

PROCEEDINGS
OF THE
Casualty Actuarial Society

1926-1927.

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Volume XIII
No.
Number 27—November 19, 1926
Number 28—May 13, 1927
1927 Year Book

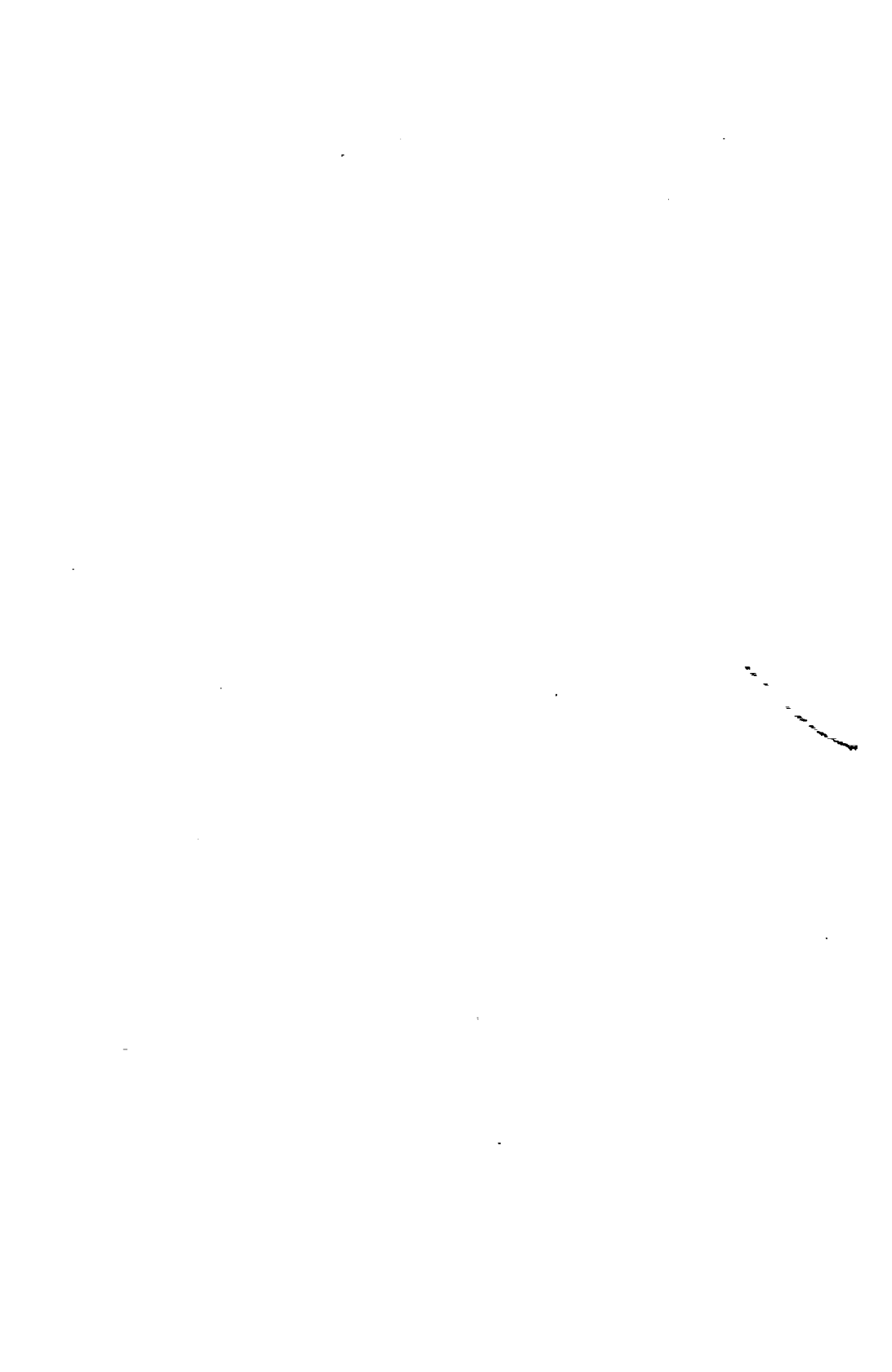
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PROCEEDINGS

NOVEMBER 19, 1926

"MORAL HAZARD" IN THE FIELD OF CASUALTY
INSURANCE

PRESIDENTIAL ADDRESS, G. F. MICHELbacher.

Moral hazard is the Bogey Man who will catch the unwary insurance official who does not watch out. When insurance is under consideration he is always present in one guise or another, sometimes standing out in bold relief, but more often lurking in the background where he employs every expedient to avoid detection. In all the ramifications of insurance procedure, from the binding of the risk until the last moment of policy coverage has expired, his insidious influence may manifest itself, usually where it is least expected. Constant vigilance may keep him at a distance, but if there is a loophole in the safeguards erected to defeat his activities, he will be the first to find it. He is ruthless; when he strikes, the blow invariably leaves its mark upon the financial record of the insurance carrier.

Here is a vital element of the insurance transaction which is eternally under discussion wherever insurance men congregate. Strangely enough, however, it is seldom used as a subject for written dissertation. Perhaps the moral hazard is so vague, and takes so many different forms, that it does not readily lend itself to analysis and description. The present attempt in this direction can do no harm, and it may have merit in developing certain standards of thought on a topic concerning which there seem to be numerous divergent opinions and points of view.

BY WAY OF DEFINITION

The business of insurance is entirely surrounded by hazards since the stock in trade of insurance carriers is contingencies of every description. A classification of these hazards is necessarily arbitrary, and depends for its character upon the particular purpose to be served. In this discussion the endeavor will be to

describe the scope of the moral hazard in the field of casualty insurance. As the term itself is subject to various definitions, a broad treatment is required.

The hazards of casualty insurance may be classified in three groups: legal hazards, physical hazards and moral hazards.

Legal hazards are those created by law or by rulings of authorities whose duty it is to administer or to interpret the law. Thus, the necessity for the numerous forms of liability and property damage coverage arises out of the fact that certain responsibilities are created for individuals, firms and corporations by the Law of Negligence. Similarly, workmen's compensation insurance would not be in existence except for the legislative enactments of the several states imposing upon employers an obligation to indemnify industrial workers and their dependents who may suffer as a result of injuries arising out of and occurring during employment.

These legal conditions are not hazards in the customarily accepted sense of the word. They do, however, create contingencies which would not arise if there were no legal doctrines affecting these situations, and injuries might occur without involving anyone except those whose persons or property are injured. Therefore, so far as the public and insurance carriers are concerned, these legal complications may be classified as hazards because they produce opportunities for monetary loss by policyholders, upon whom the law places the responsibility in the first instance, and by insurance carriers, which, in turn, assume the responsibility in accordance with the terms of their insurance contracts.

But the law on a disputed point is not always easily determined by referring to a statute or to established legal precedents. It may be necessary to apply the law to a particular case which is somewhat out of the ordinary, or the application of precedents may be questionable. Under these circumstances appeal is usually taken to a state authority or to the courