}}{E} \cdot \frac{V_{2:x''}}{V_{1:x''}} + (1 + V_{2:m'})(1 + 2 \cdot V_{1:M} + V_{2:M})$$

and as averages for all values of E we would have:

$$V_{1:R''} = 1 + V_{1:M}$$

$$V_{2:R''} = (1 + V_{1:M})\frac{V_{2:x''}}{V_{1:x''}}\left(\text{Average } \frac{1}{E}\right) + (1 + V_{2:m'})(1 + 2 \cdot V_{1:M} + V_{2:M})$$

$$U_{2:R''} = (1 + V_{1:M})\frac{V_{2:x''}}{V_{1:x''}}\left(\text{Average } \frac{1}{E}\right) + U_{2:M}(1 + V_{2:m'}) + V_{2:m'}(1 + V_{1:M})^2$$

or, if each value of E had been multiplied by $(1 + V_{1:M})$ before the individual values of R'' were calculated, we would have:

$V_{1:\text{Adjusted } R''} = 1$ and

$$U_{2:\text{Adjusted } R''} = \frac{1}{(1 + V_{1:M})} \cdot \frac{V_{2:x''}}{V_{1:x''}} \cdot \left(\text{Avg.} \frac{1}{E}\right) + V_{2:m'}$$
$$+ (1 + V_{2:m'}) \cdot \frac{U_{2:M}}{(1 + V_{1:M})^2}$$

For a range of E in which the greatest value of E is r times the least value of E we have approximately that:

$$\frac{1}{V_{1:E}} = \left(\text{Average } \frac{1}{E}\right) \cdot \frac{.8686 \, (r-1)}{(r+1) \log_{10} r}$$

For example if $r = 2$ then $\dfrac{1}{V_{1:E}} = .962 \left(\text{Average } \dfrac{1}{E}\right)$

Thus this method of calculation of $U_{2:R''}$ overestimates its value by an error of approximately:

Calculated $U_{2:R''}$ — True $U_{2:R''} = (1 + V_{1:M}) \dfrac{V_{2:x''}}{V_{1:x''}} \dfrac{1}{V_{1:E}} \left[\dfrac{(r+1) \log_{10} r}{.8686 \, (r-1)} 1 - 1 \right]$

where the $(1 + V_{1:M})$ term becomes $\dfrac{1}{1 + V_{1:M}}$ if the values of R'' are corrected for the error in rate level.

C. Calculations Based on the Z-Function

A second method of calculation would be based on the z-function described in section F of Part I. The value of Z would be calculated for each risk or class, the moments of these observed Z's calculated and the value of $U_{2:R''}$ calculated from these. For a particular value of E we would have:

$V_{1:z''} = \sqrt{E}(V_{1:R''} - 1) = V_{1:M} \sqrt{E}$

$V_{2:z''} = E(V_{2:R''} - 2 \cdot V_{1:R''} + 1)$

$$= E\left[\frac{1 + V_{1:M}}{E} \cdot \frac{V_{2:x''}}{V_{1:x''}} + (1 + V_{2:m'})(1 + 2 V_{1:M} + V_{2:M}) \right.$$
$$\left. - 2 (1 + V_{1:M}) + 1 \right]$$

$$\doteq (1 + V_{1:M}) \frac{V_{2:x''}}{V_{1:x''}} + E\left[V_{2:M} + V_{2:m'} (1 + 2 V_{1:M} + V_{2:M}) \right]$$

and for all values of E we would have:

$V_{1:z''} = V_{1:M} \, (\text{Average } \sqrt{E})$

$V_{2:z''} = (1 + V_{1:M}) \dfrac{V_{2:x''}}{V_{1:x''}} + V_{1:E} \left[V_{2:M} + V_{2:m'} (1 + 2 V_{1:M} + V_{2:M}) \right]$

$$U_{2:z''} = (1+V_{1:M})\frac{V_{2:x''}}{V_{1:x''}} + V_{1:B}\,[U_{2:M}\,(1+V_{2:m'})+V_{2:m'}\,(1+V_{1:M})^2]$$

$$+\,[V_{1:B}-(\text{Average }\sqrt{E})^2]\,V^2_{1:M}$$

$$U_{2:R''} = \frac{U_{2:z''}}{V_{1:B}} = \frac{1+V_{1:M}}{V_{1:B}}\cdot\frac{V_{2:x''}}{V_{1:x''}} + U_{2:M}\,(1+V_{2:m'}) + V_{2:m'}\,(1+V_{1:M})^2$$

$$+\,V^2_{1:M}\left[\,1-\frac{(\text{Average }\sqrt{E})^2}{V_{1:B}}\,\right]$$

As we have approximately that:

$$\frac{(\text{Average }\sqrt{E})^2}{V_{1:B}} = \frac{8\,(r^{3/2}-1)^2}{9\,(r-1)^2\,(r+1)}$$

we have that $U_{2:R''}$ is overestimated by this method of calculation by:

$$\text{Calculated } U_{2:R''} - \text{True } U_{2:R''} = V^2_{1:M}\left[\,1-\frac{8\,(r^{3/2}-1)^2}{9\,(r-1)^2\,(r+1)}\,\right]$$

Obviously the Z-method gives exactly the right answer if the expected losses have been balanced to the actual losses prior to the calculation of the individual values of Z, as the value of $V_{1:M}$ then becomes zero.

D. Calculations based on the z-Function.

The most readily obtained exact value of $U_{2:R''}$ (and the closest approximation to $U_{3:R''}$) is calculated from the average value of $z^2 = \dfrac{(T'')^2}{E}$. This, however, requires the separate calculation of z^2 for each risk.

For a particular value of E we would have:

$$V_{1:T''} = E\,(1+V_{1:M})$$

$$V_{2:x''} = (1+V_{1:M})\cdot\frac{V_{2:x''}}{V_{1:x''}} + E(1+V_{2:m'})(1+2\,V_{1:M}+V_{2:M})$$

and for all values of E:

$$V_{1:T''} = V_{1:B}\,(1+V_{1:M})$$

$$V_{2:x''} = (1+V_{1:M})\frac{V_{2:x''}}{V_{1:x''}} + V_{1:B}\,(1+V_{2:m'})\left[\,U_{2:M}+(1+V_{1:M})^2\,\right]$$

so that:

$$\frac{V_{2:x''}}{V_{1:B}} = \frac{(1+V_{1:M})}{V_{1:B}}\cdot\frac{V_{2:x''}}{V_{1:x''}} + U_{2:M}\,(1+V_{2:m'}) + V_{2:m'}\,(1+V_{1:M})^2+(1+V_{1:M})^2$$

and the true value of $U_{2:R''}$ is seen to be:

$$U_{2:R''} = \frac{V_{2:x''}}{V_{1:B}} - \left(\frac{V_{1:T''}}{V_{1:B}}\right)^2$$

and the true value of $U_{2:R''}$ corrected for the error in rate level:

Corrected $U_{2:R''} = \dfrac{V_{1:E}\, V_{2:x''}}{V^2_{1:T''}} - 1$

Note: If $V_{3:z}$ is the average value of $\dfrac{(T'')^3}{E}$, a very close approximation to the true value of the corrected $U_{3:R''}$ is given by:

Corrected $U_{3:R''} = \dfrac{V_{1:E}\, V_{3:z''}}{V^3_{1:T''}} - 3\,\dfrac{V_{1:E}\, V_{2:x''}}{V^2_{1:T''}} + 2$

E. Calculations Based on the W-Function

The calculation of individual values of R'' for a large number of risks becomes quite laborious and the calculation of the individual values of Z'' becomes prohibitive. The data is usually available on punch cards in the form of actual losses and either premiums at manual rates or expected losses. The following method of computation assumes that expected losses are cut on the cards. The necessary adjustments of the formulae to use premiums in place of expected losses will be left to the reader. It will be assumed that the reader is familiar with the methods of obtaining sums of squares and of cross products of data cut on punch cards and has obtained the values:

$\Sigma\,(T'' - E) = \Sigma\, T'' - \Sigma\, E$ and $\Sigma\,(T'' - E)^2 = \Sigma\,(T'')^2 + \Sigma\, E^2 - 2\,\Sigma\, T'' E$

from which values of $V_{1:(T'' - E)}$ and $V_{2:(T''-E)}$) have been calculated.

For a particular value of E we would have:

$V_{1:T''} = E\,(1 + V_{1:M})$

$V_{1:(T''-E)} = V_{1:T''} - E = E \cdot V_{1:M}$

$V_{2:(T''-E)} = V_{2:T''} - 2\,E \cdot V_{1:T''} + E^2$

$\quad = E\,(1 + V_{1:M})\,\dfrac{V_{2:x''}}{V_{1:x''}} + E^2\,[V_{2:M} + U_{2:M} \cdot V_{2:m'} + V_{2:m'}\,(1 + V_{1:M})^2]$

and for all values of E:

$V_{1:T''} = V_{1:E}\,(1 + V_{1:M})$

$V_{1:(T''-E)} = V_{1:E} \cdot V_{1:M}$

$V_{2:(T''-E)} = V_{1:E}\,(1 + V_{1:M})\,\dfrac{V_{2:x''}}{V_{1:x''}} + V_{2:E}\,[V_{2:M} + U_{2:M} \cdot V_{2:m'} +$

$\qquad\qquad\qquad\qquad\qquad\qquad\qquad V_{2:m'}\,(1 + V_{1:M})^2]$

Now if we calculate:

$V_{1:W} = \dfrac{V_{1:(T''-E)}}{V_{1:E}} = V_{1:M}$ and $V_{2:W} = \dfrac{V_{2:(T''-E)}}{V^2_{1:E}}$ we have:

$V_{2:W} = \dfrac{1 + V_{1:M}}{V_{1:E}} \cdot \dfrac{V_{2:x''}}{V_{1:x''}} + \dfrac{V_{2:E}}{V^2_{1:E}}\,[V_{2:M} + U_{2:M} \cdot V_{2:m'} + V_{2:m'}\,(1 + V_{1:M})^2]$

$U_{2:W} = \dfrac{1 + V_{1:M}}{V_{1:E}} \cdot \dfrac{V_{2:x''}}{V_{1:x''}} + U_{2:M}\,(1 + V_{2:m'}) + V_{2:m'}\,(1 + V_{1:M})^2$

$\qquad + \left[\dfrac{V_{2:E}}{V^2_{1:E}} - 1\right] \cdot [V_{2:M} + U_{2:M} \cdot V_{2:m'} + V_{2:m'}\,(1 + V_{1:M})^2]$

and make use of the following approximation:

$$\frac{V_{2:E}}{V^2_{1:E}} - 1 = \frac{(r-1)^2}{3\,(r+1)^2}$$

we have that $U_{2:W}$ is an overestimate of $U_{2:R''}$ having an error of:

True $U_{2:R''} - U_{2:R''}$ calculated from $U_{2:W} =$

$$-\frac{(r-1)^2}{3\,(r+1)^2}\,[V_{2:M} + U_{2:M} \cdot V_{2:m'} + V_{2:m'}\,(1+V_{1:M})^2]$$

Similarly, if we calculate:

$$V_{1:W'} = \frac{V_{1:(T''-E)}}{V_{1:T''}} \quad \text{and} \quad V_{2:W'} = \frac{V_{2:(T''-E)}}{V^2_{1:T''}}$$

then $U_{2:W'}$ is an overestimate of the Corrected $U_{2:R''}$ having an error of:

True Corrected $U_{2:R''} - U_{2:R''}$ calculated from $U_{2:W'} =$

$$-\frac{(r-1)^2}{3\,(r+1)^2}\left[\,V_{2:m'} + \frac{V_{2:M} + U_{2:M} \cdot V_{2:m'}}{(1+V_{1:M})^2}\,\right]$$

In most cases this estimate of $U_{2:R''}$ is closer to the true value than that obtained from the calculation of R'' for each risk. Although not as exact as the estimate obtained from the z-function, it is so much more easily obtained as to make its use mandatory in all but the most exact studies.

VI.

EXCESS PURE PREMIUM RATIOS

A. The Use of Excess Pure Premium Ratios

Tables of excess pure premium ratios are made available only to serve as the means of calculating the "insurance charge" to be included in the basic premium of a retrospective rating plan. All other parts of the final retrospective premium are on an actual cost-plus basis and as such do not represent insurance. Because of the complete reliance on tables of excess pure premium ratios for the determination of the entire insurance portion of retrospective premiums, it is necessary to analyse very carefully all of the conditions under which the tabular values of these excess pure premium ratios may be in error.

The "insurance charge" is made up of an expected amount of losses, or loss portion, loaded for expenses, such as claim adjustment expenses, that are assumed to vary directly with losses and, in some cases, for taxes or other expenses which are to vary with the final premium. The loss portion of the "insurance charge" is the net difference between the loss portion of the "charge for losses in excess of those contemplated by the maximum premium"

and the loss portion of the "saving on minimum premium risks." It is customary to express all of these as ratios to the standard premium, P.

The loss portion of the charge for losses in excess of those contemplated by the maximum premium is equal to the product of the average loss ratio, A, and the excess pure premium ratio corresponding to the loss ratio necessary to reach the maximum premium, $B_{(max)}$. Symbolically this is expressed as:

Loss on Maximum Premium Risks $= A$ (x-ratio for $B_{(max)}$, P, A)

The loss portion of the savings on minimum premium risks is equal to the loss ratio contemplated by the minimum premium, minus the average loss ratio, plus the product of the average loss ratio and the excess pure premium ratio corresponding to the loss ratio necessary to reach the minimum premium, $B_{(min)}$, *i.e.*:

Saving on Min. Prem. Risks $= B_{(min)} - A + A$ (x-ratio for $B_{(min)}$, P, A)

In deriving the insurance charges for a retrospective plan, the average loss ratio, A, is assumed to be the permissible loss ratio, L. In actual application, however, the actual loss level varies considerably above and below the permissible creating considerable differences between the true insurance cost and that obtained from the use of the permissible loss ratio and the tabular values of excess pure premium ratios.

When the actual loss level, A, is equal to aL, the true value of the excess pure premium ratio is equal to the tabular excess pure premium ratio corresponding to a loss ratio of B/a, a premium size of aP, and the permissible loss ratio L. The loss portion of the insurance charge thus becomes:

$$a L - B_{(min)} - a L \left[(x\text{-ratio for} \frac{B_{(min)}}{a}, a\,P, L) - (x\text{-ratio for} \frac{B_{(max)}}{a}, a\,P, L) \right]$$

The effect of departures from the expected loss level can best be seen from a consideration of specific examples. Let us take a hypothetical plan in which the minimum and maximum premiums for a \$10,000 standard premium risk contemplate loss ratios of .400 and .800 respectively. The loss portion of the insurance charge included in such a plan, if based on a permissible loss ratio of .598, would be:

.598—.400—.598 [(x-ratio for .400, \$10,000, .598) — (x-ratio for
.800, \$10,000, .598)] $=$ .198—.598 [.467—.213] $=$ .046

If manual rates were redundant to an extent that the average loss ratio was .498, the actual cost of insured losses would be:

.498—.400—.498 [(x-ratio for .480, \$12,000, .598) — (x-ratio for
.961, \$12,000, .598)] $=$ .098—.498 [.382—.144] $=$ —.021

If, however, the manual rates were inadequate and the average loss ratio was .698, the actual cost would be:

.698—.400—.698 [(x-ratio for .343, \$8,570, .598) — (x-ratio for
.685, \$8,570, .598)] $=$ .298—.698 [.532—.281] $=$ .123

This example illustrates three important points. First, the actual insured losses under a retrospective plan may even be negative when the rate level is redundant. Second, the actual insured losses may be several times greater than provided for, by the insurance charges in the plan, when the rate level is inadequate. Third, the actual insured losses under a retrospective plan always average to an amount greater than provided for in a retrospective plan over any period of years in which the actual loss levels varied although averaging out to the permissible level. A comparison of the loss portion of the insurance charge with the permissible loss ratio also indicates the extent to which the hazards of the insurance have been transferred to the risk by the carrier with, in most cases, but little change being made by the carrier in the charges for the expense of providing it.

In addition to the variations in the insurance costs due to departures of actual average loss ratios from the permissible, there are many other causes of variation in these costs due to departures of actual excess pure premium ratios from their tabular values. It will be necessary to study in detail the composition of an excess pure premium ratio in order to analyse such variation and the conditions under which it will occur.

The excess pure premium ratio corresponding to a loss ratio of B, a standard premium risk size of P, and a permissible loss ratio of L is defined as the ratio, to the total of all losses, of losses in excess of BP per risk. When the average loss ratio of all risks is equal to the permissible loss ratio the excess pure premium ratio has the form:

$$x\text{-ratio for } B, P, L = 1 - \frac{B}{L} + \int_0^{B/L} \int_0^{B/L} F_{(R)} \cdot dR \cdot dR \cdot$$

where $F_{(R)}$ is the probability that a risk of standard premium size P will have actual losses of $P \times L \times R$ when the expected losses are $P \times R$.

It is obvious from the above form of the excess pure premium ratio that, for fixed values of B and L, any variation to occur must result from variation in the value of $F_{(R)}$. It has been shown that $F_{(R)}$ takes the form of a frequency distribution with a mean of unity and a variance of:*

$$U_{2:R} = \frac{1}{P \times L} \frac{V_{2:x}}{V_{1:x}} + U_{2:m} + U_{2:M} + U_{2:m} U_{2:M}$$

where:

$\quad V_{1:x}$ and $V_{2:x}$ are the first and second moments, about the origin, of the distribution of amounts of individual claims by size of claim.

$\quad U_{2:m}$ is the variance of the inherent hazards of risks assigned to a classification about the average hazard of the classification, (on a percentage basis).

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*The (') and ('') notation has been omitted throughout this Part and must be inferred as necessary.

$U_{2:M}$ is the variance of the errors in ratemaking and experience rating (on a percentage basis).

The importance of the variance of $F_{(R)}$, as a measure of the value of the double definite integral in the formula for the excess pure premium ratio, can be visualized by recognizing

$$\int_0^{B/L} F_{(R)} \cdot d\,R$$ as the ogive of the frequency distribution of $F_{(R)}$.

This ogive is a continually ascending curve with zero as its minimum and unity as its maximum. The greater the variance of $F_{(R)}$, the less steep will be the slope of this ogive. The double definite integral is the area under this ogive up to the abscissa B/L and will obviously be greater for an ogive with a more moderate slope (corresponding to a larger value of $U_{2:R}$) than for one with a steep slope (corresponding to a small value of $U_{2:R}$). Thus the following information as to variation in the excess pure premium ratio can be obtained directly from the above equation for $U_{2:R}$.

1. The value of the excess pure premium becomes less as the size of the risk increases; but will never reach the lowest possible value (zero, or $1 - B/L$ if $1 - B/L$ is greater than zero) except for completely self-rated risks whose hazards never change from one year to another.

2. The excess pure premium ratios will be higher during periods of rapidly changing conditions than during periods of comparatively stable conditions, due to the greater error in manual rates and experience modifications at such times.

3. The excess pure premium ratios will vary by state, as a result of the material effect of differences in law levels on the value of $\dfrac{V_{2:x}}{V_{1:x}}$ They will be higher for states (such as Pennsylvania) that have fewer and broader classifications than for states having many special classifications, because broadening of classifications increases $U_{2:m}$ by increasing the differences between risks in the same classification. They will be lower for states with a large volume of business, because the rates in such states will be more accurate and the value of $U_{2:M}$ will be smaller.

4. The excess pure premium ratios will vary considerably by classification, because of variation in the values of $\dfrac{V_{2:x}}{V_{1:x}}$ by classification arising from differences in the expected frequencies of large losses. For homogeneous classifications in which the inherent hazard of all risks is very nearly the same, they will be lower than for heterogeneous or N.O.C. classifications, because of lower values of $U_{2:m}$ in homogeneous classes. They will be lower for large classifications than for small classes, due to the greater accuracy of the manual rates producing lower values of $U_{2:M}$.

5. The excess pure premium ratios will vary by date of valuation of the experience; being lower for first reports and higher successively for second, third and later reports. This is the result of the use of averages as estimated values of unsettled cases in early reports having the effect of depressing the value of $\dfrac{V_{2:x}}{V_{1:x}}$ below its ultimate and correct value.

B. Computation of Excess Pure Premium Ratios from Actual Data for Individual Risks

The usual procedure for the calculation of excess pure premium ratios (hereafter called x-ratios) from actual risk data is shown on Exhibit A on the basis that the individual risk data consists of punch cards containing the expected and actual losses and the ratio of actual to expected losses. The data used as an example in Exhibits A, B and C is that for 173 New York State workmen's compensation risks having a standard premium between $4,000 and $6,687 and having a governing classification contained in a particular group of classifications indicated as Hazard Group 1 by the writer and characterized by low average loss cost per claim. Such risks have, as would be expected, x-ratios quite different from the average of similar risks but of all classifications.

If the risk data consists of premium, actual losses, and the loss ratio, exhibit A would have the following columns:

Col. (1)   Desired Loss Ratio
Col. (1a)   Actual Loss Ratio $= (2a) \div F$
Col. (2)   Desired Upper Sorting Limit of Loss Ratios $= (1) \times F$
Col. (2a)   Actual Upper Sorting Limit of Loss Ratios
Col. (3)   Tabulated Data — Number of Risks
Col. (4)   Tabulated Data — Premium   Expect Losses
Col. (5)   Tabulated Data — Actual Losses
Col. (6)   Premium Cumulated Up $=$ Col. (4) Cumulated Up
Col. (7)   Actual Losses Cumulated Up $=$ Col. (5) Cumulated Up
Col. (8)   Adjusted Premium Cumulated Up $= (6) \times F$
Col. (9)   Excess Losses $= (7) - (8)(1a)$ or $= (7) - (6)(2a)$
Col. (10)   Excess Pure Premium Ratio $= (9) \div$ Total (7)

$$F = \frac{\text{Total (5)}}{\text{Total (4)} \times \text{P.L.R.}}, \text{ Average Adjusted Premium} = \frac{\text{Total (5)}}{\text{Total (3)} \times \text{P.L.R.}}$$

It should be noted that unless the ratios of actual to expected losses or the loss ratios for individual risks have been calculated to more decimal places than is usually the case, the resulting x-ratios will not correspond to exactly the same loss ratios (column 1a) for all risk size groups. Because some variation is bound to occur, it is frequently advantageous to use the same set of sorting limits for all risk size groups in order to avoid the need for a hand

EXHIBIT A

CALCULATION OF EXCESS PURE PREMIUM RATIOS

(New York State Workmen's Compensation Risks — Premium Size Group \$4,000 to \$6,687 — Hazard Group 1)

(1) Desired Loss Ratio	(2) Desired Upper Limit of R $\frac{(1)}{PLR}$ .587	(2a) Actual Upper of R $\frac{(3a)}{F}$	(3) Desired Upper Sorting Limit (2)×F	(3a) Actual Upper Sorting Limit	(4) No. of Risks	(5) Expected Losses	(6) Actual Losses	(7) Expected Losses Cumulated Up Col. (5) Cumul. Up	(8) Actual Losses Cumulated Up Col. (6) Cumul. Up	(9) Adjusted Expected Losses Cumulated Up (7)×F	(10) Excess Losses (8)−(9)(2a)	(11) Excess Pure Premium Ratio $\frac{(10)}{\text{Total (6)}}$	(11a) Actual Loss Ratio PLR×(2a)
					Tabulated Data								
.000	.0000	.00000	.0000	.000	—	——	——	534,403	518,947	518,960	518,947	1.00000	.00000
.200	.3442	.34497	.3343	.335	34	106,787	22,865	427,616	496,082	415,259	352,830	.67990	.20043
.400	.6884	.69509	.6685	.675	47	142,351	73,362	285,265	422,720	277,022	230,165	.44352	.40385
.500	.8606	.87015	.8357	.845	15	47,685	35,218	237,580	387,502	230,715	186,745	.35985	.50556
.600	1.0327	1.03491	1.0029	1.005	19	59,321	54,363	178,259	373,139	173,108	153,988	.29673	.60128
.800	1.3769	1.38503	1.3371	1.345	20	62,280	73,393	115,979	259,746	112,628	103,753	.19993	.80470
1.000	1.7211	1.72485	1.6714	1.675	13	39,768	57,162	76,211	202,584	74,009	74,930	.14439	1.00214
1.500	2.5817	2.57955	2.5071	2.505	17	50,727	104,945	25,484	97,639	24,748	33,800	.06513	1.49872
2.000	3.4422	3.44455	3.3427	3.345	4	12,599	35,545	12,885	62,094	12,513	18,992	.03660	2.00128
		6.18371	Over	6.005	4	12,885	62,094						3.60132
			Total	Total	173	534,403	518,947						

$$F = \frac{518947}{534403} = .9711 \qquad \text{Average Adjusted Expected Loss} = \frac{518047}{173} = 3,000 \qquad \text{Avg. Adj. Prem.} = \frac{3000}{PLR} = 5,164$$

NOTE: Except in very accurate work columns (1a), (2a) and (3a) are omitted and columns (1), (2) and (3) are used in their place. Although column (9) is usually calculated and used to obtain column (10), it should be noted that column (9) is not necessary as column (10) can be calculated as equal to (8) − (7)(3a).

sort of the cards and the calculation of the desired sorting limit. Resulting
x-ratios are then plotted against the actual loss ratio to which they corre-
spond and interpolated values read, from such charts of all risk size groups,
for the desired loss ratios.

Whenever it is necessary to make a wide grouping of risk sizes in order to
obtain a sufficient number of risks, the problem arises as to the effect of this
variation by size of risk. The above procedure produces x-ratios for the
observed distribution of risks. If the risks of any one size group were divided
into two sub-groups in some random fashion, two sets of x-ratios would
result, which frequently would be widely different. This only illustrates the
difference between the calculation of the actual x-ratios for a set of observed
risks and the estimation of the most probable set of x-ratios to use in the
rating of other risks or of the same risks in future years. To obtain the most
probable set of x-ratios for future use, some type of smoothing procedure
should be applied to the observed data.

One smoothing procedure of considerable value consists of the reference to
already smoothed values obtained from a much larger group of risks of vari-
ous risk sizes. Such values are available, for example, in the tables of x-ratios
for New York workmen's compensation risks prepared by the New York
Compensation Insurance Rating Board. Such a procedure will, of course,
include in the smoothing process any imperfections that were incorporated
in the table used for reference by the methods of its development.

The most important single statistic characterizing a set of x-ratios is the
second moment of R, $U_{2:R}$, of the distribution of risks which it represents.
Just as the x-ratios can be calculated from the distribution of risks by R, so
can the value of $U_{2:R}$ be calculated from the x-ratios. The formula for doing
this is based on the procedures of determining moments by successive sum-
mations and is:

$$U_{2:R} = 2 B \sum_0^\infty (x\text{-ratios}) + B - 1$$

$$\text{where } B = \frac{\text{class interval of the loss ratios in } x\text{-ratio table}}{\text{permissible loss ratio of the } x\text{-ratio table}}$$

For the New York workmen's compensation table of x-ratios

$$B = \frac{.010}{.598} = .016722$$

and the formula becomes:

$$U_{2:R} = .033444 \sum_0^\infty (x \text{ ratios}) - .983278$$

The values of $U_{2:R}$ calculated from this formula for the New York x-ratio
table are shown on Figure 3 plotted against the standard premium amount.
Thus the standard premium amount in the New York Table can be read for
any desired value of $U_{2:R}$.

FIGURE 3

STANDARD PREMIUM AMOUNTS FOR VALUES OF $U_{2:R}$

NEW YORK WORKMEN'S COMPENSATION INSURANCE

EXCESS PURE PREMIUM RATIO TABLE
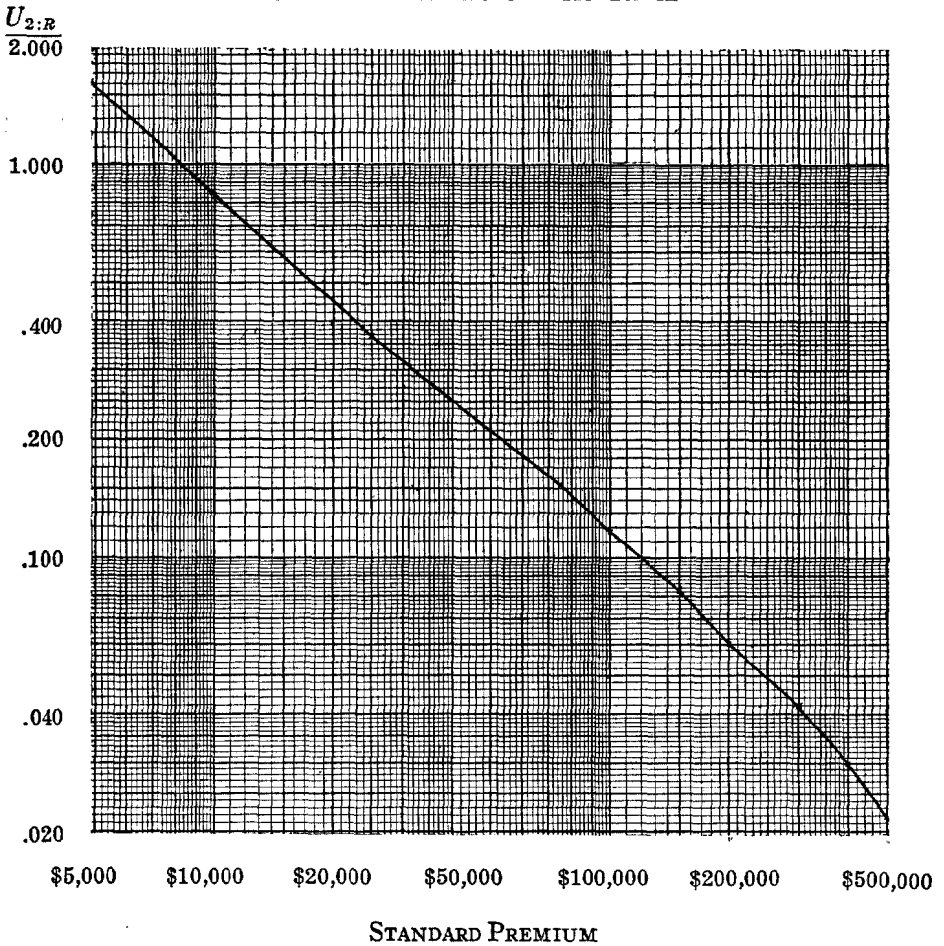
STANDARD PREMIUM

In the example we are using the value of $U_{2:R}$ was calculated from the individual risk values of R as .794. The equivalent standard premium amount from Figure 3 is \$10,500. The x-ratios obtained from the New York table for this amount are compared below with those calculated from Exhibit A.

		Excess Pure Premium Ratios		
R	Corresponding Loss Ratio $= R \times .598$	From Exhibit A	From N. Y. x-Ratio Table Prem. = \$10,500	Normal Logarithmic Freq. Distribution (See Following Discussion)
.34497	.2063	.680	.679	.687
.69509	.4157	.444	.448	.453
.87015	.5203	.360	.361	.366
1.03491	.6189	.297	.297	.301
1.38503	.8282	.200	.198	.199
1.72485	1.0315	.144	.141	.136
2.57955	1.5426	.065	.060	.055
3.44455	2.0598	.037		.024
6.18371	3.6979	.000		.003

The x-ratios calculated on Exhibit A or obtained on the basis of the moments of R do not correspond to any particular premium size, being only averages applicable to the range of risk sizes from which they were obtained. The importance of this is seen from the fact that such an average is always less than the true value of the x-ratio corresponding to the average risk size of the size group. An example using x-ratios from the New York table will serve to demonstrate this:

(1) Risk	(2) Premium	(3) Expected Losses .598 (2)	(4) x-Ratio for 100% Loss Ratio	(5) Expected Excess Losses (3) $\times$ (4)
A	5,000	2,990	.237	709
B	5,000	2,990	.237	709
C	10,000	5,980	.153	915
D	20,000	11,960	.109	1,017
Average	10,000	5,980	.140	837
True Value	10,000		.153	

There is no way of directly calculating the true x-ratios following any procedure such as that of Exhibit A. The proper correction can, however, be made in the determination of $U_{2:R}$ by obtaining its value from $U_{2: \text{(Corrected } x)}$ or from $U_{2:W'}$, as these functions are designed to provide the function of the average expected loss rather than an average function for all expected loss sizes in the size group. The value of $U_{2:R}$ determined from the W' moments is .883 in our example and corresponds to a standard premium of \$9,300 in the table of New York x-ratios. Estimates of the true x-ratios on this basis compare with the calculated values from Exhibit A as follows:

R	Corresponding Loss Ratio = R × .598	Calculated x-Ratios From Exh. A	Estimates of True x-Ratios	
			From N. Y. x = Ratio Table Prem. = \$9,300	Normal Logarithmic Freq. Distribution (See following discussion)
.34497	.2063	.680	.684	.688
.69509	.4157	.444	.458	.459
.87015	.5203	.360	.373	.375
1.03491	.6189	.297	.309	.311
1.38503	.8282	.200	.212	.212
1.72485	1.0315	.144	.155	.149
2.57955	1.5426	.065	.070	.066
3.44455	2.0598	.037		.031
6.18371	3.6979	.000		.004

The above smoothing procedure cannot be applied when it is known that the distribution of risks by R has a skewness widely different from that underlying the reference table x-ratios of the standard premium amount having the same $U_{2:R}$. It obviously should not be used to develop a new table of x-ratio values. An independent procedure making use of all known facts should be applied in the latter case.

There is one peculiar characteristic of an observed frequency distribution which should be recognized here. This is, that no matter how many observations have been made, there is always the possibility that the next observation will have a value greater than any yet observed. Similarly, for the loss ratio distribution, if no zero loss ratios have been observed, there is always the possibility that one will occur. The result is that any smoothing process applied directly to a frequency distribution will include the probabilities of more extreme cases occurring than any of those observed.

This same condition when followed through into the x-ratios will produce, from a smoothed frequency distribution, higher x-ratios than those observed for high loss ratios and usually higher values for the low loss ratios. Intermediate values of the x-ratios will be uniformly lower than the observed values. Such a consistent departure of the smoothed x-ratios from those calculated from observations should not be viewed with alarm but should be recognized as the provision against the eventual occurrence of extreme cases.

The normal logarithmic frequency distribution has been found to satisfactorily fit many distributions of R. In the particular case in hand this distribution fits very well as shown by the following:

Range of R	Actual No. of Risks	Expected No. Based on Normal Log. Freq. Distribution	$\frac{(A - E)^2}{E}$
0- .19	16	18	.22
.20- .39	27	25	.16
.40- .59	22	26	.62
.60- .79	29	23	1.57
.80- .89	19	18	.06
1.00-1.49	32	30	.13
1.50-1.99	10	15	1.67
2.00-2.99	13	12	.08
3.00 & Over	5	6	.17
	173	173	$\chi^2 = 4.68$

The value of 4.68 for Chi-Square, with $n = 6$ (obtained by subtracting the 3 parameters used in fitting the distribution from the 9 groups), represents a probability of between .5 and .7 that, purely as a result of chance variation, a divergence from the theoretical distribution as great or greater than that actually observed would occur.

This distribution, or any other providing a reasonable fit to the observed data, may be used to smooth the observed data prior to the calculation of x-ratios from the formula:

$$\chi_{(R', B)} = 1 - \frac{R - {}^{R}\!\!\int_0 {}^{t}\!\!\int_{-\infty} \phi_t \cdot d\,t \cdot d\,R}{V_{1:R}}$$

which gives the x-ratio, to be applied when $V_{1:R} = 1$, for values of R' equal to $\dfrac{R}{V_{1:R}}$. When the normal logarithmic distribution is used, the value of ϕ_t and ${}^{t}\!\!\int_{-\infty} \phi_t \cdot d\,t$ can be read from tables of the normal distribution directly, and the value of ${}^{R}\!\!\int_0 {}^{t}\!\!\int_{-\infty} \phi_t \cdot d\,t \cdot d\,R$ can be calculated from these by the application of the Euler-Maclaurin formula which produces:

$$^{R}\!\!\int_0 {}^{t}\!\!\int_{-\infty} \phi_t \cdot d\,t \cdot d\,R = \frac{w}{2} {}^{t(n)}\!\!\int_{-\infty} \phi_t \cdot d\,t + w \sum_0^{n-1} {}^{t(n)}\!\!\int_{-\infty} \phi_t \cdot d\,t$$

$$- \frac{.03619117\ w^2}{\sigma_e\,(R-a)} \phi_{t(n)} - G$$

$$\text{where } G = \frac{w}{2} {}^{t(0)}\!\!\int_{-\infty} \phi_t \cdot d\,t = \frac{.03619117\ w^2}{\sigma_e\,(R-a)} \phi_{t(0)} \text{ and}$$

where $t = \dfrac{\log_{10}(R-a) - l_0}{\sigma_e}$ and, a, l_0 and σ_e are the parameters of the normal logarithmic distribution, and where ${}^{t}\!\!\int_{-\infty} \phi_t\, d\,t$ and ϕ_t are obtained for values of R starting with 0 and increasing by intervals equal to w. Thus $R_{(n)} = 0 + n\,w$ and $t_{(n)}$ is the value of t corresponding to $R_{(n)}$.

The application of this procedure to the previously used data to obtain x-ratios is shown in detail in Exhibit B. The results for specific values of B, obtained by second difference interpolation from the values in Exhibit B, have been previously shown for comparative purposes.

In the above described processes the x-ratios are obtained on the basis that the difference between $V_{1:R}$ and unity, its expected value, is a significant difference that should be carried through as an adjustment to the entire distribution of risks according to R. That is, the factor $F = V_{1:R}$ has been applied to the unit of measurement and, in effect, enters as F^2 into the correction of $V_{2:R}$ and as F^3 for $V_{3:R}$. The actual facts of the case may be, however,

EXHIBIT B

CALCULATION OF EXCESS PURE PREMIUM RATIOS BASED ON BEST FITTING NORMAL LOGARITHMIC FREQUENCY DISTRIBUTION

(New York State Workmen's Compensation Risks — Premium Size Group \$4,000 to \$6,687 — Hazard Group 1)

(0)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
n	R	$R-a$	$\log_{10}(R-a)$	t	ϕt	$\dfrac{\phi t}{R-a}$	$\int_{-\infty}^{t}\phi_t \cdot dt$	$\overset{n-t}{\underset{0}{\Sigma}}\int_{-\infty}^{t}\phi_t \cdot dt$	$\int_{0}^{R}\int_{-\infty}^{t(n)}\phi_t \cdot dtdR$	$\dfrac{(9)}{V_{1:R}}$	Adjusted R $=R'$	Excess Pure Premium Ratios
	$=nw$	$(1)+.247609$	$\log_{10}(2)$	$.012562$ $+3.605605(3)$	From Normal Freq. Dist. Table	$(5)\div(2)$	From Normal Frequency Dist. Table	$\overset{n-1}{\underset{0}{\Sigma}}\ (7)$	$-.001305(6)$ $+.05(7)+.1(8)$ $-.000546$	$1.03222(9)$	$1.03222(1)$	$1+(10)-(11)$
0	.00	.247609	−.6062336	−2.173	.03763	.15197	.01489	—	.00000	.00000	.00000	1.00000
1	.10	.347609	−.4589089	−1.642	.10362	.29809	.05029	.01489	.00307	.00317	.10322	.89995
2	.20	.447609	−.3491012	−1.246	.18357	.41011	.10639	.06518	.01076	.01111	.20644	.80467
3	.30	.547609	−.2615294	− .930	.25888	.47275	.17619	.17157	.02480	.02560	.30967	.71593
4	.40	.647609	−.1886872	− .668	.31916	.49283	.25207	.34776	.04619	.04768	.41289	.63479
5	.50	.747609	−.1262255	− .443	.36165	.48374	.32889	.59983	.07525	.07767	.51611	.56156
6	.60	.847609	−.0718044	− .246	.38705	.45664	.40284	.92872	.11187	.11547	.51933	.49614
7	.70	.947609	−.0233708	− .072	.39791	.41991	.47130	1.33156	.15563	.16064	.72255	.43809
8	.80	1.047609	.0201992	.085	.39750	.37944	.53387	1.80286	.20594	.21258	.82578	.38680
9	.90	1.147609	.0597939	228	.38870	.33870	.59017	2.33673	.26219	.27064	.92900	.34164
10 etc.	1.00	1.247609	.0960785	359	.37404	.29981	.64021	2.92690	.32376	.33419	1.03222	.30197

$$V_{1:R} = .968786 \qquad a = -.247609$$
$$U_{2:R} = .745064 \qquad l_0 = -.003484$$
$$\alpha_{3:R} = 1.486148 \qquad \sigma_e = +.277346$$
$$w = .1$$

$$t = \frac{\log_{10}(R-a) - l_0}{\sigma_e}$$
$$t = -.012562 + 3.605605(3)$$

$$\int_{0}^{R}\int_{-\infty}^{t(n)}\phi_t \cdot dtdR = \frac{-.03619117w^2}{\sigma_e} \times \frac{\phi_t}{R-a} + \frac{w}{2}\int_{-\infty}^{t}\phi_t \, dt + w\overset{n-1}{\underset{0}{\Sigma}}\int_{-\infty}^{t}\phi_t \cdot dt - G$$

$$= -.001305(6) + .05(7) + .1(8) - G$$

$$G = -.001305(.15197) + .05(.01489) = .000546$$

that the observed difference between unity and $V_{1:R}$ is entirely the result of chance variations. Similarly the values of $V_{2:R}$ and $V_{3:R}$ used to fit the theoretical distribution are likewise subject to chance fluctuations. The results of these chance fluctuations are readily seen when the values of the x-ratios, for a particular loss ratio, are plotted against the average adjusted size of risk for several risk size groups. Whatever method of calculation of the x-ratios has been used, such a chart will show an appreciable variation about a trend. Rather than use some artificial method of smoothing these x-ratios by size of risk, it would seem more reliable to use the available knowledge of the functional form of the variation in the mutually independent statistics: $V_{1:R''}$, $(CV)^2$, and $\alpha_{3:R''}$. From the results of C-3 of Part IV we have that these statistics are functions of E of the following form:

$$E \cdot V_{1:R''} = A \cdot E$$

$$E \cdot (CV)^2 = B \cdot E + C$$

$$E \cdot \alpha_{3:R''} = D \cdot E + F \sqrt{E} + G + \frac{H}{\sqrt{E}}$$

where E is the expected loss and H and G are of least importance and should be disregarded unless a very large amount of data is available. In determining the parameters in these equations the observed values for the various size groups should be weighted by the number of risks in the groups.

When $V_{1:R}$ shows a consistent downward (or upward) trend as E increases, as often happens, the further problem arises as to whether such a trend should be recognized in the preparation of a table of x-ratios. If, for example, the table were to be used to experience rate all risks, it would be possible to have manual rates keyed to the level of losses of small risks and to include the credit (or debit) for the larger risks in the x-ratio table. The x-ratios in such a table would start at $V_{1:R}$ for a loss ratio of 0 rather than at unity. The usual procedure is for the rate structure to correct for any loss level differences by size of risk that are definite enough to be recognized. In that case, or if the table is not to be used for rating all risks, it is necessary to base the table of x-ratios on an adjusted value of $V_{1:R}$ of unity for all risk sizes and to carry this adjustment through into the values of E.

The procedure developed by Mr. Dorweiler consisted of smoothing the calculated x-ratios for different size groups by the use of an empirical formula having no a priori relationship to the expected form of curve, and then smoothing such values for a single risk size by the judicial use of a french curve. Such a procedure obviously cannot be used if the data is available for only a single size group. Such a method would also produce consistently too low x-ratios due to the use of uncorrected size group averages as pointed out above. Within the range of the majority of observations, the results of different types of smoothing processes would differ only slightly. Beyond the range of the majority of observations, all methods are subject to the dangers

inherent in any attempt to extrapolate. Thus, the values in any x-ratio table for loss ratios above which only a few risks have actually been observed should be used only in conjunction with an appreciable "balance for contingencies."

VII.

Two Kinds of Credibility

When two sources of experience indicate different values of a statistic (claim frequency, average claim cost, pure premium, or loss ratio), it is customary to use a weighted average of the two using "credibilities" as weights. Such credibilities are, or may be, designed to accomplish one but not both of two separate results. One type provides an average value which will not fall outside of a specified range of accuracy in more than a specified proportion of all cases as a result of fluctuations in one value due to chance only. This type might be termed the limited fluctuation credibility and is the type generally used in developing manual rates. The other type is that designed to provide the most accurate average of the two values irrespective of how much variation will result in the average and recognizing all types of variation in both of the individual values and not just the chance variation in one of them. This is the type of credibility that most actuaries have in mind in dealing with experience rating plans and which would be most effective if applied in retrospective rating plans.

A. The "Limited Fluctuation" Credibility

If the two sets of values to be averaged have the same average value, and if Z is the credibility given to the value which is subject to chance variation, then the variation due to chance in the weighted average will be Z times the variation due to chance in the value having such variation. If it is specified that $B\%$ of all cases may fall outside of the range to be specified, then the difference between the values in the $\left(\dfrac{B}{2}\right)$ and $\left(1 - \dfrac{B}{2}\right)$ columns of Tables 5, 10, and 11 of Part II give the range of variation of the statistic. Furthermore, if the specified range is to be $A\%$ of the average, then

$$A = Z\left[\left(1 - \frac{B}{2}\right)\text{Value} - \left(\frac{B}{2}\right)\text{Value}\right]$$

$$\text{and } Z = \frac{A}{\left(1 - \dfrac{B}{2}\right)\text{Value} - \left(\dfrac{B}{2}\right)\text{Value}}$$

where Z varies from 0 to 1.00.

It has frequently been prescribed in developing credibility formulae that $A = B = 10\%$. The following table shows the values of Z calculated from Tables 5, 11, and 10, respectively, with such specifications for each of claim frequencies, average claim costs, and for pure premiums or loss ratios. For comparison with these, credibility values are shown calculated from the formula:

$$Z = \sqrt{\frac{C}{C \text{ for } 100\% \text{ Credibility}}}$$

It should be noted that these credibilities for average claim costs, total losses, pure premiums, and loss ratios are applicable only to New York commercial automobiles—property damage coverage.

COMPARISON OF "LIMITED FLUCTUATION" CREDIBILITIES

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Number of Claims*	Number of Claims or Claim Frequencies		Average Claim Costs of a Fixed Number of Claims		Total Losses, Pure Premiums, or Loss Ratios	
	From Table 5	$\sqrt{\frac{(1)}{1,084}}$	From Table 11	$\sqrt{\frac{(1)}{3,520}}$	From Table 10	$\sqrt{\frac{(1)}{4,590}}$
1	.033	.030	.031	.017	.026	.015
4	.057	.061	.050	.034	.040	.030
10	.100	.096	.070	.053	.057	.047
40	.190	.192	.120	.107	.101	.093
90	.286	.288	.171	.160	.146	.140
160	.385	.384	.223	.213	.192	.187
250	.481	.480	.276	.267	.238	.233
360	.575	.576	.328	.320	.284	.280
490	.671	.672	.382	.373	.331	.327
640	.763	.768	.437	.426	.379	.373
810	.862	.864	.488	.480	.426	.420
1,000	.962	.960	.538	.533	.472	.467
1,440	1.000	1.000	.640		.565	.560
1,960	1.000	1.000	.746		.658	.653
2,560	1.000	1.000	.853		.752	.747
3,240	1.000	1.000	.959		.847	.840
4,000	1.000	1.000	1.000		.935	.934
4,840 & Over	1.000	1.000	1.000		1.000	1.000

* For columns (2), (3), (6), and (7) these are the expected number of claims; while for columns (4) and (5) they are the actual number of claims.

B. The "Greatest Accuracy" Credibility

In section I of Part I the least squares solution for Z in the formula:

True Inherent Hazard $= Z$ (Actual Losses) $+ (1 - Z)$ (Expected Losses)

was found to be $Z = \dfrac{U_{2:m}}{U_{2:R'}}$ where $U_{2:m}$ represented the second moment of all

types of variation of the actual losses from the expected losses except that due to chance, and where $U_{2:R'}$ represented the second moment of the ratio of actual to expected losses. In the notation of Part IV we would have:

$$Z = \frac{U_{2:R''} - U_{2:R}}{U_{2:R''}}$$

where $U_{2:R''}$ is to be *calculated from the data to which the credibilities are to be applied* as outlined in Part V and where $U_{2:R}$ is to be calculated from the moments of the distribution of claims by size of claim for the same data from the formula:

$$U_{2:R} = \frac{1}{E} \cdot \frac{V_{2:x''}}{V_{1:x''}}$$

One very important point in regard to this type of credibility is that it does not always or even usually have the range of possible values from 0 to 1.00. One extreme case is where the "expected" losses are those based on one year of actual experience and the "actual" losses are those of another year in which all elements of exposure and hazard remain unchanged. Under these conditions Z would be .50 irrespective of the value of E. In an application to New York commercial automobile property damage experience of individual risks, a minimum credibility of approximately .30 and a maximum credibility of approximately .85 have been developed. This only serves to remind us that, no matter how little experience is available for the most recent period, it is worth looking at and considering and, conversely, no matter how much recent experience is available, it is worth giving some consideration to the past experience.

From section C-3 of Part IV we would evaluate Z as:

$$Z = \frac{\dfrac{V_{1:M}}{V_{1:B}} \cdot \dfrac{V_{2:x''}}{V_{1:x''}} + U_{2:M}(1+V_{2:m'}) + V_{2:m'}(1+V_{1:M})^2}{U_{2:R''}}$$

or, if adjustments have been made to eliminate rate level differences,

$$Z = \frac{U_{2:M} + V_{2:m'} + U_{2:M} \cdot V_{2:m'}}{U_{2:R''}}$$

for individual risk experience or

$$Z = \frac{U_{2:M}}{U_{2:R''}}$$

for classification experience. In reviewing these formulae, it should be borne in mind that $U_{2:M}$ may vary by size of classification and $V_{2:m'}$ may vary by size of risk.

The most important feature, however, is that this credibility will be greatest when the new experience differs most from that underlying manual rates: that is, when there is the greatest need for a revision of rates, and will approach zero when the new experience evidences only chance variation from that underlying the existing rates.

ABSTRACT OF THE DISCUSSION OF PAPERS READ
AT THE PREVIOUS MEETING

AN APPROACH TO A PHILOSOPHY OF SOCIAL INSURANCE

JARVIS FARLEY AND ROGER BILLINGS

VOLUME XXIX, PAGE 29

WRITTEN DISCUSSION

MR. W. R. WILLIAMSON:

This thoughtfully prepared paper from two Health and Accident students is of particular significance in any discussion of the current Wagner-Dingell Bill.

It has set me to a reconsideration of the phrase *social insurance* and to re-examining, with the help of the Beveridge and the Marsh Reports, the area commonly signified by "social insurance." In a paper presented to this Society in 1938, I adopted the phrase *"social budgeting."* I did so after reading the P.E.P. Report on the British "Social Services," published in 1937. I have tried to change *"budgeting"* to *"insurance."* I have recently gone back to "budgeting." *Insurance* seems to me to carry with it too many of the overtones of *savings* which have become attached to the word *"insurance"* in the conduct of the business of life insurance and annuities. *"Social Budgeting"* on the other hand lays fairly equal emphasis upon the securing of funds and upon their expenditure in behalf of the beneficiaries, covering benefits and the administrative costs. *Insurance* as handled through individual contracts commonly requires methods of individual selection; commonly results in declinations which reduce the area of effective protection. The administration of the social services commonly included in the phrase "social insurance" involves in many respects the sense of risk distribution and risk sharing carried by *insurance* generally. I believe their full purpose, however is not served when they fail to budget for the risks which have already occurred, when they fail to deal with those very situations which had called for the social planning. The very use of the word *"insurance"* has seemed to exclude too many beneficiaries. It seems to have been utilized when the community dealt only with the group of industrial workers. It seems not quite adequate to the situation when the community deals with all its citizens, as do Sweden and New Zealand already and as England and Canada are asked to do in the plans of Sir William Beveridge and Professor Marsh. I like to think of the *budgeting* as following the precedent of our educational system, where we plan on a reasonable amount of education for *all* our children and not for the children of individuals with sufficient attachment to the labor market, or for the children whose parents earn less than a given sum per annum. *Budgeting*

appears in the "Approach" in the method of allotting a certain number of work-hours per week to meet the costs of the benefits.

In the "Approach" are a vigorous faith in the workability of private enterprise under the dynamic direction of Adam Smith and his legitimate successors, great confidence in the effectiveness of the profit motive, and a tone of despair concerning that cooperation which is Government. With the emphasis upon the word *"insurance,"* social insurance is rather thoroughly discussed as a competitor to private insurance. While I share the two authors' belief in private enterprise, in the probable wisdom of setting limits to the scope of Government, in the need of a sound apprenticeship for those who are to perform any skilled service for society, yet I have come to think of these social services as something very peculiar, something most difficult to pigeonhole, and inadequately defined as "another insurance."

I question the implication that for these social services, the choice is quite a free one as between Government administration and private administration. Those of us who have watched the development of the group insurances saw their establishment as virtually inescapable, and early recognized that they were not, in the main, competitors of individual life insurance. Rather they filled a vacant niche in the insurance structure. They added to the effectiveness of the whole insurance enterprise. The concomitant growth since 1910, in Ordinary insurance, in Group insurance, and in Industrial insurance has been very striking.

The Farley-Billings paper is the expression of an informed opinion by two men in the Health and Accident field. So much of social security discussion up to date has been limited to old-age and survivors insurance and that problem child, unemployment insurance, that I occasionally have to force myself to remember that a "unified social security program" includes also various forms of Health and Accident protection—that it ranges from cash benefits for temporary and long-range disability to the furnishing of the costs of medical care including hospitalization, dentists', doctors' and surgeons' fees, nursing and pharmaceutical supplies. Possibly the authors are fundamentally thinking of these health areas as they build up their story. Here there are difficulties in establishing such a floor of protection as seems so simple in old-age and survivors insurance. In the expansion of the health and accident benefit scales in the Wagner-Dingell Bill there seems to be little scope for a supplementation through private insurance companies. It may well be impossible to discuss over-all effective social security in the abstract. It may be necessary to deal separately with each of the services, the better to orient them within our existing economy.

I envision a conscious outgrowing of that sense of defeat that has accompanied the depression years. Cooperation will win the war. Toward that purpose we have allocated and will continue to allocate through sound bud-

geting, both the financial and the labor reserves essential to the job. After the war, I expect an almost overwhelming willingness among our citizens to pool enough of our joint resources to meet "presumptive near-subsistence need" in old age, in chronic disability, in orphan childhood, in widowed motherhood. These are catastrophic contingencies. They represent individual situations now with us. To focus attention upon what this could mean, I will bring in some illustrative figures as to what our current situation may be.

We may shortly have 65 million gainfully employed persons in the country and on the farflung battle lines, 54 millions in civilian employments, 11 millions in military employments. This is our working productive organization, though much of the product is destruction.

There seem to be some 6 million individuals aged 65 or over who have no current attachment to the labor market. They are either retired from work, or are the wives or widows of those who have retired. There are, I believe, 2,250,000 paternal orphan children below the age of 18 (there is, of course, a large amount of current work being done by the older children, but I will leave them in the total beneficiary group just the same). There may be 1 million widowed mothers—many of them engaged in full-time or part-time employment. I am not sure just how to define "chronic disability"—the attempt is marked by all sorts of difficulty—but let us say that there may be 3,750,000 persons past the age of 18 and under the age of 65, who believe themselves currently unable to work and have been disabled for a long time. Some of the miracles of getting such persons back to work are extremely heartening. Not counting upon such miracles to reduce the claimants, this beneficiary group adds up to 13 million persons "presumptively in need." This is one-fifth of the 65,000,000 workers. The level of benefits under our public assistance and our old-age and survivors insurance programs is below $250 a year per person. Using that level as a reasonable "rule of thumb" to measure near-subsistence, the yearly cost for such benefits for the unlucky 13 millions would be $3,250,000,000. At $30 a month or $360 a year it would cost $4,680,000,000. Against a yearly budget for national income of 100 billion—much lower than our current national product—the lower figure requires an allotment under social budgeting of $3\frac{1}{4}\%$. This figure is less than our combined expenditure upon liquor and tobacco. The higher figure is less than 5%. I believe that we could expect that much joint responsibility among the citizens; that we could pay for it; and that we could do it federally.

Among what might be called the social services are education, diagnosis of personal aptitudes, rehabilitation, and placement. Before even discussing benefits for disability, I should like to say that I am fully cognizant of the wisdom of an enlarged educational organization, with an emphasis upon adult education; upon that service which is evolving under the exigencies of the

war of measuring each person's aptitudes and directing him toward the most constructive types of employment. I am familiar also with the striking work in preventive medicine which is being handled by the Public Health Service and would like to see a similar preventive service to minimize wrong occupational alignments. These are superior services to the compensation for job loss and should be worth the sums we allocate to them. Such outlay might well help to reduce the cost of ameliorative and compensatory expenditures.

As against the catastrophic situations of jobless old age, chronic disability, orphan childhood, and widowed motherhood, there are small, cumulative expenditures required by the less serious spells of sickness and unemployment, and minor portions of medical care and hospitalization. There are occasionally large expenditures for medical care, serious cases of disability, long periods of unemployment. In the analysis of these widely varying needs, in the development of frequency distributions showing the range from the trivial to the extremely serious, the Health and Accident profession could present sound advice to those in the social budgeting field. There is the need to know much more as to the impressions and the facts. Coordination between life insurance and annuities both on the individual and group bases, and the services for catastrophic conditions under social security has seemed simple. Coordination of social and commercial benefits will be a little harder to arrange in this disability field. It seems probable that a floor of protection can be devised for administration under a social budgeting project, either at the Federal level, or at some lower level, such as the State, or the county. In reading many of the reports of the Gallup and the Fortune polls, I have frequently wondered as to the adequacy with which the questions are phrased. The replies, however, show a considerable interest in social budgeting for disability.

I am in complete accord with the suggestion made by the authors that it will be easier to allocate provision from wealth than from poverty—but human brotherhood can exist under both conditions. I question the implication I find here and there throughout the paper that we can postpone dealing with actual need among those who have catastrophic needs today until we have organized society at a higher plane. It would be wiser for us to set social budgeting benefits safely low, both from the standpoint of reasonable finance and from the social usefulness of preserving a marked incentive to return to work, and to supplement the floor of protection thus established by individual or group thrift programs. Simplicity, understandability, must mark both the benefits and their financing.

"Bargains" are commonly disappointing. Subsidies, like weasel words, are Janus-faced. I like to think of joint *responsibility* coordinate with *rights*. I prefer to think of a *responsibility* that challenges the citizen to greater efforts rather than a *grant* that encourages him to reduce his output. Social budget-

ing need over-emphasize neither the *giving* nor the *getting*. It is but enlight-
ened bookkeeping.

Such bookkeeping under Government administration, meeting the desires
of the citizens, may promote coordination of the Government and such admin-
istrators of group, wholesale, and individual insurances as are equipped to
cooperate. I expect the profit motive to continue to function. I do not expect
the Government to delay its plans for a generation, until all individuals may
become fully cared for under the existing organizations.

I do not recommend protecting the citizens from securing a fair knowledge
of what they may be "in for" when social budgeting gets under way, nor do
I see why they should wait until "they know all." Under such caution mar-
riage would be impossible, new enterprises would not arise, the spirit of
adventure would die. The times are auspicious for more pioneering, not less,
more enterprise, more effective American ingenuity.

WRITTEN DISCUSSION

MR. ROBERT J. MYERS:

Messrs. Farley and Billings have contributed a most thoughtful paper out-
lining their philosophy of social insurance and the role of Government. An
individual's philosophy, just as his politics and religion, is traditionally im-
mune from criticism, but I should like to take the liberty of setting forth a
bit of my own philosophy in those instances where it differs greatly from
theirs.

The authors raise the issue in connection with extension of the present
coverage of social security that there is the difficulty of obtaining complete
compliance of premium payment from the present non-covered groups. The
point is well taken considering the present foundation of wages being the
basis of taxes. But a universal benefits plan with flat or uniform payments
and general financing by the entire nation (by income tax, sales tax, or any
other general taxing basis) would not run into any such difficulties; thus
benefits would be paid to all individuals who met certain qualifications such
as retirement from gainful work after age 65, orphanhood, aged widowhood,
etc., without regard to their having paid any specific taxes or contributions
since as working members of society they would either directly or indirectly
have shared in support of the program. In other words, the authors have
considered only the question of whether it is possible to build additional
stories onto the present social security structure without considering the like-
lihood of rebuilding the edifice from the foundations up.

I must take serious issue with the authors' belief that agencies of democratic governments cannot be thoroughly efficient or, conversely, if they are efficient, then we do not have democracy. This philosophy seems most unfortunate since according to its terms, no matter what the civil servant did he would be wrong. If an agency or in fact the entire group of agencies of the Government operated inefficiently, they would obviously be subject to criticism, whereas, on the other hand, if they were highly efficient they would have overthrown our democratic form of government! I do not believe that the authors have given sufficient proof of their point just by stating that in the past Government agencies have not been efficient and therefore that this will indubitably hold into the future. In the past decade the quality of Government service has improved drastically, and it is to be hoped that this trend will continue as more attention is paid to getting and holding good men in the service. For instance, the newly instituted courses in government administration in many universities will contribute materially to such improvement. An attempt to attract men from private business by paying them more nearly the level of salaries paid by business would seem to be desirable.

Throughout the paper the authors emphasize the cost aspects of social insurance and the fact that additional availability of benefits means added costs. While in the great majority of instances this may be so, there should always be kept in mind the counterbalancing effect of existing programs which could be lessened or scrapped. Thus for instance, as against the apparent cost of a universal pension plan there would be a number of "savings" from such sources as public assistance, private charities, individual provision for old age income, and family support of the aged.

Next, considering the question as to the advisability of disability insurance administered by the Government, the fact that other countries have had such programs in operation for years does really seem to be an important item. We should perhaps take a lesson from them and have our benefits at a very low level, at least until we are certain that the program can be efficiently and socially administered. The authors' argument that men who know the disability insurance business seriously question the possibility of successful Government operation is not necessarily final. After all, it seems likely that the individual operators of such now widely accepted public functions as education and mail delivery also seriously questioned the Government's ability to conduct such businesses.

The authors wisely trod lightly and rapidly over the quicksands of the socialized medicine argument, which could well bring forth reams in itself. I will limit myself to the one remark that the doctors' argument that it would cause actual deterioration of the quality of medical care seems hypocritical. (Do we as actuaries feel that we are rendering inferior technical service because we are on salary rather than individual consultants?)

In my opinion there is little valid argument for the indefinite maintenance of fifty-one different unemployment insurance systems. Once again there comes a conflict of the authors' philosophy and my own. I feel that there would be continuing efficiency from centralization where only relatively few high calibre men are needed for successful operation, whereas at present there must be at least one such person for each of the fifty-one agencies. Turning aside to the field of private insurance, would not many problems be simplified if there were only one regulatory body instead of the forty-nine state ones now in existence, many of which are at best impotent and at worst bungling because of a failure to employ skilled administrators. Let us not forget that only a few short years ago many insurance companies were heartily in favor of federal supervision of insurance.

Finally, I would like to discuss a bit of general national economics. The authors state that the repayment of the national debt caused by the war or else its servicing will require that all of us will have to work several hours more each week and that, moreover, in order to achieve a higher standard of living we can not have any thought of even as little as a 40-hour work week. First, considering the financing of the war, I do not see that we will necessarily have to work longer in the future to pay for the cost of today's war since in the aggregate we will only be paying the money to ourselves. The war is actually being paid for currently; the extra hours now worked and the extra raw materials now consumed are the cost of the war, and not the bonds being purchased. The authors' argument is exactly the reverse of that frequently appearing in advertisements that after the war is over everybody can cash in their bonds and buy the good things of life, all without any regard as to where the money is coming from. It certainly seems elementary to me that in the aggregate the redemption of the war bonds will largely go for the taxes to redeem them. Second, considering the argument that we will have to work long hours for many years to come, I am of the belief that the heights of efficiency to which we have come during the war years will enable even greater peacetime production efficiency so that with a short work week we can turn out tremendous amounts of goods and that we will need such a short work week to provide long after-work leisure to enjoy all the fruits of our production. Just as a nation can oversave (consider the effect of an extreme case in normal times where everybody decided for a whole month to spend no money whatsoever except for minimum food needs; without strict government controls a terrific depression would ensue as a result of overproduction), so can it overwork by producing items that it has no time to use. Somehow or other in my envisioned post-war utopia there must be developed methods for harnessing those two all-powerful items, superefficient production of which we are capable, and widely distributed consumption of which we are all in favor.

MR. C. A. KULP

The paper of Mr. Farley and his colleague Mr. Billings in *Proceedings* No. 59 presents a thoughtful and statesmanlike analysis. It is the more significant and welcome because it comes from men engaged in the insurance business, a group up to now all too rarely represented in serious discussions of social insurance matters. One can comment only with approval on the breadth of the authors' approach to these complex and pervasive economic and social issues; on their insistence on the responsibility of the citizen for sound decisions on these issues and on the obligation of our national (that is our political) leaders to handle them honestly and thoughtfully. That the authors, in the nature of the case, give us a counsel of perfection makes the counsel not a bit less valuable. Some of the difficulties in the way of intelligent citizen participation in a discussion of social insurance questions, as will be evident in the following discussion, arise from the fact that men do not agree readily, or indeed ever, on matters of philosophy. Even if those who think about social insurance most and soundest (by their own standards at least) should come to agreement, there would still be the very considerable task of transmitting and translating their ideas and recommendations to the rest of the nation. The difficulty here is that social insurance is not a simple idea or a simple institution. To master the problems of American social insurance is a task as great, as the authors suggest, as to master those of American democracy itself.

Take first the matter of achieving even minimal agreement on a philosophy of social insurance. Their definition (and mine) of a philosophy emphasizes a "consistent personal attitude." It requires that opinions be based on observation and sound reasoning but it is axiomatic that their observations and mine frequently may lead us to quite different conclusions and what is sound reasoning to me may be so much twaddle to them. Or vice versa. The standard of common sense is even more subjective. This comment on the nature of a philosophy does not make a philosophy the less important; it emphasizes that a philosophy is essentially personal and therefore non-universal and always debatable.

The formulation of a philosophy requires a statement of basic premises and even before this agreement on a set of definitions. It is here that the philosopher must guard most carefully against identifying his subjective judgments with universal principles. There is the basic question of the proper role of private enterprise and of government. There would be far from universal agreement for example "that government agencies cannot create an economic value as cheaply and efficiently as private enterprise" (p. 38). It is hardly fair either to say that "agencies of democratic governments have not been and cannot be truly efficient." The comparison, even limited to relative administrative performance, does not always result in a

decision for private management. (The authors incidentally do not limit the efficiency test to administration [p. 37].) Efficiency is a relative standard, even in private business; in terms of the objectives of a social insurance system it is a standard too narrow and too shortsighted. The test of efficiency when applied to social insurance institutions needs perhaps to be redefined and broadened, as the authors themselves suggest when they conclude that "private enterprise . . . is not as well equipped to define social sins and to police the maintenance of social responsibility" (p. 41). The authors in fact agree with critics that private workmen's compensation carriers "have failed to appreciate the social viewpoint" (p. 40). Their proposal is not however to turn both administration and social control over to the state but to have private enterprise and the state share the responsibility between them. The difficulty here arises of course when "the discipline" supplied by the profit motive and the government's social responsibility for wider objectives prove in practice irreconcilable. Practically for example private workmen's compensation carriers and self-insurers fail and fail to pay benefits to injured workmen and their dependents. Solvent carriers provide every possible variety of administrative performance. The impact of this uneven company performance on overall policy is evident. The point is not that state workmen's compensation funds cannot fail or have not failed, or that the state in this field has a perfect record as insurer or social guardian. The point is that this recommendation of the authors casts the state almost inevitably in the role of supernumerary.

This tendency of the authors to apply the standards of private business to a social insurance organization, it should be added, has another element of unfairness to a state-administered plan. It leaves entirely out of consideration those aspects of insurance administration in which the state has the advantage. The discussion on page 41 for instance gives the impression that only private administration can successfully underwrite the disability hazard, particularly the long-term. Actually the advantage here, if the experience of the rest of the world means anything, is with the government carrier. We agree with the authors that conditions elsewhere and here are different. But to conclude against state operation, omitting reference to the immense advantage of the state in this field in its freedom from selection, is to omit for consideration of "the man who if forming his opinions" (p. 46) on this subject the most important single underwriting factor.

A philosophy is all compact of subjective judgments and it surprises none, I hope, to discover evidence above that subjective judgments differ. These judgments are after all carefully discussed and their bases exposed for analysis and criticism. Harder to put the critical finger on are the rather numerous evidences of standards not only subjective but implicit and even moral or ethical. Obiter dicta are more dangerous even for actuaries than for

judges. An actuary may be ethical of course but the level of analysis is hardly raised by such casual analagies as that on page 36 in which "proposals for the government's entry into any field . . . might prove to be akin to the coming of inflation or the creation of a drunkard. . . . The insidious gradual onslaught may be called the "disease of inflation or alcoholism; and similarly 'just a little socialism' can develop unexpectedly the disease of socialism." This is hardly argument on the issue; and in any case socialism no longer has the punch it had for our ancestors. "Socialized medicine" (p. 43) is more effective, but is not the name of an institution or an idea but an epithet hurled at compulsory medical benefit insurance.

I hope this will prove the first of a series of contributions to the *Proceedings* on social insurance issues from those engaged in private insurance administration. In some ways unfortunately, it is already late for study and discussion. The social insurance system seems to set early and set hard and we have had a going federal concern for eight years. But our system is not yet complete and social disability insurance is still in the talking stage. For once let the experts of every persuasion say their say before decisions are irrevocably made.

AUTHORS' REVIEW OF WRITTEN DISCUSSION

We want to thank those who took part in this discussion of social budgeting (we like Mr. Williamson's phrase).

The discussions have been especially concerned with benefits which might be obtained for society from a sound system of social budgeting. Most of these benefits are not controversial if the system is sound. We accept the objectives as part of our hypothesis, and in our approach to the problem we have tried to study as searchingly as we were able some of the major facts and difficulties which must be faced and overcome if the objective is to be reached. With the benefit of another year of thought and discussion, we shall use this review as an opportunity to summarize our thoughts.

We believe that true social security will come not from any device of social insurance alone, but rather from the underlying economy. There is general agreement that the highest social security of all is that which comes from working in a productive and interesting job, and that the first step in providing social security is to create conditions in which our economy can become and remain efficiently productive. Such an economy produces the highest volume of those consumer goods and services which make up the material part of our living standard, and such an economy also tends to

distribute its products to the member individuals by the most efficient and logical route—productive employment.

Social measures—whether assistance or insurance—enter the picture only to catch up the loose ends of distribution which exist even in the best economy. When a man is truly superannuated or truly disabled, or when he becomes one of the unfortunates for whom the economy seems temporarily to have no job, then the normal methods of distribution do not work for him and we must find another way to provide for him a minimum subsistent income. We are trying to do that now by charity and relief. When the economy has an ample margin of production over subsistence it can afford to adopt more generous or more ambitious social measures; but it is the sound economy which creates the margin which makes these measures possible. Social insurance can pick up the loose strings of distribution which the ordinary methods of distribution—normal employment—leave untied, and thus it is one way of preventing *manifestation* of want. But social insurance cannot by itself prevent the *causes* of want, and to expect that is to ask it to do a job far beyond its power.

No social measure can bring about the sound economy. The economy must come first; and if there is any feature of the social insurance system which saps the vitality of the economy, then to that extent the system defeats its own purpose. If the economy is made less efficient, in the engineering sense, the same amount of effort put in will produce a smaller end product, and it is that end product which determines our standard of living and our degree of true social security. Social measures can help to distribute the product more fairly; but if in doing so they create conditions which cut down the amount to be distributed, the net decrease in production may more than offset the unquestioned advantages of better distribution. That is a real element of social cost which no realistic social program can disregard.

As we studied the underlying philosophy we came to believe strongly that the highest measure of social security can be won only by placing our trust in a sound economy of free private enterprise. It seemed to us that an unwise social insurance program might very easily create conditions which could seriously impair the efficiency of the economy. Present proposals seem to go hand in hand with an intent to stabilize the economy through government planning and management. Any general substitution of government controls for free private enterprise, however much it might help in solving problems of distribution, would substitute problems of production which, by cutting down the total product to be distributed, would leave us farther than before from true social security. A man in Washington is much the same as a man in business. Both can be motivated by conscience and honor, or by greed. Both can be lazy. But the business man has the spur of competition —of the *necessity* to be reasonably efficient or lose his shirt. The man in

Washington lacks that spur. The business man is subject to the police action of government—but who can effectively police the non-elected government administrator? We believe that government is necessarily, by its very nature, less efficient than private enterprise, and to that extent administration by government agencies may be a much more costly way of doing a job than administration by an agency which is subject to the profit motive.

We believe that centralization of a tremendous amount of economic power in Washington has long-run political dangers which carry a very serious threat to the efficiency of the private enterprise system, if not to its very existence. On a University of Chicago Round Table broadcast recently three prominent tax experts and economists agreed that our post-war federal budget might well be at least twenty-four billion dollars, *before* provision for veterans' compensation or military establishment or international commitments—and before social security payments. It will require a very productive economy to support any such budget, unless the burden of the nation's debt is reduced by inflation or by some direct means of repudiation. If we add the taxes to support a complete federal system of social security benefits, *then the spending of thirty to forty percent of our national income will be controlled by the administration in Washington.* Even assuming that the entire cost of the social security program was merely a transfer from present methods of meeting social cost—that is, assuming no net increase in social costs—such a concentration of power, by itself, should make us pause. That is a lot of power and responsibility to put in the hands of any group of men. Any such concentration of power in Washington might work passably as long as those who held the power were honest, able and intelligent men, but would be disastrous if the power came even for a short time into the hands of stupid, selfish or unscrupulous men. We find it hard to believe that in the long run such men would never reach Washington.

We believe, further, that any system imposed on the people from above rather than adopted by the people themselves after full discussion would be, in effect, a denial of the very democracy which we are fighting to maintain. The strongest statement in the whole Beveridge Report appears at the beginning of the last paragraph: "Freedom from want cannot be forced on a democracy or given to a democracy. It must be won by them." A part of the process of winning freedom from want is full public discussion. Such a discussion, if the leaders are temperate and intelligent, can bring about a major advance in democratic education. One of the objectives is a healthy, vigorous and enlightened citizenry; but such a citizenry is not to be developed merely by enacting a social insurance law. It is developed by discussion, by education, and above all by hard, productive, efficient work.

We believe that all these problems vitally affect our chances of attaining true social security—and these beliefs we tried to express in our paper.

The discussions noted the paper's emphasis on cost and on economic aspects. One reason for that emphasis is a distrust of the philosophy of those government officials who have most to do with developing government economic policies and government social policies. There are influential groups who would have our government put too much weight on its own economic influence and not enough weight on the constructive forces of natural human instinct. In that respect we are today approaching a position very much like that of two hundred years ago. Two centuries ago the barriers which government imposed against normal incentives held down economic development until they were broken by the forces of which Adam Smith was the intellectual spearhead. The breaking of the barriers made possible the Industrial Revolution and tremendous increases in the living standards of all. In recent years our economic development has again been hampered by artificial government-imposed barriers. Some of them, like tariff walls, have been imposed at the insistence of business men themselves, but they are none-the-less harmful. We cannot return to a laissez-faire economy; we do not need to do so. Continual government policing is necessary. It is widespread government intervention in business policymaking and business administration—as distinct from policing—which can bring unfortunate results. Not until we have less government intervention in these respects, rather than more, will society be able to realize the potentialities of free private enterprise. If that time comes, if we successfully shoulder the burdens of post-war reconstruction and readjustment, if we establish the atmosphere of reasonable confidence and understanding between the leaders of labor and management which alone can restore the political feasibility of rebuilding our economy around the profit motive, then we can approach the problems of social insurance with real hope of building a sound social security program.

Unless we can do those things to a reasonable degree there is not much basis for optimism toward our future. We fear that the theme-song of a managed economy would come to be, "I'd rather have a paper doll to call my own than have a fickle-hearted real live girl." We might achieve a sort of paper doll security, but we seriously doubt whether that sort of security is enough to induce our nation to give up all chance of winning the affections of a real, live economy, even if slightly fickle-hearted. For these reasons we are concerned first with the economic question rather than with social insurance problems. If we can have a sound economy, then we can consider how to have a sound social insurance program; but if there is doubt about having a sound economy then we want to concentrate our attention on the economic issues. To us, the foundation of economic policy must be laid on reasonably sound lines before we have very much interest in social insurance. That is not to say that some reasonable form of social insurance might not make even an unsound economy more bearable; but our interest isn't to put

salve on a sick system—we want to see the system reasonably healthy so that it can enjoy healthy pleasures.

The concept of "sound economy" is so important to this review as to call for special discussion of what these words mean to us. Nowhere have we used the phrase "sound *and prosperous* economy"—certainly not in the sense that there must be permanent prosperity without any thought of depression. There will always be economic fluctuations. The important thing is that the general framework of the economy, through good times and bad, be based on constructive recognition of what it takes to make the economy click.

In giving our opinion of a sound economy we would start by recognizing the profit motive, with all its good and bad aspects, as the foundation. The touchstone of economic policy would be the stimulation of the good aspects and the discouragement of the bad. Profit is essentially a selfish instinct, and where there is selfishness there can be abuse of the rights of others. The most important deterrent to such abuse is a general spirit of fair play and confidence. A democracy can't work—either economically, socially or politically—unless that spirit is an integral part of the life of the people. That spirit must be supplemented by the police action of government, but sound police action will make the fullest possible use of the ingrained integrity and mutual confidence of the citizenry. A government policy which tends to divide one faction against another—which tends to decrease rather than increase the confidence and respect of one citizen for another—is unsound and dangerous; and that is one important test of policy.

If the rights of others are protected it is rather hard to think of a way for a man to benefit himself without at the same time benefitting others. That is one of the major strengths of the profit system; and subject to the necessity for police action, sound government policy will avoid interference with the individual's efforts to benefit himself. Every time a Ford or an Edison or a Steinmetz is discouraged from following his self-interest—still recognizing the necessity for policing—the people as a whole are the major losers. Our federal tax policy is coming to be recognized as being extremely faulty in this respect. Further, whenever a decision of business judgment is made in Washington rather than by the man whose interest is directly affected the people are apt to lose rather than to gain. The SEC and the ICC, for example, contribute to well-being when they protect the people against the adverse effects of unfair competition or monopolistic rate making or misrepresentation of financial data, but there is more doubt about the benefits of their functions when they presume to decide whether or not railroad rates should be changed or whether a given company should use a bond issue or a stock issue to readjust its financial structure. Admittedly there is difference of opinion over where policing stops and business judgment starts, but we would put the burden of proof on those who would substitute the judg-

ment of any government employe for that of the parties affected in any matter of business policy.

It seems to us that the fundamentals in determining government policy —whether it be tax policy, labor policy, or whatever—are to keep responsibility for making decisions as close as possible to those who will gain or lose from the results of those decisions, and, by acting as referee when necessary, to foster the highest attainable degree of mutual confidence and respect among the people.

This sounds like standard classical economics, and that's just about what it is. Economics, like law and science and social customs, can be brought up-to-date to meet changing conditions. We do not need to accept every comma of Smith's or Marshall's writings as final, complete gospel, nor are we forced to the alternative of those Continental schools of economic thought which have contributed so much to economic thinking in Washington today. We have not observed that the results of the social and economic policies of any other country have been so superior to ours as to cause us to scrap ours and adopt theirs.

The thing which we fear most from present attitudes is that the social program would be part of a broad program characterized either by failure to comprehend the importance of the economic organization or by mistrust of the part which the profit system plays in maintaining a constant upward pressure on the standard of living. If we can have a social insurance program which avoids the dangers of federal centralization, a program which is not associated with a policy of handcuffing initiative and which has reasonable safeguards against damaging raids by organized minorities, then we could favor such a program. We will not have it overnight. Admittedly we won't make much progress if no one ever takes a step that he's not completely sure of in advance; but on the other hand progress would be rather uncertain if we refused to wear anything but seven-league boots. We need to prove our ability to digest our present program before we take major new departures.

We heartily mistrust hopeful wishing as a basis for action. Certainly there should be hope in all we do, but hope can burn higher if the preparations have not ignored considerations of cost and of difficulties to be overcome. Beveridge said, "Winning it (freedom from want) needs courage . . . to face facts and difficulties and overcome them." We have no confidence that the present proposals are based on any such facing of facts. In other words, we sympathize strongly with the goal but we heartily distrust presently proposed methods to reach the goal. We would try methods which might go under the same name but which would put a greater over-all reliance on individual initiative, supplemented by a more realistically designed program of social insurance than any yet proposed from Washington. A recent Fortune Magazine poll spoke of "cradle-to-grave security" as

having "about it something puling, something unappetizing and unenter-
prising", connoting "a sticky official solicitude toward babes-in-arms and
senile rocking-chair sitters—and everyone in the able-bodied years between".
It's that "puling sticky attitude" which we particularly deplore as leading to
the paper-doll brand of security. That attitude isn't necessary to social
insurance. If it can be washed away and the program reset in a healthy
atmosphere then we believe that the sentiment in favor would be
overwhelming.

It has been urged that we must provide assured subsistence in order to
avert widespread discontent—"bread for all before cake for any". There is
no question that assured subsistence is needed at all times, not only to avert
discontent (an approach which has in it an unpleasant concept of bribery)
but also from an obligation of common decency. The level at which sub-
sistence can be assured, however, does depend on the general standard of
living. If too many crumbs are assigned to the purpose of meeting want, the
standard of living as a whole will be lower than it need be. It is precisely
the application of "bread for all before cake for any" that we fear. Unques-
tionably we want bread for all, but the very process of conceding cake as
the reward for extra effort and ability actually develops a greater supply of
bread—and even passes the cake around more freely. If the less fortunate
elements of society knew what was really best for them and acted intelli-
gently to further their own most selfish interest they would not deny cake
but would constructively encourage the quest for cake.

Above all, we must recognize clearly that the issue is not between "social
security" or "no social security", but is instead between managed economy
and the fifth freedom—freedom to produce. Unless that issue is clearly
drawn our nation may find that in voting against "no social security" it has
unwittingly saddled itself with a paper doll security not at all to its taste;
and may learn too late that there was a much more red-blooded sort of
security which it might have chosen if it had understood the issue.

Our whole theme is summarized by the statement that if social security is
what we want, the very best possible social security will come from honest,
wholehearted confidence in the profit motive, properly policed, and supple-
mented by a sound, conservative, realistic program of social insurance. The
social insurance by itself isn't "social security"; true social security requires
the freedom of efficient production in order to create the greatest possible
amount of goods to be shared. Social insurance can help share the goods
more fairly, but it can't produce the goods. You can't eat social insurance.
Social insurance is *a part* of social security, but the economy must be recog-
nized as the major part. As Mr. Epstein said, "We mustn't let the tail wag
the dog." And if we want the healthiest possible dog we will feed it a liberal
diet of private enterprise.

SAMPLING THEORY IN CASUALTY INSURANCE
ARTHUR L. BAILEY
VOLUME XXIX, PAGE 50
WRITTEN DISCUSSION

MR. A. H. MOWBRAY:

The Society is to be congratulated on the presentation of this paper (of which so far only the Introduction and Parts I and II have appeared in print) and the paper "Notes on Mathematical Statistics" by Mr. Satterthwaite. These two of our younger members have thus called attention to powerful methods of investigation which may help solve some of our perplexing problems.

It has, of course, long been recognized that the insurance business is a business of averages which are not wholly stable in themselves but are much more stable than the individual risks from which those averages are derived. It has also been recognized for some time that there may be subordinate averages within any class which are characteristic and this has given rise to modification of class rates by merit rating. But few have grasped the significance of the fact that the forms of distributions of risk hazards about the class average and of the risk experience of particular periods about the true risk hazard are or should be the important determinants of credibility factors and of merit rating formulae in general. It is because they attack this problem that the papers are important.

It is true that these papers go further into theoretical mathematical statistics than even most of our members are prepared to go and that rating plans which must pass scrutiny by state officials and the insuring public must be expressible in terms understandable to the layman. But if we can be sure our theoretical formulation is right we can usually find a way to present it that will be acceptable. If we have to simplify and compromise we should at least know fairly clearly what is the effect of the simplification and where is the compromise. In many cases in our pioneering efforts those were just the things we did not know.

Until the desire for experience rating posed the problem and led to the unit system of reporting there was little opportunity for study of distributions. The individual companies have detailed records of individual risks and individual losses but the total data of any one company was too limited to make such study tempting or promising. But with the unit data reported to the bureaus there is now available the material for fruitful study in this field.

Once the exploration of the field is earnestly taken up it seems certain that occasions for the use of others of the powerful tools of modern statistical

analysis will arise. For example, it seems likely that good use might be made of R. A. Fisher's Analysis of Variance in considering questions of consolidating or subdividing classes. Nor, I think, do we need fear too greatly objection on the part of our assureds to theoretical methods. Business, especially manufacturing, is gradually learning the validity and power of these types of mathematical analysis of statistics and planned experiment. The growing successful adoption of the Shewart technique of specification control of quality of manufactured product is one indication of this.

Mr. Bailey's demonstrations that the characteristic distributions in casualty insurance are of the Poisson Exponential type are clear and convincing and the assumptions he makes for the purposes of his exploration seem realistic and reasonable.

The development of the moment formulae for the several distributions he studies gives the paper a forbidding appearance of high mathematical requirement that may lead our older members to pass it over. This would be most unfortunate. In general, they will have most influence with executives in getting favorable consideration of the use of such investigations and techniques. It is, of course, necessary for the author to submit that part of his work to his colleagues for review and criticism. But it would, I think, add to the general readability of the paper if a summary statement of what is accomplished by use of them appears in the body of the paper and the development then given in an appendix.

The somewhat intemperate reference in the second paragraph on page 51 to the retrospective rating plan seems a bit unfortunate as likely to prejudice, in this highly competitive business, a reader against the author and all he says, unless the later parts of the paper to be presented at a subsequent meeting take up this plan and show that it is a "form of gambling." If the retrospective rating plan is not sound in theory, of course, like constant "c" which was in the experience rating credibility formula for a short while, it will be relegated to the limbo of things forgotten and be replaced by a plan which will stand the test of analysis in the light of modern theory of statistical distributions. We hope the application of the test will not be retarded by a feeling that the test is a competitive weapon.

REVIEWS OF PUBLICATIONS
CLARENCE A. KULP, BOOK REVIEW EDITOR

Comprehensive Liability Insurance. E. W. Sawyer. The Underwriter Printing and Publishing Company, New York, 1943. Pp. 176.

At long last, liability insurers have accepted responsibility for the liability hazards of their insureds and the job of determining the hazards in the individual case as a basis for writing an adequate contract and naming a proper premium. Until recently it was only in the marine insurance field (where perhaps the function of insurance is best understood) that the insurer proceeded from an initial agreement to cover all the losses of the insured. It may be no mere coincidence that the insured and his broker have long dealt as equals with the marine underwriters and that comprehensive liability insurance has developed with the concentration of the insurance management and representation of large corporations in the hands of competent insurance specialists.

Sawyer's book is no primer for neophytes, though it is written in simple, clear and direct language. It conveys much more than appears on the surface of its pages. For complete understanding, the reader should be familiar with the history of liability insurance and with its contract forms, past and present. In fact, copies of the comprehensive policies and endorsements should be read with the text. For example, frequent reference is made to the policy definition of contractual liability, but the definition does not appear in the text.

The purpose of the text is "to discuss principles, purposes and methods" and, one suspects, to convert the unenlightened. With slight concessions, here and there, to the practical necessities, Sawyer cogently develops his thesis that comprehensive insurance should and will become really comprehensive; that exclusions, options and exceptions should be reduced to an absolute minimum and that standardized contracts should be used nationwide. The reviewer, lacking any responsibility other than the academic, agrees and suggests that consideration be given to an unlimited policy. In effect, liability insurers with reinsurance facilities at their command now refuse, by writing only policies subject to limits, to accept a catastrophe hazard which must be borne by the individual insured, and presumably the insurance carrier sometimes invests in the securities of that same insured. Among various proposals for innovations which have Sawyer's support is the continuous policy. Would it not be well to adopt, with such a policy, rating and commission programs that would recognize the economy of continuous relationships between insured, producer and insurer, as long as they are mutually satisfactory? If an insured desires to change his insurer, for

whatever reason, let him do so at a cost consistent with the necessity of making new arrangements.

The way of the innovater is hard. The problems of introducing comprehensive liability insurance illustrate this quasi-Biblical statement. Underwriters fear the loss of their customary safeguards and the unstated hazards and exposures to which they are subjecting themselves; incompetent producers do not like to expend the time and mental effort necessary to master and apply a contract which does a complicated and thorough job; insureds are impatient with insurance discussions and suspicious of attempts to sell coverage which may result in larger premiums; even state insurance departments are slow to approve a new method of doing business for which no experience has been developed.

This book points up the difficulties and the virtues of comprehensive liability covers; it shows what has been accomplished and what remains to be accomplished; best of all, it makes clear a method of approach to problems of insurance coverage and demonstrates a way of thinking fundamentally about such problems.

Since no reviewer's ego is satisfied without making suggestions for improvement, the following are submitted: it would have been helpful if the chapters had been dated, since they were written at various times from September, 1941 to January, 1943, a period during which comprehensive insurance was developing rapidly; the type should be larger—continuous reading of the text is difficult; the questions appended to each chapter might have been designed to bring out an understanding of the text rather than the student's capacity for memorizing.

But these are minor matters in a book which, for perhaps the first time, attacks a problem of contract drafting in terms of achieving the final goal of full protection of the insured and which presents a method refreshingly at variance with the bickerings and short-sighted manoeuvers which have characterized so much discussion of contract revision. And all of this is done with a complete awareness of the interests of insurance carriers and producers. Here, as has often been found elsewhere, interests which are divergent in the short run are discovered to be common when the long view is taken. Insurance may become a profession.

RALPH H. BLANCHARD.

Compulsory Health Insurance in the United States. Herbert D. Simpson. Northwestern University, Evanston, 1943. Pp. 89.

In this brief but penetrating appraisal of the status and implications of the present movement for compulsory health insurance, Professor Simpson examines the broader economic and social aspects of the problem and finds

them not altogether reassuring. After reviewing the background of the move-
ment and the standard arguments in support of compulsory health insurance,
the author analyzes and contrasts current proposals as represented by the
Wagner Bill (1939), the Capper Bill (1941) and the Eliot Bill (1942). The
incidence of payroll taxes is given expert attention (the author is Emeritus
Professor of Public Finance of Northwestern University) and alternative
methods of meeting the problem, which is essentially the wider distribution
of available medical service, are systematically considered. Professor Simp-
son concludes that, while the time may be ripe for broadening the coverage
of present social security legislation and extending the scope of old-age bene-
fits to include permanent disability prior to age 65, we would be well advised
to wait, at least until the war is won, before adopting a health insurance
program involving commitments from which there would be no turning back.

OTTO C. RICHTER.

Lectures on Fire Insurance Accounting. The Insurance Society of New York,
  Wisdom Press, New York, 1943. Pp. 128.

This small but meaty volume comprises a series of lectures delivered before
various groups of members and students of the Insurance Society of New
York. The book is not offered as a text on fire insurance accounting but
"merely as a collection of lectures on those aspects of the subject on which
material is not readily or conveniently available."

It comprises 11 lectures, 10 written by officials of well-known fire insurance
companies and one by the president of a statistical organization. The lec-
tures are entitled: (1) Organization and Functions of Accounting and Statis-
tical Departments; (2) Underwriting Income—Premiums; (3) Underwrit-
ing Income—Reinsurance Premiums; (4) Investment Accounting; (5) Dis-
bursements—Losses; (6) Disbursements—Taxes and Other Expenses; (7)
General Ledger; (8) Reserves; (9) Annual Statement; (10) Mechanical
Equipment; (11) Statistics.

The lectures are very instructive. I was particularly impressed by the
succinct manner in which the contributors have presented the basic pattern
of fire insurance accounting. The lecture on *Mechanical Equipment* does not,
in my opinion, measure up to the same standard of informative data as the
others. I had anticipated the author would discuss: (1) the types of equip-
ment, (2) the purpose for which they are used in fire insurance offices and
(3) the basic reasons for their use. The lecture instead deals with the sub-
ject in a very abstract manner, the principal theme being the speed, card
production and sorting technique, of tabulating equipment.

I heartily recommend this book to all interested in insurance accounting,

REVIEWS OF PUBLICATIONS

whether fire or casualty. Fire insurance accounting students will find it particularly valuable. The casualty accountant or student will find much of interest in observing how closely fire accounting practices sometimes parallel casualty, yet in other instances how divergent are the procedures in handling identical and similar problems.

It should have particular appeal to insurance accountants and students interested in fire and casualty "group" accounting. They will discover (as I have from extensive practical experience) that no real obstacles exist which will prevent the coordinated handling of fire and casualty accounts and statistics. For such persons, I suggest a study of this volume in conjunction with Mr. Tarbell's splendid contributions to the *Proceedings*, Volume XV, p. 141, and Volume XXVII, p. 294. This will provide an excellent starting point for more detailed travels into the intricacies of fire and casualty accounting.

W. H. CRAWFORD.

Man and the Motor Car. A. W. Whitney, Editor. Revised Edition, 1941. National Conservation Bureau, New York, 1941. Pp. xi, 287.

This book, first published in 1936, and now revised in the light of much practical experience, has been widely used as a high school textbook. The fact that more than a quarter million copies have been obtained by several thousand schools is evidence of its value in preparing young people in an intelligent way to operate automobiles. The emphasis is on safety, which is only natural in a publication sponsored by insurance interests.

The driver education program based upon this book has produced such satisfactory results that when the United States Army found it necessary to train huge numbers of men in motor transport work, it used much of this material in its classrooms.

JAMES M. BUGBEE.

Why We Have Automobile Accidents. Harry R. De Silva. John Wiley and Sons, New York, 1942. Pp. xvii, 394.

It is somewhat difficult to appraise the value of this book now because, while published in 1942, its statements and conclusions are largely based on studies of conditions existing between 1930 and 1941. The author has assembled a most comprehensive collection of data (there are more than 70 tables) in an effort to analyze the relationships between accidents and use of car, driving speed and other factors which influence highway safety in different parts of the country.

The value of all these figures is somewhat doubtful now because war-time conditions have changed the use of automobiles in such a radical manner. When the country returns to a peace-time economy, conditions will presumably be different from those of the 1930's and our author will have to compile new data.

Mr. De Silva is a psychologist and has approached the problem from the psychologist's viewpoint. He is a recognized authority in the field of the psychological bases of accident occurrence, and we know that he has spent a great deal of time for a number of years in making studies of this kind. However, some of his conclusions are theoretical. For example on page 9, in reference to hazards resulting from vehicular defects, it is stated:

> Little or nothing has been done to find out how many accidents are prevented by lessening the hazards arising from defects in the vehicle and what types they are.

We agree that more accidents are occurring from mechanical defects than appear in the records and that more should be done in this direction. Yet at the same time from a practical standpoint, it is very difficult to ascertain which accidents have been caused by these defects. In the first place, the investigating police are not mechanics. Secondly, drivers are rarely willing to admit that mechanical defects were responsible for their accidents, as this would be an admission of liability. Moreover, after a motor vehicle is demolished in a serious accident it is not possible to determine the condition of the vehicle prior to the accident.

On page 14 the author says:

> At present, we know practically nothing about the difference between hazards ordinarily encountered in necessity driving as compared with those met in recreational and social and other non-necessary types of driving.

While a further study of this subject might be interesting, we cannot understand what difference it makes from an accident prevention standpoint. The same is true with regard to the author's comment on speed on page 52. He deplores the fact that we do not know who are speeders and why they speed. We cannot see where it would be of a great deal of benefit to have such information. As Mr. De Silva mentions further on in his book, it has been found that the most effective measure of speed control is to have an adequate number of police and strict enforcement of speed regulations.

On page 30 a comparison is made between bus, truck, passenger car and truck-trailer accidents; and it is mentioned that truck-trailer accident rates are high. We have found as additional accident factors in our experience that truck-trailer units carry the heaviest loads, their braking systems are often inadequate for the loads carried, and the condition of their equipment is

generally poor compared with other motor vehicles because of the heavy duty and continuous service which permit little time for repairs. The truck-trailer or tractor semi-trailer combinations are extensively used on interurban freight lines providing overnight deliveries so that of those factors mentioned by the author as responsible for the high accident frequency, night driving conditions are probably most important.

On page 89 the author in passing on his opinion that the article, *And Sudden Death,* may have a good effect on some drivers, says that the witnessing of gruesome accidents will have a more lasting effect. We feel that the article mentioned does not make anyone a safer driver. And while we agree that witnessing serious accidents is not an effective safe-driving measure, it is because the experience makes drivers more nervous. Mr. De Silva is skeptical on the same point but because he believes repression of unpleasant experience produces carelessness.

From the insurance standpoint, the most interesting chapter is that on *Incompetent Drivers.* The tables and statements on this topic are helpful in reminding us that accident-repeaters have an accident expectancy much higher than the average driver; that drivers under 20 years have an above-average accident frequency; and that the rate goes up again for drivers over 60. In this chapter the author very briefly dismisses the several financial responsibility laws as probably having no tendency to reduce accidents. Surely the red-tape formalities required in order to comply with these laws and the premium surcharges have some deterrent effect on the future behavior of drivers who have received notice that unless they file evidence of responsibility within so many days they will have their right to operate a motor vehicle forthwith suspended.

The author leans toward compulsory liability insurance as financial protection to the public against bad drivers, but predicts the eventual development of automobile accident compensation systems with compulsory insurance provided either by private companies or state funds. Without doubt, this is a possibility that many members of the Society will have to study at some future time.

The author's general conclusion is that, to continue research on automobile accidents and to coordinate and plan accident prevention work, it is necessary for the Federal Government to provide the all-important financing. He feels that insurance interests along with automobile manufacturers and oil companies, in view of the loss to their own businesses from the killing and disabling of customers, would profit if accidents were drastically reduced and driving made safer and that it would be to their advantage and to the public interest if they would add their influence and perhaps their financial support to a scientific fact-finding program. The author seems to overlook entirely the time and effort expended by the safety engineers of the casualty

insurance companies on automobile safety work although practical experience shows that such work does reduce accidents.

The theory that we should look to the Federal Government to lead the way and provide the funds is not always sound. When we rely upon Washington or some other place to do the work, we lose the personal and immediate interest of local people. While it is true that the present accident control programs of the various states are not ideal, yet much has been done in this direction in recent years. Granted that there should be greater uniformity in compiling accident records so that the results in one state may be compared with those in another, it would seem that better results will come from efforts in the individual communities and the several states, each attacking the problem in its own way, than from uniform methods of procedure handed down from some central authority.

The author's bibliography with its 300 references is the most extensive we have seen in this field.

JAMES M. BUGBEE.

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WHAT IS SO PECULIAR ABOUT AN ACTUARY?

BY

SYDNEY D. PINNEY

Twenty-five years ago, Richard Fondiller was elected Secretary-Treasurer of this Society. At approximately that same moment, I was squatting among the ruins of a little town north of Verdun, wondering if I would get turkey for Thanksgiving dinner. A quarter of a century has passed. Richard Fondiller is still Secretary-Treasurer of this Society, while I am still wondering whether I shall get turkey for Thanksgiving dinner. Not that it really matters, as we have so many things to be thankful for. Ranking high among these is this opportunity to do honor to one who has served our organization so long and so faithfully. To the satisfaction accruing to him from the knowledge of a job well done, we now would add such encomiums as shall bring joy to the heart of a modest man. Maybe, before this day is over, if success crowns our efforts, we shall hear him murmur, "Yes, I guess that it was worth it, after all."

Please be assured that if you hear him say this, he will be referring to his long years of service and not to any exorbitant fee that I may have charged for my appearance on this program. I am strictly an anti-inflationist and believe in rigid adherence to all regulations of the OPA and WLB, especially the "little steel" formula. A little steal here and a little steal there and the first thing you know your speech is written. Furthermore, I feel that I owe you something for my failure to deliver two years ago. This will be a sort of "nunc pro tunc" proposition, like the belated college degree which is given to the rich alumnus who flunked out cold twenty years previously. I believe that you will find my remarks most interesting, as I plan to deal with that absorbing subject, ourselves. I shall endeavor to give no offense to your finer sensibilities and, by the same token, I shall take none if you treat my remarks in accord with the motto of this Society, "Cum grano salis".

I should explain that the interjection of all this Latin is due to my having spent last evening in the company of two Manhattan Greeks. I am referring, of course, to Greek fraternity brothers. They tossed off quips in Latin, old proverbs, and selected quotations from the Bible, as they poured advice into me, hour after hour. I was finally convinced that the best thing in Manhattan is the cherry at the bottom of the glass. There was a diversity of opinion, however, as to whether the stem is the best part of the cherry or of the glass. Much may be said in favor of either contention, but I think that I lean toward the cherry. At least, it was much better eating than the glass. Mirabile dictu!

I have chosen as the subject for my discourse, this afternoon, that old question which has plagued us for so many years, "What is so peculiar about an actuary?" I sincerely trust that there is none among you, so crass or evil-

minded as to think that I had Richard Fondiller in mind when I selected this topic. Perish the thought! As a matter of fact, when I propounded this question, I had each member of this Society under consideration and I have even gone so far as to examine myself in an honest effort to arrive at the correct answer.

Whereas, it may not be possible to reduce this to rigorous mathematics, I believe we should follow the classical lines of analysis favored by such purists as Paul Dorweiler and Francis Perryman. As in the case of the five blind men and the elephant, there are five different approaches to this problem. There may be more, but you will find that five will be more than sufficient to thoroughly exhaust the subject and, quite likely, yourselves as well. In the order of their importance, these are as follows:

1. *"What* is so peculiar about an actuary?" This form of presentation is too narrow in its implications, since it gives one the impression that he is called upon to guess what one thing makes an actuary so peculiar. Is it his manner of speech; the cut of his clothes; his interest in crossword puzzles or contract bridge; his preference for lectures on political science rather than Star and Garter or By Jupiter; can it be a secret penchant for cherry brandy and Coronas? It is quite obvious that this approach is unworthy of further thought.

2. "What *is* so peculiar about an actuary?" This proposition falls in the same classification as the first one. It is of passing interest, however, to note that this variation is the type currently favored by the rapid-fire school of radio quiz specialists. You are all familiar with those clamoring female voices which demand, "What *is* the fourteen-day Palmolive Plan? Yes, what *is* the fourteen-day Palmolive Plan?" There is nothing to do but work oneself up into an immediate lather and *give* with the answer. Can you imagine what our Proceedings would look like if we disposed of our problems in any such summary fashion? We would probably be reduced to issuing a small pamphlet, known as the Actuaries' Grist. Truly, a grisly fate for our beautiful and voluminous Proceedings. We shudder at the very thought.

3. "What is *so* peculiar about an actuary?" Thus Nero sitting on his podium might have queried of Petronius concerning the Christians, as he languidly crushed another grape and peered through his emerald at the broken bodies nailed to the crosses in the arena. It is apparent that posing the question in this manner will lead us up a blind alley, since innuendo and insult have no place in an impartial scientific analysis. Let us grind this under our heel, as we take the next step.

4. "What is so *peculiar* about an actuary?" This is the way in which the question is commonly asked by the proletariat, the hoi polloi and the bourgeoisie. Home office underwriters and field representatives have never been able to cope with the workings of the actuarial mind. Whenever there is a

rate revision, the actuary is cursed and denounced as trying to wreck the business. Woe unto him if the rate for Bean Sorting and Handling in the State of Michigan should be increased by as much as two cents. The experience rating plan had just been mastered by at least ten percent of the underwriters and agents, when the actuaries brought forth a new plan, so complicated that even some of the actuaries couldn't understand it. No wonder that the practical men in the business throw up their hands in despair. Claim adjusters recognize in the actuary, a juggler of interest and mortality rates and a compiler of reserves. They have always felt that there was something phoney about the results but have been completely frustrated and exasperated by their inability to prove their contentions. Inspection engineers and payroll auditors regard the actuary as a rare bird, all right, but they dismiss the matter lightly, by simply inserting an extra "r" into the spelling of the name, thereby referring to him as "acturary". Executives and insurance commissioners have found that the best way to keep everybody happy is to smile indulgently at the actuary and then behind his back, call him a crack-pot. This approach to the problem will be subsequently dealt with in further detail.

5. "What is so peculiar about an *actuary?*" Stating the question this way, we sense that there is another viewpoint worthy of consideration. The implication is that the actuary isn't so peculiar, after all, or, at least, he is no more crazy than many others engaged in the insurance business. He may approach a problem through channels unfamiliar to the rank and file, and he may arrive at conclusions contrary to those reached by the majority. This should be taken as an indication that he is possessed of the scientific mind, which delights in probing for the truth. One thing certain is that the actuary is no "yes" man. The editor of one of the prominent insurance publications once referred to him as the "yes, but" man of the insurance world. Maybe that is why he is called peculiar. Well, be that as it may, let us proceed with our investigation.

Our preliminary examination has served to emphasize the main point at issue. We must now determine whether in reality the actuary is peculiar and, if so, how he gets that way. For the sake of simplicity, the affirmative viewpoint will be represented by the opinion of the underwriters, while the actuaries will do their best to defend themselves. Let the chips fall where they may, but the truth must prevail, in order that this moot question may be disposed of, once and for all time. Public opinion will be the judge.

The concensus of the underwriters will now be presented. The actuary is a self-opinionated theorist, whose conception of the practical side of the business is less than nil. He spends his time in a sort of vacuum, far removed from the front line of contact with the outside world, playing upon his slide-rule, as he applies untried formulae to a mass of outdated statistics. There is a fanatical gleam in his eye, and he ignores all whose opinions differ from

his own. The actuary regards all underwriters as morons and he has absolutely no respect for that sacred sixth sense, known as underwriting judgment. He is firmly convinced that the underwriters are in cahoots with the agents to cut the rates as much as possible, and scathingly refers to them as under-raters. He never misses an opportunity to show the underwriters up, especially when in joint conference with an executive. The actuary is so damn superior!

Although the actuary's I.Q. is fairly high, his P.Q. (personality quotient) is abnormally low. He seems to be utterly lacking in all the human graces. The actuary may occasionally take a drink, but he never treats, as he has shrewdly calculated that the odds of breaking even are against him. His clothes need pressing; he has been known to wear high shoes and even sleeve garters; and, to judge from the length of his hair, he is no longer on speaking terms with his barber. Bill Leslie will remember that particularly bitter critic who went so far as to say that the actuaries are lily-fingered.

Now this is a pretty serious indictment of the actuary, and, in spite of certain obvious exaggerations, we cannot simply laugh it off. Where there is smoke, there is fire, or, as Confucius might have said "When there is cackling, an egg has been laid."

We will concede the point that there are such things as long-haired actuaries, and even some with lily fingers, if I understand correctly what our critic meant by this. Perhaps he was thinking of "pale hands I love beside the Shalimar." At any rate, these actuaries, by virtue of their own initiative and recognized ability, have earned the right to membership in our Society and we are proud to have them associated with us. I refer, of course, to the charming ladies in our midst. I hope that they won't mind being called "lily-fingered." It does seem somewhat strange, however, that long hair should be considered as an attribute of the actuary, since it would appear that the length of the hair on the heads of some of our most distinguished members is inversely proportional to the actuarial gray matter contained therein. Just take a look around and you will see what I mean, or ask Win. Greene.

All remarks directed at the attire of the actuary are grossly superficial and inaccurate. The fact is that most actuaries are fastidious dressers. They lay great stress on such matters as the proper matching of necktie, socks and pocket handkerchief. I would refer you to those two obvious authorities Sanford Perkins and Bill Constable for confirmation.

To concern ourselves with the fundamentals, let us touch briefly upon the background of training necessary to produce an actuary in the field of casualty insurance. He must have a thorough grounding in mathematics, up through the customary college courses, and in the theory of probabilities, life contingencies, statistics, and accounting. He must also become familiar with all the intricacies of company statistical procedure, rate-making, experience rating, compilation of reserves, allocation of expenses, underwriting practices

and, in general, the methods employed in all other departments of the company. He must understand the preparation of the annual statement and other reports required by state and federal authorities. In order to become a member of this Society, he must pass our prescribed examinations, which usually will take from four to six years. To accomplish all these things, and I have only hit the high spots, the actuary must be possessed of an analytical, clear thinking, technical mind; be quick to understand problems; must be accurate, resourceful and responsible; and, above all, he must retain the younger man's viewpoint and ability to grasp new ideas.

As in the case of other professions, requiring years of training in theory and practice, the way to the goal is a hard one. It usually takes from eight to ten years to arrive somewhere in the vicinity. Of course, it may be a matter of another eight or ten years before he receives outward recognition, as evidenced by a telephone listed under his name, carrying with it the right to make and receive outside calls; an extra week of vacation; a title; an office of his own and, possibly, a private secretary. However, he has been pulling down a handsome salary all these years, so the trappings of office are only of secondary importance. I would not have you think for an instant that the actuary is primarily interested in the mazuma, but he has not yet been classed as tax exempt and he is expected to buy War Bonds, just like everybody else.

This brief review of background may help to explain why the actuary is as he is. Possibly, there are times when he is irritated by some dull-witted underwriter, but he must endeavor to be tolerant, patient and kind. In explaining some technical subject he should use non-technical language and words of one syllable which the underwriter can understand. The presentation of papers before our Society gives us ample outlet for showing off how good we are.

The actuary should picture himself as a physician, to whom the underwriters may turn for advice when they are in trouble. Like any good doctor, he must inspire confidence and be ever willing to lend a helping hand. By all means, make the underwriters feel at home in your office. Always have a generous supply of cigars, cigarettes and smoking tobacco on hand for this purpose. It will pay large dividends.

It is of paramount importance to have a sense of humor. The actuarial cross is hard to bear anyway but, without a sense of humor, you will be crucified, and what's more, you will deserve to be. You must laugh convincingly at the Vice President's favorite story. This, too, will pay large dividends,—usually in the form of more stories. One word of warning, however, learn to become a good listener, rather than the one who tells the stories. There is nothing more fatal than for an actuary to get the reputation of being funny. Sound advice, but who believes it?

All of which leads to the point that, if the actuary is out of step with the

rest of the insurance world, a little quiet introspective analysis should indicate the remedy. Furthermore, since the selection and training of candidates for actuarial positions are usually controlled by actuaries already established in the business, you have it within your own power to bring about a continual improvement in the personnel, not only with respect to technical ability, but also in terms of human relations. I am suggesting neither that you recruit glamor boys, nor that you lower our high standards of actuarial proficiency in the slightest degree. There are such things as men with actuarial ability and a pleasing personality, underwriters to the contrary notwithstanding. It may be a case of many being called and only a few being chosen, but your efforts to find these few will be amply rewarded. You will derive a lasting satisfaction in watching the progress of the young men whom you select and, what is more important, you will bring credit to our profession and the men in it. In this manner, you will remove the last trace of any stigma of peculiarity which may attach to the title of actuary.

It is a strange phenomenon that whatever stigma there is seems to attach to the title, rather than to the individual. Quite the reverse of the rose, by any other name, smelling just as sweet. Just let the actuary divest himself of that title and assume that of secretary, vice president, president or general manager, and he immediately passes from purgatory into paradise on earth. Instead of being referred to as one of those damned actuaries, he is revered as something akin to divinity. Quite likely this serves as an incentive to the actuaries, for certainly a goodly number of them have been so transformed. Some companies have recognized this phenomenon and, in lieu of an actuarial department, they have established what is known as a rating and research department. I believe that we should deplore any trend in this direction, as it smacks of defeatism. We are proud of our profession. Let's stand by our guns. If we don't watch out, there will be agitation for changing the name of our Society to the Casualty Rating and Research Society. God forbid!

In these rambling remarks, I have endeavored to show that the actuary in reality is not so peculiar, and, even if he is a little that way, he can easily overcome it through his own efforts. Certainly, there is no foundation for the belief that all actuaries are endowed with peculiarity in perpetuity. The time may never come when the underwriters will consider us as their equals, but let us carry on with the hope that some day they will admit that we are not such bad fellows and associates, after all. Until that happy day, let us be content with our lot. When some one raises the old question, "What is so peculiar about an actuary?", we shall without malice make a simple but dignified answer, giving a Stoopnagle reverse English twist to the classical one concerning the southern exposure of a horse going north. Yes, our reply shall be, "There are so many fewer of them than there are underwriters."

THE ANNIVERSARY

By Clarence W. Hobbs

Long ago, Horatius Flaccus
Sadly sang, *Eheu fugaces*
labuntor anni; all which means, time marches on.
From our wrestlings with the present
Let us snatch a moment pleasant
From the memories of hours that are gone.

Goodly hours we recall
Of our meetings, Spring and Fall:
Wit and wisdom flowing free in glorious tide.
But whoever might be there
In the presidential chair,
He's had Secretary Richard by his side.

Five and twenty years have gone,
But he blandly goes right on
With keeping of our records and our money.
And this is but a revealing
Of the universal feeling
That, as a secretary, he's a honey.

Here's the earnest of our thought.
To commemorate, we've sought,
This anniversary in fitting wise.
Three the gifts we bring this day:
And, in systematic way,
Let us mention first the Third Fondiller Prize.

May this prize true zeal inspire
In the soul that would aspire
Of insurance destinies to be the shaper,
Ever seeking hopefully
To achieve reality
By manipulating ghosts of things on paper.

May it stir all mental attics
To achieve by mathematics
Sound logic, maybe, too, hypocrisy,
Worshipping in sober sooth
Both the virgin, Lady Truth.
And that winsome wanton, Plausibility.

May this desk set be productive
Of things learned and constructive:
More receipts for fees than checks, we fondly hope:
Of opinions, fair to see,
Proving clients' solvency,
And making State Funds smell like Heliotrope.

May this bag go with you far;
Serve you well where'er you are.
May its course on trail of business never flag.
And when homeward you're returning,
And the home folks are discerning,
May you ever proudly say, "It's in the Bag."

Good friend, take our salutation.
Fill for long your present station
Good health be yours, long life, prosperity.
Demonstrate in living presence
Of reality the essence,
As Bergson holds it, durability.

OBITUARY

CHARLES SAVAGE FORBES

1879 - 1943

Charles S. Forbes, a charter member of the Casualty Actuarial Society, died at the Brooklyn Hospital, New York, on October 2, 1943, following an operation.

He was born at Warren, Mass. on July 8, 1879. He was graduated from Columbia University in 1901, receiving his Ph.D three years later. He remained for two years as a member of the Columbia University Faculty as a teacher of mathematics. In 1906 he became an Associate of the Actuarial Society of America. Upon leaving Columbia, he entered the casualty insurance business and subsequently was the Secretary of the Liability Department of the Casualty Company of America for several years. Since 1917, he had been associated with the insurance brokerage firm of Smyth, Sanford and Gerard of New York City. He was the treasurer of this firm for many years.   .

Mr. Forbes was particularly interested in workmen's compensation and in the early years of this Society, he had contributed a paper in this field and had attended its meetings regularly.

OBITUARY

BURRITT A. HUNT

1870 - 1943

Burritt A. Hunt, a charter member of the Casualty Actuarial Society, died, after a sudden illness, at his home in Manchester, Connecticut September 3, 1943. Mr. Hunt was born May 18, 1870 in Albion, New York where he lived until his graduation from high school. Soon afterward, he began his business career in the accounting department of a wholesale company in Hartford, Connecticut. In 1904, he joined the Ætna Life Companies beginning as a clerk in the casualty statistical department. He was elected Actuary of the Liability Department in 1917 and was made an Assistant Secretary in 1922. He retired in 1942 after more than thirty-seven years of service.

Mr. Hunt was one of the pioneers in casualty statistical work and had a large part in the development of statistical plans and standards in many lines

of Casualty Insurance. He appraised statistical problems from the account-
ant's viewpoint: he was unusually accurate in his own work and constantly
insisted on the use of balances and controls. Although of a rather retiring
and modest disposition, Mr. Hunt was well known and popular among his
associates in casualty insurance associations and committees, where his long
and varied experience brought him, in later years, the unofficial title, "Dean"
of casualty insurance statisticians.

OBITUARY

WILLIAM COLET JOHNSON

1876 - 1943

William Colet Johnson, 67, vice president, actuary and director of The
Massachusetts Protective Association, Incorporated, The Massachusetts Pro-
tective Life Assurance Company and The Paul Revere Life Insurance Com-
pany, Worcester, Massachusetts, died October 7th in New York City.

Mr. Johnson was born at Sag Harbor, New York, and became general
agent of the Phoenix Mutual Life in New York City, serving from 1901 to
1910. He was vice president and general manager of the Columbian National
Life, 1911-1915, and inspector of agencies of the Equitable Society from
1915 to 1918, when he joined the Massachusetts Protective.

In the Hughes investigation of insurance in New York in 1905, Mr. John-
son represented the various underwriters' associations of the United States
in the hearings, and he participated in the preparation of the reform insurance
laws thereafter adopted.

Mr. Johnson pioneered in the use of the non-medical plan in the United
States in connection with life insurance. This was done through The Massa-
chusetts Protective Life Assurance Company of Worcester. He was also one
of the most active and aggressive proponents of non-cancellable accident and
health insurance. Mr. Johnson was a contributor to many of the technical
periodicals and was a much sought lecturer on economic and insurance sub-
jects.

OBITUARY

ALBERT WURTS WHITNEY

1870 - 1943

Albert Wurts Whitney, a charter member of the Society, died July 27, 1943 at the New York Hospital in New York City, after a brief illness.

Albert Whitney became interested in insurance when he was selected by the faculty of the University of California to organize a course in insurance. This course prospered. Today it ranks high among similar courses offered by our institutions of higher learning and many of its graduates occupy positions of great responsibility. Albert Whitney's activities gradually extended beyond the classroom. His non-academic work was performed for various private and governmental agencies as an expert in the fields of fire and workmen's compensation insurance. Finally, in 1914, he became associated with the business of stock casualty insurance as Manager of the then newly-organized Workmen's Compensation Service Bureau (now the National Bureau of Casualty and Surety Underwriters). This association continued in several capacities until his retirement, shortly before his death, from the National Conservation Bureau, a department of the Association of Casualty and Surety Executives.

Albert Whitney belonged to that select group of men whose intelligence, scientific integrity, perseverance and foresight created the firm foundation upon which the rating structure of casualty insurance has been built. Their work was well done. It must have been sound because the fundamental principles which they enunciated still endure. In those hectic early days Albert Whitney was a veritable tower of strength. Possessing great technical skill, a proper sense of professional dignity and unusual capacity to communicate his enthusiasm to others, he largely influenced the deliberations of his pioneer contemporaries and thus stamped the indelible impress of his personality upon what we today are proud to refer to as casualty actuarial science.

Later, by one of those curious twists of fate which sometimes govern the activities of men, Albert Whitney's attention was almost wholly diverted to the field of safety and his interest in rate-making gradually diminished. In this new field of endeavor Albert Whitney enjoyed a welcome opportunity to employ his special talents in a great humanitarian movement. Here, also, he became a pioneer whose vision largely influenced the development of organized safety in this country.

Albert Whitney's most conspicuous quality was his high character. It shone forth from his countenance and completely dominated his activities. Always a competent scholar, he never compromised with principles although

he did recognize that a workable program must meet the test of practicability. Nor did he indulge in acrimonious debate, preferring to rest his case on its obvious merits and thus to win his point by persuasion. When dealing with serious and profound subjects, he went to the greatest lengths to discover simple ways of presenting his conclusions that they might be more readily grasped by those who were unable to comprehend a maze of mathematical formulae. He had definite moral and intellectual convictions and stood solidly by them; for all that he was always tolerant and considerate of the ideas of others. He possessed a quiet sense of humor and shunned all forms of sham and hypocrisy. In his personal relationships he was a gentleman in every sense of that word. Kindly, generous, helpful and human, he was a true friend who enriched the lives of an army of persons, including especially his students and business associates, all of whom will miss him terribly.

Another great pioneer has departed this life; may we who survive prove worthy to carry on the good work according to the blueprint he so ably charted for our guidance.

OBITUARY

JOHN J. GATELY

1906 - 1943

John Joseph Gately, an Associate of this Society, died at his home in Brooklyn, New York on November 3, 1943. For several weeks he had been confined to his bed by illness but only a few days before his death he had spoken confidently to several of his associates about his expected return to work.

Mr. Gately was born in Brooklyn, August 24, 1906 and lived all his life in that city. He graduated from St. Francis College with the degree of Bachelor of Arts and in February, 1929 he entered the actuarial department of General Reinsurance Corporation. He continued a member of that department until his death. On November 22, 1934 he was admitted to this Society as an Associate after having successfully completed the requisite examinations.

John Gately was possessed of a clear and eager mind and displayed a uniformly cheerful and considerate disposition. Although beset by illness during his last few years he consistently maintained a keen interest in life and in his work. His unfailing courage remains an inspiration to his associates.

OBITUARY

JOHN MELVIN LAIRD

1885 - 1942

John Melvin Laird, a Fellow of this Society for twenty-eight years, died on June 20, 1942, in Chicago, where he had been attending a meeting of the American Institute of Actuaries.

Born in Bayfield, Ontario, Canada, February 20, 1885, he graduated from the University of Toronto in 1906 and entered the Actuarial Department of the London Life Insurance Company. In 1910 he joined the actuarial staff of the Connecticut General Life Insurance Company, which he served with ability and loyalty for over thirty-two years. He successively became Assistant Actuary, Actuary, Secretary and Vice President in 1927. In 1936 he was elected a director of the Company.

He became a Fellow of this Society in 1915, was a Fellow of the Actuarial Society of America, American Institute of Actuaries, and an Associate of the Institute of Actuaries of Great Britain. He was a member of the Council of this Society in 1916-1917 and 1921-1924.

He contributed papers of unusual quality and value on a wide variety of subjects not only to this Society but to the Actuarial Society of America and to the International Congress of Actuaries. In addition to his actuarial interests his life insurance activities were rich and varied, particularly in the field of underwriting and reinsurance. He had been President of the American Life Convention, President of the Home Office Life Underwriters' Association and Chairman of the Big Risk Committee.

Although for many years his duties had been of an executive nature, he never ceased to be guided by his actuarial training. He exacted from his actuarial associates rigid standards of performance, but in a friendly and kindly manner that made them eager to live up to those which he set. While never a theorist, he yet insisted that a business decision must be actuarially sound, but without ever losing sight of the fact that the decision had to fit into the day-by-day problems of Company management. He approached business problems with the same logic, clarity and conciseness that characterized his professional papers. He will be missed by the older members of the Society.

OBITUARY

WALTER G. COWLES

1857 - 1942

Walter G. Cowles, a charter member of the Casualty Actuarial Society, died on May 30, 1942, after an illness of only a few days.

Mr. Cowles was born in Farmington, Conn., on April 4, 1857. He was educated in the public schools of Hartford, the Literary Institute at Suffield and in 1879 was graduated from the Yale University Law School. In 1883 he entered the insurance business, first as personal secretary to James G. Batterson of the Travelers, later in the Mortgage Loan, and then in the Liability Claim Department. In 1912 he was elected a vice president of the Company.

Mr. Cowles was interested in all phases of insurance and was a pioneer in the development of Liability and Compensation Insurance. He held a preeminent position in the field of policy drafting and his influence toward standardization of phraseology and policy forms did much to advance the entire field of Casualty Insurance. His services and help were freely extended to all who came to him for counsel and advice.

CASUALTY ACTUARIAL SOCIETY

NOVEMBER 17, 1943

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*Terms expire at the annual meeting in November 1944.
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> JOHN A. MILLS (CHAIRMAN)
> JOHN W. CARLETON
> JARVIS FARLEY

ASSOCIATESHIP
> GEORGE B. ELLIOTT (CHAIRMAN)
> ROGER A. JOHNSON, JR.
> ERNEST T. BERKELEY

COMMITTEE ON PAPERS
> ARTHUR N. MATTHEWS (CHAIRMAN)
> PAUL DORWEILER
> RALPH H. BLANCHARD
> CLARENCE W. HOBBS (ex-officio)

COMMITTEE ON PROGRAM
> HAROLD J. GINSBURGH, CHAIRMAN (ex-officio)
> ALBERT Z. SKELDING
> CHARLES J. HAUGH
> JAMES M. CAHILL
> CLARENCE W. HOBBS
> GREGORY C. KELLY
> RICHARD FONDILLER (ex-officio)

COMMITTEE ON PUBLICATIONS
> HAROLD J. GINSBURGH, CHAIRMAN (ex-officio)
> RICHARD FONDILLER
> CLARENCE W. HOBBS
> THOMAS O. CARLSON

SPECIAL COMMITTEES

COMMITTEE ON MORTALITY FOR DISABLED LIVES

PAUL DORWEILER (CHAIRMAN)
RALPH M. MARSHALL
MARK KORMES
HARMON T. BARBER
JOHN W. CARLETON
CHARLES M. GRAHAM
RICHARD M. PENNOCK

COMMITTEE ON SOCIAL INSURANCE

FRANCIS S. PERRYMAN (CHAIRMAN)
HARMON T. BARBER
JAMES M. CAHILL
HAROLD J. GINSBURGH
CLARENCE A. KULP
WILLIAM R. WILLIAMSON
JARVIS FARLEY

ABSTRACT FROM THE MINUTES OF THE MEETING
November 17, 1943

The thirtieth annual (sixtieth regular) meeting of the Casualty Actuarial Society was held at the Hotel Biltmore, New York, on Wednesday, November 17, 1943.

President Blanchard called the meeting to order at 10:20 A.M., the roll was called, showing the following fifty-two Fellows and fourteen Associates present:

FELLOWS

Ault	Fuller	Maycrink
Barber	Goddard	Michelbacher
Berkeley	Graham, C. M.	Mills
Blanchard	Graham, T. B.	Moore, G. D.
Brown, F. S.	Graham, W. J.	Perkins
Cahill	Hammond	Perryman
Cameron	Haugh	Pinney
Carleton	Hobbs	Pruitt
Carlson	Jackson, C. W.	Ross
Cogswell	Jackson, H. H.	Satterthwaite
Comstock	Johnson	Shapiro
Constable	Kelly, G. C.	Skillings
Dorweiler	Kormes	Smick
Elliott	Leslie	Tarbell
Eppink	Linder	Valerius
Farley	McConnell	Van Tuyl
Fondiller	Masterson	Williamson
	Matthews	

ASSOCIATES

Bailey, A. L.	Guertin	Smith, A. G.
Black, N. C.	Hagen	Stoke
Buffler	Hart	Trench
Eger	Kirk	Wells
Gildea	Nicholson	

By invitation, a number of officials of casualty insurance companies and other organizations were present.

Mr. Blanchard read his Presidential Address.

The minutes of the meeting held November 20, 1942 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.

Samuel M. Ross, an Associate, had passed the necessary examination in 1943 and had been admitted as a Fellow. A diploma was presented to him by the President.

The President announced the deaths, since the last meeting of the Society, of six Fellows: Charles S. Forbes, William A. Granville, Burritt A. Hunt, William C. Johnson, A. R. Lawrence and Albert W. Whitney, and one Associate, John J. Gately. Obituary notices appear in this number of the *Proceedings*.

The report of the Secretary-Treasurer was read and accepted. The report on finances follows:

CASUALTY ACTUARIAL SOCIETY
ANNUAL REPORT ON FINANCES
Cash Receipts and Disbursements from October 1, 1942 to September 30, 1943.

INCOME

On Deposit on October 1, 1942 in the Marine Midland Trust Company		$1,233.07
Members' Dues	$2,475.00	
Sales of *Proceedings*	1,113.39	
Examination Fees	342.75	
Luncheons and Dinners	119.25	
Sales of Hobbs' Reprint	189.35	
Sale of Bonds	1,000.00	
Profit on Sale of Bonds	125.54	
Interest and Miscellaneous	87.84	
Michelbacher Fund	64.02	5,517.14
Total		$6,750.21

DISBURSEMENTS

Printing and Stationery	$4,930.57
Postage, Express, etc.	100.94
Stenographic Services	420.00
Library Fund	16.24
Luncheons and Dinners	135.42
Examination Expense	327.97
Insurance	12.10
Printing Hobbs' Reprint	177.76
Miscellaneous	39.00
Total	$6,160.00
On deposit on September 30, 1943 in Marine Midland Trust Company	590.21
Total	$6,750.21

RECONCILIATION

Cash in Bank—September 30, 1942		$1,233.07
Income — General	$4,391.60	
Sale of Bonds	1,125.54	
Total Income	$5,517.14	
Disbursements	6,160.00	
Excess of Disbursements over Income		642.86
Cash in Bank—September 30, 1943		$ 590.21
Bonds Owned—September 30, 1942	$4,750.00	
Bonds Sold	1,000.00	
Bonds Owned—September 30, 1943		3,750.00*
Total Assets		$4,340.21
*Includes Michelbacher Fund		$1,444.36

The Auditing Committee (Dudley M. Pruitt, Chairman) reported that the books of the Secretary-Treasurer had been audited and his accounts verified.

The Examination Committee (Harry V. Williams, Chairman) submitted a report of which the following is a summary:

1943 EXAMINATIONS — SUCCESSFUL CANDIDATES

The following is a list of those who passed the examinations held by the Society on April 7 and 8, 1943:

ASSOCIATESHIP EXAMINATIONS

PART I:

FRANCES E. ABEL
GEORGE BOYER
WENDELL W. COOKE
CHARLES E. MACKENZIE
HAROLD L. McCOLLUM
RICHARD P. PETERSON

JOHN H. ROWELL
O. F. SIEGMUND
LAURENCE K. SMITH
HAROLD THOMPSON
CLAIR D. THURSTON
MARGARET A. TREVARTHAN

PART II:

J. F. AMSDEN
OLAN T. McMILLAN
RICHARD P. PETERSON
MATTHEW RODERMUND
RUTH SALZMAN
O. F. SIEGMUND

LAURENCE K. SMITH
HAROLD THOMPSON
CLAIR D. THURSTON
D. R. UHTHOFF
ELIA VERGANO

PART III:

HAROLD L. McCOLLUM
O. F. SIEGMUND

LAURENCE K. SMITH

PART IV:	LORING BARKER	JOHN H. ROWELL
	BENJAMIN HARMATZ	LAURENCE K. SMITH
PART V:	M. S. HUGHEY	HAROLD J. SILVER

FELLOWSHIP EXAMINATIONS

PART I:	S. M. Ross	PAUL A. TURNER
PART II:	S. M. Ross	
PART III:	S. M. Ross	

The Council's re-election of Clarence W. Hobbs as Editor, and of Thomas O. Carlson as Librarian, was announced.

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

> *President*..HAROLD J. GINSBURGH
> *Vice-President*..ALBERT Z. SKELDING
> *Vice-President*..CHARLES J. HAUGH
> *Secretary-Treasurer* ....RICHARD FONDILLER
> *Editor* ....CLARENCE W. HOBBS
> *Librarian*..THOMAS O. CARLSON

Members of Council (terms expire in 1945):
> HARRY V. WILLIAMS   WILLIAM R. WILLIAMSON   THOMAS F. TARBELL

The papers appearing in this Number were presented.

Recess was taken for lunch at the Hotel until 2:30 P.M. At the conclusion of lunch, the President made some remarks in connection with the services of Richard Fondiller as the Secretary-Treasurer of the Society for twenty-five years and presented to him appropriate gifts on behalf of the members of the Society. Mr. Fondiller desired that One Hundred Dollars (drawn from the contributions made by the members for a gift to him) be used as a prize for the best paper; this sum has accordingly been designated the "Fondiller Twenty-Fifth Anniversary Prize". In relation to the same subject, Mr. Sidney D. Pinney gave a talk entitled "What is so Peculiar About an Actuary", and Mr. Clarence W. Hobbs read his original verse entitled "The Anniversary". By resolution of the Council these are included in this Number of the *Proceedings*.

Upon reconvening, by unanimous vote, the Society passed the following motion:

> *That* a committee of three be appointed by the President to prepare an appropriate resolution marking the completion of 25 years of service in office of our Secretary-Treasurer, Mr. Richard Fondiller;

That the resolution when prepared be spread upon the permanent records of the Society; and

That a copy, suitably engrossed, be presented to Mr. Fondiller as a token of appreciation of the members.*

---

* The President appointed Messrs. Barber, Chairman, Cahill and C. M. Graham. The resolution suitably engrossed and framed has been presented to Mr. Fondiller. It reads as follows:

> *The*
> *Casualty Actuarial Society*
> *on the completion of*
> *twenty-five continuous years*
> *as Secretary-Treasurer by*
>
> R I C H A R D   F O N D I L L E R
>
> *hereby records its*
> *deep appreciation of the willing*
> *and invaluable service which he*
> *has rendered the Society.*
>
> Ralph H. Blanchard
> *President*
>
> November 17, 1943

Informal discussion of the following topic was participated in by the members of the Society and by representatives of insurance organizations:

"Post War Rating Problems"

The papers presented at the last meeting were discussed.

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

1944 EXAMINATIONS OF THE SOCIETY
APRIL 12 AND 13, 1944

EXAMINATION COMMITTEE

ARTHUR E. CLEARY - - - - GENERAL CHAIRMAN

IN CHARGE OF	IN CHARGE OF
ASSOCIATESHIP EXAMINATIONS	FELLOWSHIP EXAMINATIONS
PARTS I TO IV	AND ASSOCIATESHIP EXAMINATION PART V
GEORGE B. ELLIOTT, CHAIRMAN	JOHN A. MILLS, CHAIRMAN
ROGER A. JOHNSON, JR.	JOHN W. CARLETON
ERNEST T. BERKELEY	JARVIS FARLEY

EXAMINATION FOR ADMISSION AS ASSOCIATE

PART I

1. (a) Solve the equation:

$$\sqrt{x^2 + x} + \frac{\sqrt{x-1}}{\sqrt{x^3 - x}} = \frac{5}{2}$$

 (b) Show that the sum of the squares of three consecutive, odd numbers, increased by 1, is always divisible by 12, but never by 24.

 (c) Given $\log_{10} 2 = .30103$, $\log_{10} 7 = .84509$, find $\log_7 \sqrt{2}$ and $\log_{\sqrt{2}} 7$.

2. (a) If a, b, c, d and e are in continued proportion, prove that
$(ab+bc+cd+de)^2 = (a^2+b^2+c^2+d^2)(b^2+c^2+d^2+e^2)$

 (b) The second, third and fourth terms of $(x + y)^n$ are 240, 720 and 1080 respectively. Find x, y and n.

3. A farmer spent three equal sums of money in buying calves, hogs and sheep. Each calf cost $6.00 more than a hog, and each hog cost $5.00 more than a sheep. The number of sheep exceeded the number of hogs by as many calves as he could have bought for $147. Find the number of animals of each kind, assuming that he bought in all 45 animals.

4. (a) Find the sum of all the numbers less than 100,000 which are formed by using the digits 1, 3, 5, 7, and 9 if no digit is repeated in any number.

 (b) How many numbers are eliminated in problem 4(a) by the restriction that no digit may be repeated?

 (c) In how many ways can a man invite one or more of fifteen friends to dinner?

Note: The following values will be useful in solving problems 5 to 8 inclusive. The answers to problems marked with an asterisk (*) may be stated in the form of an expression in which all numerical values are entered but not multiplied.

v^3 (at 4%) $= 0.88900$ $(1.04)^{1/12}$ $= 1.00327$

v^7 (at 5%) $= 0.71068$ $s_{\overline{20}|}$ (at 4%) $= 29.77808$

v^{18} (at 4%) $= 0.49363$ $a_{\overline{20}|}$ (at 3½%) $= 14.21240$

v^{22} (at 4%) $= 0.42196$ $a_{\overline{40}|}$ (at 2½%) $= 25.10278$

v^{23} (at 2%) $= 0.63416$

5. (a) Prove that $\dfrac{1}{a_{\overline{n}|}^{(p)}} - \dfrac{1}{s_{\overline{n}|}^{(p)}} = j_{(p)}$

   (b) To assure a college education for his son, a father invests at 4 per cent at his son's birth a sum sufficient to provide $100. per month for four years, the first $100. to be paid at the end of the first month of the nineteenth year.

   i) What sum does the father invest?

   ii) At the beginning of his second year in college, the son decides he wants to leave to go into business and asks his father for the balance of the educational fund. How much does he receive if the money is given to him immediately as a lump sum?

6. (a) A man wishes to pay a debt of $1,250. principal and interest, in eight equal annual instalments, the first payment being made immediately.

   i) If the rate of interest is 5 per cent, what is the annual payment?

   ii) What part of the fifth payment will be for interest and what part will apply against the principal?

   (b) At what rate of interest will money double itself in 12 years?

7. (a) Derive a formula for the time required to pay an interest-bearing debt P by means of annual payments, R, allowed to accumulate at the same rate as the interest on P.

   (b) *The annual profits of a business are $1,000. less a certain amount paid into a sinking fund planned to amount in 20 years at 4 per cent to the capital invested. After this reduction the net profits were found to yield 7 per cent on the capital. What was the capital invested?

8. (a) *Ten years ago two bonds of $10,000. each were issued at 5 per cent payable semi-annually, the one an annuity

bond for twenty years, and the other a serial bond with repayment of $250. at each interest-paying date. A party has agreed to purchase these bonds so as to yield 7 per cent payable semi-annually. What should he pay for each bond just after the twentieth interest-paying date?

(b) If a $3\frac{1}{2}$ per cent government bond for $1,000. due in 23 years with half-yearly coupons is bought to yield at the rate of 4 per cent per annum payable half-yearly, what is the purchase price of the bond?

PART II

1. (a) Given the curve $\log(1+y)=1-\sqrt{5-x^2}$. Find the curvature at the point $(2,0)$.

   (b) Evaluate $\displaystyle\int\frac{dx}{\sin x}$

2. (a) Find the shortest line that can be drawn with its ends on two mutually perpendicular lines, and also pass through a point whose distances from the perpendicular lines are a and b respectively.

   (b) Given: $y=b^{e^x}$. Find $\dfrac{dy}{dx}$

3. (a) Apply Maclaurin's theorem to express $e^x\cos x$ as a power series in x and show the law of formation of the coefficients.

   (b) Evaluate:
$$\int x^2\sin 2\,x\,dx$$

4. Find the area bounded by the following curves and draw the figure, showing the element of area:
$$y^2=4x \text{ and } x=12+2y-y^2$$

5. (a) The area A of a circle with diameter d is given for the following values:

d	80	85	90	95	100
A	5026	5674	6362	7088	7854

   Find approximate value for the area of a circle of diameter 91, by the method of finite differences.

   (b) Obtain the function whose first difference is
$$x^3+3x^2+5x+12$$

6. Derive Newton's divided difference formula.

7. (a) Given:
$$u_0 + u_8 = 1.9243$$
$$u_1 + u_7 = 1.9590$$
$$u_2 + u_6 = 1.9823$$
$$u_3 + u_5 = 1.9956$$
Find u_4.

   (b) Given $u_{20} = 2854$, $u_{24} = 3162$, $u_{28} = 3544$, $u_{32} = 3992$. Find u_{25} by Bessel's formula.

8. Prove that

$$\sum_0^{n-1} u_r x^r = \frac{u_0 - x^n u_n}{1-x} + \frac{x}{(1-x)^2}(\Delta u_0 - x^n \Delta u_n) + \frac{x^2}{(1-x)^3}(\Delta^2 u_0 - x^n \Delta^2 u_n) + \cdots$$

and apply this formula to find the sum of the first n terms of the series whose r^{th} term is $r(r+1)x^{r-1}$.

PART III

1. (a) What is Bowley's formula for measuring skewness? Discuss.

   (b) Discuss fully r_{xy} in relation to S_y, given the equation $S_y^2 = \sigma_y^2(1 - r_{xy}^2)$

   (c) Distinguish between arithmetic mean, median, and mode. If, in a given frequency distribution, the order of magnitude is mode, median, mean, what can you tell about the skewness?

2. (a) Given the following data:

Year	X	Y	Year	X	Y
1900	5	44	1905	4	39
1901	3	30	1906	5	42
1902	5	40	1907	5	35
1903	4	32	1908	4	36
1904	4	33	1909	4	39

Where $X =$ July rainfall in inches

$Y =$ Yield of corn in bushels per acre

Find r_{xy} and explain the significance of the result.

   (b) What tests may be applied to a given table of X and Y values to determine whether the representative equation is a straight line, quadratic parabola, exponential function or power function? Give the general equation in each case.

3. If the class interval is taken as a unit, i.e., if $w = 1$, show
   that:
   $$v_2 = v_2' - b_x^2,$$
   $$v_3 = v_3' - 3\,v_2\,b_x - b_x^3$$
   $$v_4 = v_4' - 4\,v_3\,b_x - 6v_2\,b_x^2 - b_x^4$$

4. Fit a straight line and a second degree parabola to the follow-
   ing data by the method of least squares:

x	1	2	3	4	5	6	7
y	4	5	8	11	12	10	7

5. (a) Outline the algebraic content of the profit and loss state-
       ment and indicate how the correctness of the developed
       profit or loss may be checked.

   (b) Define adjusting entries, name the seven classes or types
       and give an example of one type, including the correspond-
       ing closing entry.

6 & 7. John Jones is an insurance company employee who keeps
       his personal records by means of double entry bookkeep-
       ing. On January 30, 1944 the totals of his ledger accounts
       were as follows:

Cash on Hand	$	64.96
Savings Bank Account		351.42
Checking Account		131.09
Accounts Payable		24.16
Dr. Roberts — Dentist		75.00
War Bonds		375.00
Interest on War Bonds		.60
War Stamps		6.50
War Bond Account—XYZ Insurance Co.		14.25
Automobile	450.00	
Less Depreciation	162.00	288.00
Auto Insurance (Prepaid)		18.00
Salary		100.00
Miscellaneous Expenses		19.43
Rent		35.00
Amusements		8.66
Food		29.40
Social Security		1.00
Income Tax Withheld		14.00
Contributions		1.25
Gifts		3.00
Stationery and Supplies		1.28
Auto Expenses		11.14
Clothing		19.06
John Jones, Personal		1,193.88

   On January 31, 1944, John Jones receives his semi-monthly
   salary check of $100 from the XYZ Insurance Co., from

which is deducted $14 for Income Tax, $1 for Social Security, $10 for War Bonds and $1.50 for Hospitalization, leaving a total of $73.50 which he receives when he cashes his check. He then spends the following amounts:

Dr. Roberts — Dentist............................ $	25.00
Miscellaneous	.57
Food	1.60
War Stamps	.50
Deposit in Savings Bank...........................	50.00
Deposit in Checking Account.......................	25.00

Set up "T" accounts where necessary, record the above transactions, and take a trial balance as of January 31, 1944.

8. Mr. A opened a dry goods store on July 1, 1942 with a capital of $5,000. Eleven months later, on the night of May 31, 1943, the store and contents (including the books of account) were destroyed by fire just before the monthly accounts were to be made up.

Mr. A recalled certain pertinent items of information and estimated others as follows:

Net Sales for ten months..........................	$20,000
Net Expenses for ten months......................	4,000
Estimated Purchases of merchandise for eleven months	14,000
Estimated Recovery from fire policy for merchandise..	2,500
Estimated Recovery from fire policy for furniture and fixtures............................	700
Due Mr. B. on note (end of eleven months)..........	250
Cash in bank (end of eleven months)	4,200
Estimated Accounts payable (end of eleven months) ..	1,000
Estimated Accounts receivable (end of eleven months)	500
Drawings (eleven months).........................	1,450
Inventory July 1, 1942............................	3,000

Estimate Mr. A's net worth after the fire by setting up a profit and loss statement and balance sheet, assuming average sales and expenses in eleventh month.

PART IV

1. (a) If n is the product of any 69 integers taken at random, find, to the first significant place of decimals, the value of the probability that n is not a multiple of 5, given that

$$\log_{10} 2 = .30103.$$

(b) A book contains 1,000 pages. A page is chosen at random. What is the chance that the sum of the digits of the number on the page is nine?

2. (a) *A* and his wife engage in a mixed doubles tennis tournament in which each pair of players consists of one member of each sex. There are fourteen other persons, seven of each sex, also entered for the tournament and players are drawn by lot before each round in such a way that any person of one sex may be the partner of any person of the other sex. Only the winners in one round enter the next round. Assuming that all players of each sex are equal in skill, find the probability that *A* and his wife will play together as partners in the final round.

   (b) An experiment succeeds twice as often as it fails. Find the chance that in the next six trials there will be at least four successes.

3. A bag contains 6 black balls and an unknown number, not greater than six, of white balls; three are drawn successively and not replaced and all are found to be white. Find the chance that a black ball will be drawn next.

4. Of two purses, one originally contained 20 silver dollars and the other 8 silver dollars and 12 half dollars. One purse is taken at random and 3 coins drawn out, which prove to be all silver dollars. What is the chance that this purse contains only silver dollars? What is the probable value of the next coin drawn from it, assuming that the 3 coins have not been put back?

> *Note*: The following values will be useful in solving problems 5 to 8 inclusive.
>
> | | |
> |---|---|
> | $D_{40} = 19727$ | $D_{50} = 12499$ |
> | $M_{40} = 8089$ | $N_{50} = 181663$ |
> | $N_{40} = 344167$ | $M_{55} = 5511$ |
> | | $D_{55} = 9733$ |

5. (a) A single premium whole life policy is sold at age 40 with the provision that the gross premium without interest will be returned, together with the face amount $1,000, at the death of the insured. Compute the net and gross premiums for this policy, assuming the gross premium is obtained from the formula

$$P' = (P + c)(1 + K)$$

where P = the net level premium

$c = \$5$

and $K = .1$

(b) A beneficiary now aged 50 is offered one of the following options:

    (a) $10,000 in cash or

    (b) Equal payments at the beginning of each month as long as she lives.

Compute the monthly payment under option (b).

6. (a) A child's endowment policy issued at age 1 provides for a death benefit of $100 in event of death the first year, $200 in event of death the second year, and so on, increasing by $100 per year until a maximum of $1,000 is reached. The policy matures at age 21 with an endowment of $1,000. Show that the net annual premium payable for twenty years is

$$1000 \frac{0.1\,(R_1 - R_{11}) - M_{21} + D_{21}}{N_1 - N_{21}}$$

6. (b) Assuming that the gross premium is the same as the net premium, how large an endowment policy maturing in fifteen years can be purchased by an annual payment of $100. to be paid each year for ten years by an individual now aged 40?

7. (a) Express in terms of commutation symbols the fifth terminal reserve for a twenty payment $1,000. life policy issued at age 25, using the retrospective method.

(b) The probability that at least one of two lives A and B will die in the next 10 years is 0.44. The probability that at least one of the two lives will survive the period is 0.94. Find the probability that A will be living at the end of the ten years.

8. (a) Table I in Special Bulletin No. 207, published by the New York State Department of Labor, gives the present value per $100 annual wages of compensation payable to widows from ages 15 to 103. Explain why the present values gradually increase to age 42 and gradually decrease thereafter. How does Special Bulletin No. 207 differ from Special Bulletin No. 190 which it superseded?

(b) Explain what the following expressions mean:

i) $\dfrac{A_{\overline{xy}}}{a_{\overline{xy}}}$ ii) $750\, a_{x|y}$ iii) $\dfrac{D_{w+n,\,w+n}}{D_{ww}}$ iv) $a_{\overline{xys}}$

PART V

1. (a) Discuss the significance of over-insurance and methods of avoiding it in connection with
   - (i) non-cancellable accident and health policies and
   - (ii) other accident and health policies.

   (b) Describe the principal features of the 1943 Workmen's Compensation Rating Program of the National Council on Workmen's Compensation Insurance.

2. (a) Discuss the objectives of the automobile liability policy standardization plan.

   (b) Where board and lodging constitute part of an employee's earnings, what values for such items are included with actual wages in the calculation of the premium for Workmen's Compensation Insurance?

3. (a) What is the definition of "one location" in the new boiler and machinery manual?

   (b) What relief does an insurance carrier have in the event of non-payment of premium under a surety bond, and in what respect, if any, does this relief differ from other lines of insurance?

4. Briefly outline the National Council's Workmen's Compensation classification rate making procedure.

5. (a) Why was the use of a contingency loading eliminated from Workmen's Compensation Insurance rate making?

   (b) What are the two most essential qualifications that should be considered in selecting the exposure medium most desirable as a premium basis?

6. (a) Outline the procedure that was followed in the development of the Specific Occupational Disease Rating Plan that was adopted in 1934 by the National Council on Workmen's Compensation Insurance.

   (b) What are the arguments for classifying "by product" and for classifying "by process" in Workmen's Compensation Insurance?

7. (a) Assume that an insured is a travelling salesman and owns a private passenger car which he uses in connection with his business and also for pleasure purposes. The car is insured for Bodily Injury Liability, Property Damage Liability, and Medical Payments including named insured

coverage under an automobile liability policy which contains the standard provisions. Due to gasoline rationing the insured no longer uses his car for long distant trips which he occasionally is required to make. Instead he uses the railroad to get to his destination and then hires a car which he drives himself for local use. While using a hired car, he struck another automobile causing injury to occupants and was himself injured, requiring hospital care. What coverage does the policy provide for this accident?

(b) What procedure is followed in providing rates for higher limits for Workmen's Compensation and Liability Insurance in the Maritime employments?

8. Assume that it is the practice of an insurance carrier to endeavor to cancel or refuse to renew individual private passenger automobile insurance policies on which a serious Bodily Injury claim has occurred. Do you think that this apparent departure from the mathematical concept of credibility is justified? Discuss.

EXAMINATION FOR ADMISSION AS FELLOW

PART I

1. Discuss the effects of inflation on a casualty insurance company and the extent to which they may influence a company's investment policy. What can such a company do to improve its position in an inflation and the following readjustment period? Do not limit your discussion to purely investment considerations.

2. Assume that on the date of this examination the United States Treasury offered new eleven year, $2\frac{1}{4}\%$ bonds (callable in nine years) and new twenty-five year, $2\frac{1}{2}\%$ bonds (callable in twenty years). Assume that you are investment officer of a casualty insurance company whose investments consist of $5,000,000 of United States Treasury Bonds and $4,000,000 of highest grade railroad and utility bonds, both well diversified as to maturity, $200,000 of common stock and $500,000 in cash available for new investments. The Company's management has definitely decided to keep the remaining $5,000,000 of assets in cash. How would you divide the new investment among (a) the new $2\frac{1}{4}\%$ bonds, (b) the new $2\frac{1}{2}\%$ bonds and (c) other investments? Discuss your reasons fully.

3. (a) Distinguish between investment credit instruments and commercial credit instruments.

(b) Outline the requirements laid down by the New York Insurance Law governing the incorporation of an insurance company.

4. (a) Discuss briefly the extra-territorial provisions of State Workmen's Compensation Laws.

   (b) Outline the major requirements for an effective plan of State rate regulation.

5. Outline the important difference between the Financial Responsibility laws in effect in New York and New Hampshire.

6. (a) What are the bases on which casualty insurance companies are taxed by the United States Government? Would you suggest any changes in this method of taxation?

   (b) Considering the economic theory of risk, discuss the theory of combining various casualty lines of insurance for the purpose of rating assureds.

7. An extremely large corporation requests your advice on self-insuring the following lines of insurance. What factors would you consider in preparing your answer?

   1) Product Liability Insurance
   2) Group Hospitalization Insurance
   3) Ocean Marine
   4) Workmen's Compensation Insurance

8. (a) How would you distinguish between economic and extra-economic risks?

   (b) Discuss briefly the concept of "the cost of risk".

PART II

1. (a) What information should be shown on premium punch cards of multiple line casualty companies for use in calculating pro rata unearned premium reserves? Describe one tabulating and calculating procedure for this reserve.

   (b) In what respect are bond losses given exceptional treatment under Schedule "O" and why?

2. What premises underlie the Schedule "P" formula reserve? Give some of the reasons why these premises may not be valid in actual practice.

3. (a) Outline a method for determining reserves for incurred but unreported losses for a multiple line casualty company.

(b) What current statistics developed outside of the casualty insurance business might be of assistance in indicating the loss ratio trend of Workmen's Compensation Insurance?

4. Discuss the internal statistical value of the data developed under the unit statistical plan. Consider in your discussion the size of the company and the method of producing business.

5. (a) Outline a method that would provide an approximation of the variations by size of risk in payroll audit and safety engineering expenses for Workmen's Compensation Insurance.

   (b) Of what value would the results of this study be in

       (i) Ratemaking
       (ii) Sales Promotion
       (iii) Agency Analysis

6. It has been asserted that the Annual Statement Blank of the National Association of Insurance Commissioners for Casualty Insurance companies tends to overvalue assets and undervalue liabilities. Name the assets and liabilities which might be subject to this criticism. What justification is there for leaving this situation unchanged?

7. (a) What current external statistics may indicate the trend of automobile liability insurance loss costs?

   (b) The following data is taken from the records of a casualty insurance company. The information refers to transactions in 1943 and assets and liabilities as of December 31, 1943, except where otherwise specified. Prepare a statement of assets and liabilities as of December 31, 1943, following the form of the Annual Statement Blank of the National Association of Insurance Commissioners. In your answer you may refer to the numbers opposite each item rather than writing out the actual item.

1. Net Premiums written............................. $8,000,000
2. Interest, dividends and rents received................ 200,000
3. Gross profit on sale of ledger assets................. 50,000
4. Gross increase by adjustment in book value of ledger assets (including $5,000 accrual of bond discounts). 10,000
5. Paid for losses.................................... 3,800,000
6. Paid for investigation and adjustment of claims...... 700,000
7. Underwriting expenses paid (excluding ⅛ of 1% of mean invested assets)........................... 2,480,000
8. Investment expenses paid.......................... 10,000
9. Dividends to stockholders.......................... 100,000

10. Gross loss on sale of ledger assets.................... $40,000
11. Gross decrease by adjustment in book value of ledger
    assets (including $10,000 for bond amortization)...   20,000
12. Real Estate.......................................   200,000
13. Bonds 5,000,000
14. Stocks 1,000,000
15. Cash 5,000,000
16. Premiums in course of collection less than 90 days due   800,000
17. Premiums in course of collection more than 90 days due   50,000
18. Interest and rent accrued..........................   20,000
19. Book value of stocks over market value 12/31/43......   20,000
20. Reserve for losses 12/31/43....................... 5,000,000
21. Reserve for investigation and adjustment of claims
    12/31/43   100,000
22. Reserve for unearned premiums 12/31/43............ 3,000,000
23. Underwriting expenses unpaid 12/31/43.............   520,000
24. Capital 12/31/43 1,000,000
25. Surplus 12/31/43.................................. 2,355,000
26. Unearned premiums 12/31/42....................... 2,700,000
27. Unpaid losses 12/31/42............................ 4,500,000
28. Unpaid loss expenses 12/31/42.....................   90,000
29. Unpaid underwriting expenses 12/31/42............   450,000
30. Premiums in collection over 90 days due 12/31/42.....   40,000
31. Interest and rents accrued 12/31/42.................   15,000
32. ⅛ of 1% of mean invested assets....................   10,000
33. Book value of stocks over market value 12/31/42......   10,000
34. Capital 12/31/42 1,000,000
35. Surplus 12/31/42.................................. 2,150,000
36. Dividends declared but unpaid to stockholders 12/31/42   25,000
37. Dividends declared but unpaid to stockholders 12/31/43   25,000

8. Make use of the information provided in question 7(b) to
prepare the underwriting and investment exhibit following the
form of the Annual Statement Blank of the National Associa-
tion of Insurance Commissioners.

PART III

1. (a) Outline the principal steps involved in experience-rating
       an automobile fleet.

   (b) Outline the principal steps involved in experience-rating
       a Workmen's Compensation risk in accordance with the
       National Council's 1943 Experience Rating Plan.

2. (a) The prospective Workmen's Compensation Experience
       Rating Plan produced an off-balance. Discuss the possi-
       bilities of the 1943 New Workmen's Compensation Rating
       Program of the National Council being off-balance, giv-
       ing reasons for your answers.

(b) Outline a method for determining the discounts for deductible coverage on liability lines other than automobile.

3. (a) What experience period is used and what steps are followed in experience-rating a plate glass risk?

(b) What is the definition of "risk" under the new retrospective rating plans and under the guaranteed cost premium discount plan?

4. The latest report of the Social Security Board proposes a federally administered program of compulsory sickness insurance. Rhode Island already has a state administered compulsory sickness insurance plan. It has been suggested that private companies issue a special low cost sickness insurance policy to be sold individually and voluntarily in lieu of compulsory plans. What are the advantages and disadvantages of each of these three methods of providing a sickness insurance?

5. (a) What is meant under social insurance plans by

   (i) the individual accounts pattern

   (ii) the average premium pattern, and

   (iii) the annual estimates pattern.

(b) Contrast the implications of individual equity under private insurance and under social insurance.

6. (a) Assuming that this country has in effect what you consider to be a broad program of social security which is fully matured, and assuming a stable population, estimate roughly the number of beneficiaries of each type of benefit at a given time.

(b) Draw an "organization" chart for a large multiple line casualty company.

7. Assume that a Company has some agents devoting their entire time to the production of accident and health insurance, others devoting their entire time to selling personal effects insurance, and others selling only automobile insurance. The Company also accepts business on these three lines from brokers. The business from the full time agents is kept separate from the business received from brokers. What differences would you expect in each line between the experience on policies produced by full time agents and policies produced by brokers? Give your reasons for this opinion.

8. Assume that the president of a multiple line casualty insurance company is convinced that a rapid decline in prices, wages and employment is imminent. What steps might be taken to protect his Company against these contingencies?

INDEX TO VOLUME XXX

CASUALTY

ACTUARIAL SOCIETY

ORGANIZED 1914

1944 YEAR BOOK

(Addendum to Volume XXX of the *Proceedings*)

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 1914 little technical study was given to the actuarial and underwriting problems of most of the branches of casualty insurance. 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 original 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. The Committee on Compensation and Liability Loss Reserves submitted a report which has been printed in *Proceedings* No. 35 and No. 36. The Committee on Remarriage Table submitted a report including tables, printed in *Proceedings* No. 40. The Special Committee on Bases of Exposure submitted a report which is printed in *Proceedings* No. 43. The "Recommendations for Study" appear in *Proceedings* No. 54.

The lower grade of membership in the Society is that of Associate. Examinations have been held every year since organization; they are held on the first Wednesday and following Thursday in April, 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 282, consisting of 159 Fellows and 123 Associates.

The annual meeting of the Society is held in New York in November and the semi-annual meeting is held in May. The Society has decided to discontinue its May meeting for the duration. The twenty-fifth anniversary of the Society was appropriately celebrated in New York on November 16 and 17, 1939.

The Society issues a publication entitled the *Proceedings* which contains original papers presented at the meetings. The *Proceedings* also contain discussions of papers, reviews of books and current notes. This Year Book is published annually 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 7, N. Y.

CASUALTY ACTUARIAL SOCIETY

NOVEMBER 17, 1943

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MEMBERSHIP OF THE SOCIETY, NOVEMBER 17, 1943

FELLOWS

Those marked (†) were Charter Members at date of organization, November 7, 1914.

Those marked (*) have been admitted as Fellows upon examination by the Society.

Date Admitted	
*Nov. 21, 1930	AINLEY, JOHN W., The Travelers Insurance Company, 700 Main Street, Hartford, Conn.
*Nov. 13, 1931	AULT, GILBERT E., Actuary, Church Pension Fund and Church Life Insurance Corporation, 20 Exchange Place, New York.
May 23, 1924	BAILEY, WILLIAM B., Economist, The Travelers Insurance Company, 700 Main Street, Hartford, Conn.
*Nov. 20, 1924	BARBER, HARMON T., Assistant Actuary, Casualty Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford, Conn.
*Nov. 20, 1942	BART, ROBERT D., (American) Lumbermen's Mutual Casualty Company, 4750 Sheridan Road, Chicago, Ill.
*Nov. 18, 1932	BARTER, JOHN L., Secretary, Hartford Accident & Indemnity Co., Hartford, Conn.
*Nov. 13, 1931	BATHO, ELGIN R., Assistant Actuary, Equitable Life Insurance Company of Canada, Waterloo, Ontario, Canada.
†	BENJAMIN, ROLAND, Treasurer, Fidelity & Deposit Company of Maryland and American Bonding Company, Baltimore, Md.
*Nov. 22, 1934	BERKELEY, ERNEST T., Superintendent, Actuarial Department, Employers Liability Assurance Corporation, Boston, Mass.
†	BLACK, S. BRUCE, President, Liberty Mutual Insurance Company, 175 Berkeley Street, Boston, Mass.
Apr. 20, 1917	BLANCHARD, RALPH H., Professor of Insurance, School of Business, Columbia University, New York.
†	BREIBY, WILLIAM, Vice-President, Pacific Mutual Life Insurance Company, Los Angeles, Cal.
*Nov. 18, 1927	BROWN, F. STUART, Statistician, Indemnity Insurance Co. of North America, 1600 Arch St., Philadelphia, Pa.
Oct. 22, 1915	BROWN, HERBERT D., (Retired), Glenora, Yates County, New York.
†	BUCK, GEORGE B., Consulting Actuary for Pension Funds, 150 Nassau Street, New York.

FELLOWS

Date Admitted	
Apr. 20, 1917	BURHOP, WILLIAM H., Executive Vice-President, Employers Mutual Liability Insurance Company, Wausau, Wis.
*Nov. 23, 1928	BURLING, WILLIAM H., Assistant Actuary, The Travelers Insurance Company, 700 Main Street, Hartford, Conn.
*Nov. 19, 1929	CAHILL, JAMES M., Actuary, Compensation Insurance Rating Board, 125 Park Avenue, New York.
*Nov. 18, 1932	CAMERON, FREELAND R., Assistant Manager, Automobile Department, American Surety Company, 100 Broadway, New York.
†	CAMMACK, EDMUND E., Vice-President and Actuary, Aetna Life Insurance Company, Hartford, Conn.
*Nov. 17, 1938	CARLETON, JOHN W., Liberty Mutual Insurance Company, 175 Berkeley Street, Boston, Mass.
*Nov. 21, 1930	CARLSON, THOMAS O., Assistant Actuary, National Bureau of Casualty & Surety Underwriters, 60 John Street, New York.
†	CARPENTER, RAYMOND V., (Retired), 66 Park Avenue, New York.
Mar. 20, 1941	CARVER, HARRY C., Professor of Mathematics, University of Michigan, Ann Arbor, Michigan.
*Nov. 13, 1936	CLEARY, ARTHUR E., Actuary, Massachusetts Insurance Department, 100 Nashua Street, Boston, Mass.
*Nov. 15, 1918	COATES, BARRETT N., Coates and Herfurth, Consulting Actuaries, 582 Market Street, San Francisco, Calif.
*Nov. 17, 1922	COATES, CLARENCE S., Assistant Secretary, Lumbermens Mutual Casualty Company, Mutual Insurance Bldg., Chicago, Ill.
Oct. 27, 1916	COGSWELL, EDMUND S., First Deputy Commissioner of Insurance, 100 Nashua Street, Boston, Mass.
Feb. 19, 1915	COLLINS, HENRY, Manager and Attorney, Ocean Accident & Guarantee Corporation and President, Columbia Casualty Company, 1 Park Avenue, New York.
*Nov. 23, 1928	COMSTOCK, W. PHILLIPS, Statistician, London Guarantee & Accident Company, 55 Fifth Avenue, New York.
*Nov. 22, 1934	CONSTABLE, WILLIAM J., Secretary, Lumbermens Mutual Casualty Company, 342 Madison Avenue, New York.
*Nov. 22, 1934	COOK, EDWIN A., Assistant Secretary, Interboro Mutual Indemnity Insurance Company, 270 Madison Avenue, New York.
†	COPELAND, JOHN A., Consulting Actuary, Candler Building, Atlanta, Ga.
*Nov. 18, 1925	CORCORAN, WILLIAM M., Consulting Actuary, Wolfe, Corcoran & Linder, 116 John Street, New York.
*Nov. 19, 1926	CRANE, HOWARD G., Treasurer, General Reinsurance Corporation, 90 John Street, New York.
*Nov. 18, 1932	DAVIES, E. ALFRED, Asst. to Treasurer, Liberty Mutual Insurance Company, 175 Berkeley Street, Boston, Mass.
*Nov. 18, 1927	DAVIS, EVELYN M., Woodward, Ryan, Sharp & Davis, Consulting Actuaries, 41 Park Row, New York.

FELLOWS

Date Admitted	
	DEARTH, ELMER H., (Retired), 1409 Clark St., Des Moines, Iowa.
†	DEKAY, ECKFORD C., President, DeKay & Company, 84 William Street, New York.
*Nov. 17, 1920	DORWEILER, PAUL, Actuary, Aetna Casualty & Surety Company, Hartford, Conn.
May 19, 1915	DUNLAP, EARL O., (Retired), Suburban Hotel, East Orange, New Jersey.
*Nov. 24, 1933	EDWARDS, JOHN, Casualty Actuary, Ontario Insurance Department, 91 Arundel Avenue, Toronto, Ontario, Canada.
*Nov. 15, 1940	ELLIOTT, GEORGE B., Compensation Actuary, Pennsylvania Insurance Department, 938 Public Ledger Bldg., Philadelphia, Pa.
*Nov. 17, 1922	ELSTON, JAMES S., Assistant Actuary, Life Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford, Conn.
*Nov. 15, 1935	EPPINK, WALTER T., Vice-President, Merchants' Mutual Casualty Co., Casualty Insurance Building, Buffalo, New York.
†	FACKLER, EDWARD B., Consulting Actuary, Fackler & Company, 8 West 40th Street, New York.
†	FALLOW, EVERETT S., Actuary, Accident Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford, Conn.
*Nov. 15, 1940	FARLEY, JARVIS, Actuary and Asst. Treasurer, Massachusetts Indemnity Co., 632 Beacon Street, Boston, Mass.
†	FARRER, HENRY, Insurance Company of North America, 99 John Street, New York.
*Nov. 15, 1935	FITZHUGH, GILBERT W., Assistant Actuary, Metropolitan Life Insurance Co., 1 Madison Avenue, New York.
†	FLYNN, BENEDICT D., Vice-President and Actuary, The Travelers Insurance Co., 700 Main Street, Hartford, Conn.
Feb. 19, 1915	FONDILLER, RICHARD, Woodward and Fondiller, Consulting Actuaries, 90 John Street, New York.
*Nov. 22, 1934	FULLER, GARDNER V., Lumbermens Mutual Casualty Co., Compensation & Liability Dept., 260 Tremont St., Boston, Mass.
†	FRANKLIN, CHARLES H., (Retired), 5157 Latimer Place, Seattle, Washington.
*Nov. 18, 1927	FREDRICKSON, CARL H., Actuary, Canadian Underwriters Association, 55 York Street, Toronto, Canada.
†	FURZE, HARRY, (Retired), 42 Douglas Road, Glen Ridge, N. J.
Feb. 19, 1915	GARRISON, FRED S., Secretary, The Travelers Indemnity Co., 700 Main Street, Hartford, Conn.
*Nov. 20, 1924	GINSBURGH HAROLD J., Vice-President, American Mutual Liability Insurance Co., 142 Berkeley Street, Boston, Mass.

FELLOWS

Date Admitted	
*Nov. 21, 1930	GLENN, J. BRYAN, 5214 First Street, N. W., Washington, D. C.
*Nov. 13, 1931	GODDARD, RUSSELL P., American Mutual Liability Insurance Company, 142 Berkeley Street, Boston, Mass.
†	GOODWIN, EDWARD S., 750 Main Street, Hartford, Conn.
*Nov. 19, 1926	GRAHAM, CHARLES M., Associate Actuary, State Insurance Fund, 625 Madison Avenue, New York.
Oct. 22, 1915	GRAHAM, THOMPSON B., Fourth Vice President, Metropolitan Life Insurance Co., 1 Madison Avenue, New York.
†	GRAHAM, WILLIAM J., Vice-President, Equitable Life Assurance Society, 393 Seventh Avenue, New York.
†	GREENE, WINFIELD W., Vice-President, General Reinsurance Corporation, 90 John Street, New York.
†	HAMMOND, H. PIERSON, Actuary, Life Actuarial Department, The Travelers Insurance Co., 700 Main St., Hartford, Conn.
Oct. 27, 1916	HARDY, EDWARD R., Secretary-Treasurer, Insurance Institute of America, Inc., 80 John Street, New York.
Oct. 22, 1915	HATCH, LEONARD W., (Retired), 425 Pelham Manor Road, Pelham Manor, New York.
*Nov. 19, 1926	HAUGH, CHARLES J., Actuary, National Bureau of Casualty & Surety Underwriters, 60 John Street, New York.
May 23, 1924	HOBBS, CLARENCE W., Special Representative of the National Association of Insurance Commissioners, National Council on Compensation Insurance, 45 East 17th Street, New York.
Oct. 22, 1915	HODGKINS, LEMUEL G., Secretary, Massachusetts Protective Association and Massachusetts Protective Life Assurance Co., Worcester, Mass.
†	HOFFMAN, FREDERICK L., Consulting Statistician, 1978 Sunset Boulevard, San Diego, California.
Oct. 22, 1915	HOLLAND, CHARLES H., Suite 2001, 165 Broadway, New York.
*Nov. 22, 1934	HOOKER, RUSSELL O., Actuary, Connecticut Insurance Department, Hartford, Conn.
Nov. 18, 1932	HUEBNER, SOLOMON S., Professor of Insurance, University of Pennsylvania, Philadelphia, Pa.
†	HUGHES, CHARLES, Principal Insurance Report Auditor, New York Insurance Department, 61 Broadway, New York.
Nov. 19, 1929	HULL, ROBERT S., Unemployment Compensation Division, Social Security Board, Washington, D. C.
†	HUNTER, ARTHUR, (Retired), 124 Lloyd Road, Montclair, N. J.
Feb. 25, 1916	JACKSON, CHARLES W., Consulting Actuary, Woodward and Fondiller, 90 John Street, New York.
*Nov. 19, 1929	JACKSON, HENRY H., Vice President & Actuary, National Life Insurance Co., Montpelier, Vt.
*Nov. 14, 1941	JOHNSON, ROGER A., JR., Assistant Actuary, Compensation Insurance Rating Board, 125 Park Avenue, New York.
*Nov. 16, 1939	JONES, HAROLD M., Liberty Mutual Insurance Company, 175 Berkeley Street, Boston, Mass.
*Nov. 17, 1938	KARDONSKY, ELSIE, 66 Corbin Place, Brooklyn, N. Y.
Nov. 17, 1938	KELLY, GREGORY C., General Manager, Pennsylvania Compensation Rating & Inspection Bureau, 938 Public Ledger Bldg., Philadelphia, Pa.

FELLOWS

Date Admitted	
*Nov. 19, 1926	KELTON, WILLIAM H., Assistant Actuary, Life Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford, Conn.
*Nov. 21, 1919	KIRKPATRICK, A. LOOMIS, Insurance Editor, Chicago Journal of Commerce, 12 East Grand Avenue, Chicago, Ill.
*Nov. 14, 1941	KOLODITZKY, MORRIS, State Insurance Fund, 625 Madison Avenue, New York.
*Nov. 24, 1933	KORMES, MARK, Consulting Actuary, 341 Madison Avenue, New York.
Nov. 23, 1928	KULP, CLARENCE A., Professor of Insurance, University of Pennsylvania, Logan Hall, 36th Street and Woodland Avenue, Philadelphia, Pa.
Nov. 13, 1931	LA MONT, STEWART M., (Retired), 305 Sheldon Avenue, New Rochelle, New York.
*Nov. 24, 1933	LANGE, JOHN R., Chief Actuary, Wisconsin Insurance Department, State House, Madison, Wis.
†	LEAL, JAMES R., Vice-President and Secretary, Interstate Life and Accident Co., Interstate Building, 540 McCallie Avenue, Chattanooga, Tenn.
†	LESLIE, WILLIAM, General Manager, National Bureau of Casualty & Surety Underwriters, 60 John Street, New York.
*Nov. 20, 1924	LINDER, JOSEPH, Consulting Actuary, Wolfe, Corcoran & Linder, 116 John Street, New York.
*Nov. 13, 1936	LYONS, DANIEL J., Assistant Actuary, Guardian Life Insurance Co., 50 Union Square, New York.
†	MAGOUN, WILLIAM N., (Retired), 33 Fearing Road, Hingham, Mass.
*Nov. 23, 1928	MARSHALL, RALPH M., Assistant Actuary, National Council on Compensation Insurance 45 East 17th Street, New York.
*Nov. 18, 1927	MASTERSON, Norton E., Vice-President and Actuary, Hardware Mutual Casualty Co., Stevens Point, Wis.
*Nov. 19, 1926	MATTHEWS, ARTHUR N., Asst. Actuary, Casualty Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford, Conn.
May 19, 1915	MAYCRINK, EMMA C., Secretary-Treasurer, Association of New York State Mutual Casualty Companies, 60 East 42nd Street, New York.
*Nov. 16, 1923	McCLURG, D. RALPH, Secretary and Treasurer, National Equity Life Insurance Co., Little Rock, Ark.
*Nov. 15, 1935	McCONNELL, MATTHEW H., JR., Underwriter, Employers Mutual Liability Ins. Co., 60 E. 42nd Street, New York.
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 Street, Hartford, Conn.
†	MICHELBACHER, GUSTAV F., Vice-President and Secretary, Great American Indemnity Co., 1 Liberty Street, New York.
*Nov. 17, 1938	MILLER, JOHN H., Vice President and Actuary, Monarch Life Insurance Company, Springfield, Mass.

Date Admitted	
†	MILLIGAN, SAMUEL, Second Vice-President, Metropolitan Life Insurance Co., 1 Madison Avenue, New York.
*Nov. 18, 1937	MILLS, JOHN A., Vice President, Lumbermens Mutual Casualty Co., and American Motorists Insurance Co., Mutual Insurance Bldg., Chicago, Ill.
*Nov. 18, 1921	MONTGOMERY, VICTOR, President, Pacific Employers Insurance Co., 1033 So. Hope Street, Los Angeles, Calif.
Nov. 19, 1926	MOONEY, WILLIAM L., (Retired), 4 Pleasant Street, West Hartford, Conn.
†	MOORE, GEORGE D., Comptroller, Aero Insurance Underwriters, 111 John St., New York.
†	MOWBRAY, ALBERT H., Consulting Actuary, 806 San Luis Road, Berkeley, Calif.
*Nov. 17, 1920	MUELLER, LOUIS H., President, Associated Insurance Fund, 332 Pine Street, San Francisco, Calif.
†	MULLANEY, FRANK R., Vice-President and Secretary, American Mutual Liability Insurance Co., and American Policy-holders' Insurance Co., 142 Berkeley Street, Boston, Mass.
May 28, 1920	MURPHY, RAY D., Vice-President and Actuary, Equitable Life Assurance Society, 393 Seventh Avenue, New York.
*Nov. 15, 1935	OBERHAUS, THOMAS M., Assistant Actuary, Woodward and Fondiller, Consulting Actuaries, 90 John Street, New York.
†	OLIFIERS, EDWARD, Actuary and Managing Director, Previdencia do Sul, Caixa Postal 8 Petropolis, Rio, Brazil.
Nov. 18, 1927	O'NEILL, FRANK J., (Retired), Hotel Sheraton, 37th Street and Lexington Avenue, New York.
†	ORR, ROBERT K., 226 S. Logan Street, Lansing, Mich.
*Nov. 21, 1919	OUTWATER, OLIVE E., Actuary, Benefit Association of Railway Employees, 901 Montrose Avenue, Chicago, Ill.
*Nov. 18, 1921	PERKINS, SANFORD B., Secretary, The Travelers Insurance Co., 700 Main Street, Hartford, Conn.
*Nov. 21, 1930	PERRYMAN, FRANCIS S., Secretary and Actuary, Royal Indemnity Co., and Eagle Indemnity Co., 150 William Street, New York.
*Nov. 14, 1941	PETERS, STEFAN, Assistant Actuary, Compensation Insurance Rating Board, 125 Park Avenue, New York.
Nov. 19, 1926	PHILLIPS, JESSE S., Chairman of Board, Great American Indemnity Co., 1 Liberty Street, New York.
*Nov. 24, 1933	PICKETT, SAMUEL C., Assistant Actuary, Connecticut Insurance Department, Hartford, Conn.
*Nov. 17, 1922	PINNEY, SYDNEY D., 290 Wolcott Hill Road, Wethersfield 9, Conn.
*Nov. 13, 1931	PRUITT, DUDLEY M., Actuary, General Accident Fire & Life Assurance Corp., Fourth & Walnut Sts., Philadelphia, Pa.
May 23, 1919	RICHARDSON, FREDERICK, Deputy Chairman of the Board, General Accident Fire and Life Assurance Corporation, Perth, Scotland.
*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, New York.

FELLOWS

Date Admitted	
*Nov. 16, 1939	ROBBINS, RAINARD B., Vice President and Secretary, Teachers Insurance and Annuity Association, 522 Fifth Avenue, New York.
*Nov. 16, 1923	ROEBER, WILLIAM F., General Manager, National Council on Compensation Insurance, 45 East 17th Street, New York.
*Nov. 17, 1943	ROSS, SAMUEL M., Actuarial Department, National Bureau of Casualty and Surety Underwriters, 60 John Street, New York, N. Y.
*Nov. 20, 1942	SATTERTHWAITE, FRANKLIN E., Group Division, Aetna Life Ins. Co., Hartford, Conn.
†	SCHEITLIN, EMIL, Treasurer, Globe Indemnity Co., 150 William Street, New York.
*Nov. 18, 1937	SHAPIRO, GEORGE I., First Vice President and General Manager, Public Service Mutual Casualty Co., 342 Madison Avenue, New York.
*Nov. 13, 1931	SILVERMAN, DAVID, c/o Wolfe, Corcoran & Linder, 116 John Street, New York.
*Nov. 24, 1933	SINNOTT, ROBERT V., Assistant Secretary, Hartford Accident and Indemnity Company, 690 Asylum Avenue, Hartford, Conn.
*Nov. 19, 1929	SKELDING, ALBERT Z., Actuary, National Council on Compensation Insurance, 45 East 17th Street, New York.
*Nov. 19, 1929	SKILLINGS, E. SHAW, Actuary, Allstate Insurance Co., 20 North Wacker Drive, Chicago, Ill.
*Nov. 18, 1932	SMICK, JACK J., National Council on Compensation Insurance, 45 East 17th Street, New York.
*Nov. 15, 1940	SMITH, SEYMOUR E., Casualty Actuarial Department, Travelers Insurance Co., Hartford, Conn.
*Nov. 24, 1933	ST. JOHN, JOHN B., Social Security Board, Bureau of Old Age Insurance, 801 Equitable Building, Baltimore, Md.
Nov. 18, 1927	STONE, EDWARD C., U. S. General Manager and Attorney, Employers' Liability Assurance Corporation, Limited, and President, American Employers' Insurance Company, 110 Milk Street, Boston, Mass.
Oct. 22, 1915	STRONG, WILLIAM RICHARD, No. 4 "Sheringham," Cotham Road, Kew, Victoria, Australia.
*Nov. 17, 1920	TARBELL, THOMAS F., Actuary, Casualty Actuarial Department. The Travelers Insurance Co., 700 Main Street, Hartford, Conn.
†	THOMPSON, JOHN S., Vice-President and Mathematician, Mutual Benefit Life Insurance Co., 300 Broadway, Newark, N. J.
†	TRAIN, JOHN L., President and General Manager, Utica Mutual Insurance Co., 185 Genesee Street, Utica, New York.
Nov. 17, 1922	TRAVERSI, ANTONIO T., Consulting Actuary and Accountant, Bank of Adelaide Chambers, Margaret St., Sydney, Australia.
*Nov. 23, 1928	VALERIUS, NELS M., Aetna Casualty and Surety Co., Hartford, Conn.
*Nov. 21, 1919	VAN TUYL, HIRAM O., Supt., Accounts Department, London Guarantee & Accident Co., 55 Fifth Avenue, New York.
*Nov. 17, 1920	WAITE, ALAN W., Assistant Secretary, Aetna Casualty and Surety Co., Hartford, Conn.
*Nov. 15, 1935	WAITE, HARRY V., Statistician, The Travelers Fire Insurance Co., 700 Main Street, Hartford, Conn.

FELLOWS

Date Admitted	
*Nov. 18, 1925	WARREN, LLOYD A. H., Professor of Actuarial Science, University of Manitoba, 64 Niagara Street, Winnipeg, Manitoba, Canada.
*Nov. 15, 1935	WILLIAMS, HARRY V., Supt. Casualty Rating & Research Dept., Hartford Accident and Indemnity Co., Hartford, Conn.
Nov. 14, 1941	WILLIAMSON, WILLIAM R., Actuarial Consultant, Social Security Board, Washington, D. C.
*Nov. 13, 1931	WITTICK, HERBERT E., Secretary, Pilot Insurance Co., 199 Bay Street, Toronto, Canada.
†	WOLFE, LEE J., Consulting Actuary, Wolfe, Corcoran & Linder, 116 John Street, New York.
May 24, 1921	WOOD, ARTHUR B., President and Managing Director, Sun Life Assurance Company of Canada, Montreal, Canada.

ASSOCIATES

Those marked (*) have been enrolled as Associates upon examination by the Society.

Numerals indicate Associateship Part V and Fellowship examination parts credited.

Date Enrolled	
May 23, 1924	ACKER, MILTON, Manager, Compensation and Liability Department, National Bureau of Casualty and Surety Underwriters, 60 John Street, New York.
*Nov. 15, 1918	ACKERMAN, SAUL B., Professor of Insurance, New York University, 90 Trinity Place, New York.
*Nov. 16, 1939	AIN, SAMUEL N., Office of George B. Buck, Consulting Actuary for Pension Funds, 150 Nassau Street, New York.
Apr. 5, 1928	ALLEN, AUSTIN F., President and General Manager, Texas Employers Insurance Association and Employers Casualty Co., Dallas, Texas.
Nov. 15, 1918	ANKERS, ROBERT E., Secretary and Treasurer, Continental Life Insurance Co., Investment Building, Washington, D. C.
*Nov. 21, 1930	ARCHIBALD A. EDWARD, Vice President and Actuary, Volunteer State Life Insurance Company, Chattanooga 1, Tenn. (V, I.)
*Nov. 16, 1939	BAILEY, ARTHUR L., Statistician, American Mutual Alliance, 60 E. 42nd Street, New York.
*Nov. 24, 1933	BARRON, JAMES C., Asst. Treasurer, General Reinsurance Corporation, 90 John Street, New York. (V, I, III.)
*Nov. 23, 1928	BATEMAN, ARTHUR E., Liberty Mutual Insurance Company, 175 Berkeley Street, Boston, Mass. (V, I.)
*Nov. 15, 1940	BATHO, BRUCE, Actuary, Country Life Insurance Company, 608 So. Dearborn St., Chicago, Ill.
*Nov. 18, 1925	BITTEL, W. HAROLD, Chief Asst. Actuary, Department of Banking and Insurance, Trenton 7, New Jersey.
Nov. 17, 1920	BLACK, NELLAS C., Statistician, Maryland Casualty Co., Baltimore, Md.
*Nov. 15, 1940	BLACKHALL, JOHN M., Monarch Life Insurance Co., Springfield, Mass.
*Nov. 22, 1934	BOMSE, EDWARD L., National Bureau of Casualty & Surety Underwriters, 60 John Street, New York.
*Nov. 23, 1928	BOWER, PERRY S., Great West Life Assurance Company, Winnipeg, Manitoba, Canada.
*Nov. 15, 1918	BRUNNQUELL, HELMUTH G., Assistant Actuary, The Northwestern Mutual Life Insurance Co., Milwaukee, Wis.
*Oct. 22, 1915	BUFFLER, LOUIS, Director, Underwriting Department, State Insurance Fund, 625 Madison Avenue, New York.
*Nov. 20, 1924	BUGBEE, JAMES M., Asst. Manager, Automobile Department, Maryland Casualty Co., Baltimore, Md.
Mar. 31, 1920	BURT, MARGARET A., Office of George B. Buck, Consulting Actuary, 150 Nassau Street, New York.
Nov. 17, 1922	CAVANAUGH, LEO D., President, Federal Life Insurance Co., 168 N. Michigan Avenue, Chicago, Ill.

ASSOCIATES

*Nov. 18, 1927 | CHEN, S. T., Actuary, China United Assurance Society, 104 Bubbling Well Road, Shanghai, China.

*Nov. 18, 1927 | CONROD, STUART F., Actuary, Loyal Protective Life Insurance Co., 19 Deerfield Street, Boston, Mass.

*Nov. 24, 1933 | CRAWFORD, WILLIAM H., Secretary, Fireman's Insurance Co. of Newark, N. J. & Affiliated Fire & Casualty Co's Pacific Dept., 220 Bush Street, San Francisco, Cal. (V, I.)

*Nov. 18, 1932 | CRIMMINS, JOSEPH B., Metropolitan Life Insurance Co., 1 Madison Avenue, New York. (V, I.)

*Nov. 18, 1925 | DAVIS, MALVIN E., Associate Actuary, Metropolitan Life Insurance Co., 1 Madison Avenue, New York.

*Nov. 24, 1933 | DAVIS, REGINALD S., Comptroller-Actuary, State Compensation Insurance Fund, San Francisco, Calif. (V, I.)

*Nov. 14, 1941 | DOWLING, WILLIAM F., Asst. Treasurer, Lumber Mutual Casualty Co., 41 E. 42nd Street, New York.

May 25, 1923 | ECONOMIDY, HARILAUS E., Comptroller, Associated Employers Lloyds, Neil P. Anderson Building, Fort Worth, Texas.

June 5, 1925 | EGER, FRANK A., Secretary, Indemnity Insurance Co. of North America, 1600 Arch Street, Philadelphia, Pa.

*Nov. 16, 1923 | FITZ, L. LEROY, Group Department, John Hancock Mutual Life Insurance Company, Boston, Mass. (V, I.)

*Nov. 18, 1927 | FITZGERALD, AMOS H., Assistant Actuary, The Prudential Insurance Company of America, Newark, N. J. (V, I.)

*Nov. 16, 1923 | FLEMING, FRANK A., Actuary, American Mutual Alliance, 60 East 42nd Street, New York.

Nov. 20, 1924 | FROBERG, JOHN, Manager, California Inspection Rating Bureau, 500 Sansome Street, San Franciso, Calif.

*Nov. 13, 1936 | FRUECHTEMEYER, FRED J., Liberty Mutual Insurance Co., 175 Berkeley Street, Boston, Mass. (V, I.)

*Nov. 19, 1929 | FURNIVALL, MAURICE L., Assistant Actuary, Accident Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford, Conn. (V, I.)

*Nov. 18, 1932 | GETMAN, RICHARD A., Life Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford, Conn. (V, I.)

*Nov. 17, 1922 | GIBSON, JOSEPH P., JR., Vice President, Excess Insurance Company of America, 99 John Street, New York.

*Nov. 16, 1923 | GILDEA, JAMES F., The Travelers Insurance Co., 700 Main Street, Hartford, Conn.

Nov. 19, 1929 | GORDON, HAROLD R., Executive Secretary, Health & Accident Underwriters Conference, 176 West Adams Street, Chicago, Ill.

*Nov. 18, 1927 | GREEN, WALTER C., Consulting Actuary, 211 West Wacker Drive, Chicago, Ill.

*Nov. 15, 1940 | GROSSMAN, ELI A., 26 California Street, Mount Vernon, New York.

*Nov. 15, 1935 | GUERTIN, ALFRED N., Actuary, New Jersey Department of Banking and Insurance, Trenton, N. J., (V, I.)

ASSOCIATES

*Nov. 16, 1939 HAGEN, OLAF E., Metropolitan Life Insurance Company, 1 Madison Avenue, New York.

*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., Associate Actuary, Connecticut Insurance Department, Hartford, Conn.

*Nov. 13, 1936 HAM, HUGH P., Automobile Manager & Asst. Secretary, British America Assurance Co., 22 Wellington St. E., Toronto Ontario, Canada. (V, I.)

Mar. 24, 1932 HARRIS, SCOTT, Vice-President, Joseph Froggatt & Co., 74 Trinity Place, New York.

*Mar. 25, 1924 HART, WARD VAN BUREN, Assistant Actuary, Connecticut General Life Insurance Co., Hartford, Conn. (V, I.)

Nov. 21, 1919 HAYDON, GEORGE F., General Manager, Wisconsin Compensation Rating & Inspection Bureau, 715 N. Van Buren Street, Milwaukee, Wis.

Nov. 17, 1927 HIPP, GRADY H., Executive Vice-President, Liberty Life Insurance Co., Greenville, S. C.

Nov. 19, 1929 JACOBS, CARL N., President, Hardware Mutual Casualty Co., Stevens Point, Wis.

*Nov. 18, 1921 JENSEN, EDWARD S., Supt., Group Department, Occidental Life Insurance Co., Los Angeles, Calif. (II, III.)

Nov. 21, 1930 JONES, H. LLOYD, Deputy General Attorney, of Phoenix-London Group, Vice-President, Phoenix Indemnity Company, and Deputy United States Manager, London Accident & Guarantee Co., 55 Fifth Avenue, New York.

*Nov. 21, 1919 JONES, LORING D., (Retired) 64 Raymond Ave., Rockville Centre, Long Island, N. Y.

*Nov. 15, 1940 KELLY, ROBERT G., 723 North 64th Street, Philadelphia, Pa.

*Nov. 17, 1922 KIRK, CARL L., Assistant U. S. Manager, Zurich General Accident & Liability Insurance Co., 135 South LaSalle Street, Chicago, Ill.

*Nov. 15, 1935 KITZROW, ERWIN W., Vice-President, Hardware Mutual Casualty Co., Stevens Point, Wis. (V, I.)

*Nov. 16, 1939 KNOWLES, FREDERICK, 5534 Trans-Island Ave., N.D.G., Montreal, Canada.

*Nov. 18, 1937 LASSOW, WILLIAM, 185 206th St., Bronx, New York. (V.)

*Nov. 17, 1938 LIEBLEIN, JULIUS, 2710-29th, Street, S. E., Washington 20, D. C.

*Nov. 13, 1931 MacKEEN, HAROLD E., The Travelers Insurance Co., 700 Main Street, Hartford, Conn. (V, I.)

Mar. 24, 1932 MAGRATH, JOSEPH J., Executive Assistant, Chubb & Sons, 90 John Street, New York.

*Nov. 18, 1925 MALMUTH, JACOB, Examiner, New York Insurance Department, 61 Broadway, New York.

Mar. 24, 1927 MARSH, CHARLES V. R., Comptroller and Assistant Treasurer, Fidelity & Deposit Co. and American Bonding Co., Baltimore, Md.

*Nov. 13, 1936 MAYER, WILLIAM H., JR., Actuarial Department, Metropolitan Life Insurance Co., 1 Madison Avenue, New York.

*Nov. 17, 1922 McIVER, ROSSWELL A., Actuary, Washington National Insurance Co., 610 Church Street, Evanston, Ill.

ASSOCIATES

Date Enrolled	
*Nov. 17, 1922	MICHENER, SAMUEL M., Actuary, Columbus Mutual Life Insurance Co., 303 East Broad Street, Columbus, Ohio, (V., I)
*Nov. 13, 1931	MILLER, HENRY C., Comptroller, State Compensation Insurance Fund, 450 McAllister Street, San Francisco, Calif. (V, I.)
*Nov. 19, 1926	MILNE, JOHN L., Actuary, Presbyterian Ministers' Fund for Life Insurance, 1805 Walnut Street, Philadelphia, Pa.
*Nov. 18, 1937	MINOR, EDUARD H., Accident and Health Department, Metropolitan Life Insurance Company, 1 Madison Avenue, New York.
Nov. 17, 1922	MONTGOMERY, JOHN C., Secretary and Assistant Treasurer, Bankers Indemnity Insurance Co., 15 Washington Street, Newark, N. J.
May 25, 1923	MOORE, JOSEPH P., President, North American Accident Insurance Co., 455 Craig Street, W., Montreal, Canada.
*Nov. 21, 1919	MOTHERSILL, ROLLAND V., President, Anchor Casualty Co., Anchor Insurance Building, 2700 University Avenue, St. Paul, Minn. (II, III.)
*Nov. 18, 1937	MYERS, ROBERT J., Senior Actuarial Mathematician, Social Security Board, Washington, D. C.
*Nov. 19, 1929	MULLER, FRITZ, Director, Agrippina Life Insurance Stock Co., Berlin, W. 30 Mackensenstr. 16, Germany.
*Nov. 15, 1935	NELSON, S. TYLER, Utica Mutual Insurance Co., 185 Genesee Street, Utica, New York.
*Oct. 27, 1916	NEWELL, WILLIAM, Secretary, Assigned Risk Pool, 60 John Street, New York. (V., I.)
*Nov. 23, 1928	NEWHALL, KARL, Group Department, The Travelers Insurance Co., 700 Main Street, Hartford, Conn.
*Nov. 18, 1925	NICHOLSON, EARL H., Actuary, Joseph Froggatt & Co., 74 Trinity Place, New York.
May 23, 1919	OTTO, WALTER E., President, Michigan Mutual Liability Co., 163 Madison Avenue, Detroit, Mich.
*Nov. 19, 1926	OVERHOLSER, DONALD M., Office of George B. Buck, Consulting Actuary for Pension Funds, 150 Nassau Street, New York.
Nov. 20, 1924	PENNOCK, RICHARD M., Actuary, Pennsylvania Manufacturers' Association Casualty Insurance Co., Finance Building, Philadelphia, Pa.
Nov. 19, 1929	PHILLIPS, JOHN H., Vice-President and Actuary, Employers' Mutual Liability Insurance Co., Wausau, Wis.
*Nov. 17, 1920	PIKE, MORRIS, Vice-President and Actuary, Union Labor Life Insurance Co., 570 Lexington Avenue, New York.
*Nov. 23, 1928	PIPER, KENNETH B., Actuary, Provident Life and Accident Insurance Co., Chattanooga, Tenn. (V, I.)
*Nov. 18, 1927	POISSANT, WILLIAM A., The Travelers Insurance Co., 700 Main Street, Hartford, Conn.
*Nov. 17, 1922	POORMAN, WILLIAM F., Vice-President and Actuary, Central Life Assurance Society, Fifth and Grand Avenues, Des Moines, Iowa. (V, I.)
*Nov. 13, 1936	POTOFSKY, SYLVIA, State Insurance Fund, 625 Madison Avenue, New York. (V.)

ASSOCIATES

Date Enrolled	
Nov. 17, 1922	POWELL, JOHN M., President, Loyal Protective Life Insurance Co., 19 Deerfield Street, Boston, Mass. (V, I.)
*Nov. 15, 1918	RAYWID, JOSEPH, President, Joseph Raywid & Co., Inc., 92 William Street, New York.
Nov. 19, 1932	RICHARDSON, HARRY F., Secretary-Treasurer, National Council on Compensation Insurance, 45 East 17th Street, New York.
*Nov. 18, 1932	ROBERTS, JAMES A., Life Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford, Conn. (V, I.)
*Nov. 15, 1940	ROSENBERG, NORMAN, Actuary, Public Service Mutual Casualty Co., 342 Madison Avenue, New York. (I.)
*Nov. 18, 1927	SARASON, HARRY M., Assistant Actuary, General American Life Insurance Co., 1501 Locust Street, St. Louis, Mo.
Nov. 16, 1923	SAWYER, ARTHUR, Globe Indemnity Co., 150 William Street, New York.
*Nov. 20, 1930	SEVILLA, EXEQUIEL S., Actuary, National Life Insurance Co., P. O. Box 2856, Manila, Philippine Islands.
*Nov. 20, 1924	SHEPPARD, NORRIS E., Professor of Mathematics, University of Toronto, Toronto, Canada. (V, I.)
Nov. 15, 1918	SIBLEY, JOHN L., Assistant Secretary, United States Casualty Co., 60 John Street, New York.
*Nov. 18, 1921	SMITH, ARTHUR G., Assistant General Manager, Compensation Insurance Rating Board, Pershing Square Bldg., 125 Park Avenue, New York.
*Nov. 19, 1926	SOMERVILLE, WILLIAM F., Secretary, St. Paul Mercury Indemnity Co., St. Paul, Minn. (V, I.)
*Nov. 18, 1925	SOMMER, ARMAND, Supt. of Agencies, Continental Casualty Co., 910 So. Michigan Avenue, Chicago, Ill.
*Nov. 15, 1918	SPENCER, HAROLD S., Statistician, Aetna Casualty and Surety Co., Hartford, Conn.
Nov. 20, 1924	STELLWAGEN, HERBERT P., Executive Vice-President, Indemnity Insurance Company of North America, 1600 Arch Street, Philadelphia, Pa.
*Nov. 16, 1923	STOKE, KENDRICK, Actuary, Michigan Mutual Liability Company, 163 Madison Avenue, Detroit, Mich.
*Nov. 21, 1930	SULLIVAN, WALTER F., Insurance Accountant, State Compensation Insurance Fund, 450 McAllister Street, San Francisco, Calif. (V, I.)
Mar. 23, 1921	THOMPSON, ARTHUR E., Chief Statistician, Globe Indemnity Co., 150 William Street, New York. (Deceased Jan. 17, 1944.)
*Nov. 21, 1919	TRENCH, FREDERICK H., Manager, Underwriting Department, Utica Mutual Insurance Co., 185 Genesee Street, Utica, N. Y. (V, I.)
*Nov. 20, 1924	UHL, M. ELIZABETH, National Bureau of Casualty & Surety Underwriters, 60 John Street, New York. (V, I.)
May 23, 1919	WARREN, CHARLES S., Secretary, Massachusetts Automobile Rating and Accident Prevention Bureau, 89 Broad Street, Boston, Mass.
Nov. 18, 1925	WASHBURN, JAMES H., Actuary, 1501 Gale Lane, Nashville, Tenn.

ASSOCIATES

SCHEDULE OF MEMBERSHIP, NOVEMBER 17, 1943

	Fellows	Associates	Total
Membership, November 20, 1942..........	165	126	291
Additions:			
By election...........................	..		..
By reinstatement......................	..		..
By examination.......................	1	..	1
	166	126	292
Deductions:			
By death.............................	6	1	7
By withdrawal........................	1	1	2
By transfer from Associate to Fellow.....	..	1	1
Membership, November 17, 1943..........	159	123	282

OFFICERS OF THE SOCIETY

Since Date of Organization

Elected	President	Vice-Presidents	
1914–1915	*I. M. Rubinow	A. H. Mowbray	B. D. Flynn
1916–1917	*J. D. Craig	*J. H. Woodward	*H. E. Ryan
1918	*J. H. Woodward	B. D. Flynn	G. D. Moore
1919	B. D. Flynn	G. D. Moore	W. Leslie
1920	A. H. Mowbray	W. Leslie	*L. S. Senior
1921	A. H. Mowbray	*L. S. Senior	*H. E. Ryan
1922	*H. E. Ryan	G. F. Michelbacher	E. E. Cammack
1923	W. Leslie	G. F. Michelbacher	E. E. Cammack
1924–1925	G. F. Michelbacher	S. B. Perkins	R. H. Blanchard
1926–1927	S. B. Perkins	G. D. Moore	T. F. Tarbell
1928–1929	G. D. Moore	S. D. Pinney	P. Dorweiler
1930–1931	T. F. Tarbell	*R. A. Wheeler	W. W. Greene
1932–1933	P. Dorweiler	W. F. Roeber	*L. S. Senior
1934–1935	W. W. Greene	R. H. Blanchard	C. J. Haugh
1936–1937	*L. S. Senior	S. D. Pinney	F. S. Perryman
1938–1939	F. S. Perryman	H. T. Barber	W. J. Constable
1940	S. D. Pinney	H. J. Ginsburgh	J. M. Cahill
1941	R. H. Blanchard	H. J. Ginsburgh	J. M. Cahill
1942	R. H. Blanchard	Albert Z. Skelding	Charles J. Haugh
1943	H. J. Ginsburgh	Albert Z. Skelding	Charles J. Haugh

Secretary-Treasurer

1914–1917......*C. E. Scattergood
1918–1943............R. Fondiller

Editor†	Librarian†
1914..............W. W. Greene	1914.............W. W. Greene
1915–1917..........R. Fondiller	1915...............R. Fondiller
1918........... W. W. Greene	1916–1921..........L. I. Dublin
1919–1921....G. F. Michelbacher	1922–1924..........E. R. Hardy
1922–1923........O. E. Outwater	1925–1937............W. Breiby
1924–1932.......R. J. McManus	1937–1943........T. O. Carlson
1933–1943..........C. W. Hobbs	

*Deceased.
†The offices of Editor and Librarian were not separated until 1916.

FELLOWS WHO HAVE DIED

The (†) denotes original membership at date of organization, November 7, 1914

Enrolled		Died
May 24, 1921	Edward J. Bond	Nov. 12, 1941
May 19, 1915	Thomas Bradshaw	Nov. 10, 1939
June 5, 1925	William Brosmith	Aug. 22, 1937
†	William A. Budlong	June 4, 1934
Nov. 18, 1932	Charles H. Burhans	June 15, 1942
Feb. 19, 1915	F. Highlands Burns	Mar. 30, 1935
Feb. 19, 1915	Gordon Case	Feb. 4, 1920
†	Charles T. Conway	July 23, 1921
†	Walter G. Cowles	May 30, 1942
†	James D. Craig	May 27, 1940
†	James McIntosh Craig	Jan. 20, 1922
May 26, 1916	Frederick S. Crum	Sept. 2, 1921
†	Alfred Burnett Dawson	June 21, 1931
†	Miles Menander Dawson	Mar. 27, 1942
May 19, 1915	Samuel Deutschberger	Jan. 18, 1929
†	Ezekiel Hinton Downey	July 9, 1922
†	David Parks Fackler	Oct. 30, 1924
Feb. 19, 1915	Claude W. Fellows	July 15, 1938
†	Charles S. Forbes	Oct. 2, 1943
May 26, 1916	Lee K. Frankel	July 25, 1931
Feb. 25, 1916	Joseph Froggatt	Sept. 28, 1940
†	Theodore E. Gaty	Aug. 22, 1925
May 19, 1915	James W. Glover	July 15, 1941
Oct. 22, 1915	George Graham	Apr. 15, 1937
May 25, 1923	William A. Granville	Feb. 4, 1943
†	William H. Gould	Oct. 28, 1936
†	Robert Cowen Lees Hamilton	Nov. 15, 1941
Nov. 21, 1919	Robert Henderson	Feb. 16, 1942
†	Robert J. Hillas	May 17, 1940
Nov. 15, 1918	Frank Webster Hinsdale	Mar. 18, 1932
Nov. 19, 1926	Charles E. Hodges	Jan. 22, 1937
Nov. 21, 1919	Carl Hookstadt	Mar. 10, 1924
†	Burritt A. Hunt	Sept. 3, 1943
Nov. 28, 1921	William Anderson Hutcheson	Nov. 19, 1942
May 19, 1915	William C. Johnson	Oct. 7, 1943
Nov. 23, 1928	F. Robertson Jones	Dec. 26, 1941
Nov. 18, 1921	Thomas P. Kearney	Feb. 11, 1928
Oct. 22, 1915	Virgil Morrison Kime	Oct. 15, 1918
†	Edwin W. Kopf	Aug. 3, 1933
Feb. 17, 1915	John M. Laird	June 20, 1942
Feb. 19, 1915	Abb Landis	Dec. 9, 1937
Nov. 17, 1922	Arnette Roy Lawrence	Dec. 1, 1942
Nov. 18, 1921	James Fulton Little	Aug. 11, 1938
Nov. 23, 1928	Edward C. Lunt	Jan. 13, 1941
Feb. 19, 1915	Harry Lubin	Dec. 20, 1920
Feb. 15, 1915	Franklin B. Mead	Nov. 29, 1933
Apr. 20, 1917	Marcus Meltzer	Mar. 27, 1931
†	David W. Miller	Jan. 18, 1936

FELLOWS WHO HAVE DIED—Continued

Enrolled		Died
†	James F. Mitchell	Feb. 9, 1941
†	Henry Moir	June 8, 1937
Feb. 19, 1915	William J. Montgomery	Aug. 20, 1915
May 19, 1915	Edward Bontecou Morris	Dec. 19, 1929
†	Lewis A. Nicholas	Apr. 21, 1940
†	Stanley Otis	Oct. 12, 1937
Nov. 13, 1926	Bertrand A. Page	July 30, 1941
Nov. 15, 1918	William Thomas Perry	Oct. 25, 1940
†	Edward B. Phelps	July 24, 1915
†	Charles Grant Reiter	July 30, 1937
†	Charles H. Remington	Mar. 21, 1938
†	Isaac M. Rubinow	Sept. 1, 1936
†	Harwood Eldridge Ryan	Nov. 2, 1930
†	Arthur F. Saxton	Feb. 26, 1927
†	Leon S. Senior	Feb. 3, 1940
Apr. 20, 1917	Charles Gordon Smith	June 22, 1938
Feb. 19, 1915	John T. Stone	May 9, 1920
Feb. 25, 1916	Wendell Menville Strong	Mar. 30, 1942
†	Robert J. Sullivan	July 19, 1934
Nov. 22, 1934	Walter H. Thompson	May 25, 1935
Nov. 18, 1921	Guido Toja	Feb. 28, 1933
May 23, 1919	Archibald A. Welch	May 8, 1935
Nov. 19, 1926	Roy A. Wheeler	Aug. 26, 1932
†	Albert W. Whitney	July 27, 1943
†	S. Herbert Wolfe	Dec. 31, 1927
†	Joseph H. Woodward	May 15, 1928
†	William Young	Oct. 23, 1927

ASSOCIATES WHO HAVE DIED

Enrolled		Died
Oct. 22, 1915	Don A. Baxter	Feb. 10, 1920
Nov. 22, 1934	John J. Gately	Nov. 3, 1943
Nov. 20, 1924	Leslie LeVant Hall	Mar. 8, 1931
Oct. 31, 1917	Edward T. Jackson	May 8, 1939
Nov. 18, 1927	Alexander A. Speers	June 25, 1941
Nov. 21, 1919	Walter G. Voogt	May 8, 1937
Nov. 17, 1920	James J. Watson	Feb. 23, 1937
Nov. 15, 1918	Albert Edward Wilkinson	June 11, 1930

CONSTITUTION
(As Amended November 15, 1940)

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 Fellows and those who may be duly admitted to Fellowship as hereinafter provided. The Associates shall be the present Associates and those who may be duly admitted to Associateship as hereinafter provided.

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.

Any person who shall have qualified for Associateship may become a Fellow on passing such final examination as the Council may prescribe. Otherwise, no one shall be admitted as a Fellow unless recommended by a duly called meeting of the Council, with not more than three negative votes, followed by a three-fourths ballot of the Fellows present and voting at a meeting of the Society.

ARTICLE IV.—*Officers and Council.*

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

CONSTITUTION

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 November 13, 1936)

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 or who, having been members for a period of at least twenty years, shall have attained the age of sixty-five 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.

EXAMINATION REQUIREMENTS

SYLLABUS OF EXAMINATIONS
Effective 1941 and thereafter

ASSOCIATESHIP

Part	Sections	Subjects
I	1	Algebra.
	2	Compound Interest and Annuities Certain.
II	3	Differential and Integral Calculus.
	4	Calculus of Finite Differences.
III	5	Descriptive and Analytical Statistics.
	6	Elements of Accounting, Including Corporate Accounting.
IV	7	Probabilities.
	8	Life Contingencies, Life Annuities and Life Assurances.
V	9	Policy Forms and Underwriting Practice in Casualty Insurance.
	10	Casualty Insurance Rate Making Procedure.

FELLOWSHIP

Part	Sections	Subjects
I	11	Investments of Insurance Companies.
	12	Insurance Law and Legislation.
	13	Insurance Economics.
II	14	Determination of Premium, Loss and Expense Reserves.
	15	Advanced Problems in Casualty Insurance Statistics.
	16	Advanced Problems in Casualty Insurance Accounting.
III	17	Individual Risk Rating.
	18	Social Insurance.
	19	Advanced Problems in the Underwriting and Administration of Casualty Insurance.

RULES REGARDING EXAMINATIONS
FOR ADMISSION TO THE SOCIETY

1. Dates of Examination.

Examinations will be held on the first Wednesday and follow-ing Thursday during the month of April in each year, except that if such dates are in the week preceding Easter, the exam-inations will be held on the second Wednesday and following Thursday of April. The examinations will be held in such cities as will be convenient for three or more candidates.

2. Filing of Application.

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 January preceding the dates of examination. Applications should definitely state for what parts the candidate will appear.

3. Fees.

The examination fee is $2.00 for each part, with a minimum of $5.00 for each year in which the candidate presents himself; thus for one or two parts, $5.00, for three parts, $6.00, etc. Examina-tion fees are payable to the order of the Society and must be received by the Secretary-Treasurer before the fifteenth day of January preceding the dates of examination.

4. Associateship and Fellowship Examinations.

(a) The examination for Associateship consists of five parts and that for Fellowship consists of three parts. A candidate may take any one or more of the five parts of the Associateship Exami-nation. No candidate will be permitted to present himself for

any part of the Fellowship Examination unless he has previously passed, or shall concurrently present himself for and submit papers for, all parts of the Associateship Examination and all preceding parts of the Fellowship Examination. Subject to the foregoing requirement, the candidate will be given credit for any part or parts of either examination which he may pass.

(b) A candidate who has passed Associateship Parts I-IV prior to 1941, but who has not been enrolled as an Associate because of lack of the experience qualifications required by the examination rules effective prior to 1941, will be enrolled as an Associate upon passing Part V. Such a candidate may also take Fellowship Examination Parts I-III in the same year as Associateship Part V, subject to the provisions of paragraph (a) above.

(c) An Associate who has passed no part of the Fellowship Examination under the Syllabus effective prior to 1941 is required, in order to qualify for admission as a Fellow, to pass Associateship Examination Part V and Fellowship Examination Parts I-III.

5. Alternative to Passing of Fellowship Parts II and III.

As an alternative to the passing of Parts II and III of the Fellowship Examination, a candidate may elect to present an original thesis on an approved subject relating to casualty or social insurance. Such thesis must show evidence of ability for original research and the solution of advanced problems in casualty insurance comparable with that required to pass Parts II and III of the Fellowship Examination, and shall not consist solely of data of an historical nature. Candidates electing this alternative should communicate with the Secretary-Treasurer and obtain through him approval by the Examination Committee of the subject of the thesis. In communicating with the Secretary-Treasurer, the candidate should state, in addition to the subject of the thesis, the main divisions of the subject and general method of treatment, the approximate number of words and the approximate proportion to be devoted to data of an historical nature. All theses must be in the hands of the Secretary-Treasurer before the first Wednesday in April 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*.

6. Waiver of Examinations for Associate.

The examinations for Associate will be waived under Article III of the Constitution only in case of those candidates who meet the following qualifications and requirements:

(a) The candidate shall be at least thirty-five years of age.

(b) The candidate shall have had at least ten years' experience in casualty actuarial or statistical work or in a phase of casualty insurance which requires a working knowledge of actuarial or statistical procedure or in the teaching of casualty insurance principles in colleges or universities. Experience limited exclusively to the field of accident and health insurance shall not be admissible.

(c) For the two years preceding date of application, the candidate shall have been in responsible charge of the actuarial or statistical department of a casualty insurance organization or of an important division of such department or shall have occupied an executive position in connection with the phase of casualty work in which he is engaged, or, if engaged in teaching, shall have attained the status of a professor.

(d) The candidate shall have submitted a thesis approved by the Examination Committee. Such thesis must show evidence of original research and knowledge of casualty insurance and shall not consist solely of data of an historical nature. Candidates electing this alternative should communicate with the Secretary-Treasurer and obtain through him approval by the Examination Committee of the subject of the thesis. In communicating with the Secretary-Treasurer, the candidate should state, in addition to the subject of the thesis, the main divisions of the subject and general method of treatment, the approximate number of words and the approximate proportion to be devoted to data of an historical nature.

RECOMMENDATIONS FOR STUDY

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 registered students by the Society. By "registered students" is meant candidates who have signified their willingness to take the examinations by the payment of their examination fees.

LIBRARY

The Society's library contains all of the references listed in the Recommendations for Study with the exception of certain periodicals and publications subject to periodical revision. It also contains numerous other works on casualty actuarial matters. Registered students may have access to the library by receiving from the Society's Secretary the necessary credentials. Books may be withdrawn from the library for a period of two weeks upon payment of a small service fee and necessary postage.

The library is in the immediate charge of Miss Mabel B. Swerig, Librarian of the Insurance Society of New York, 107 William Street, New York City.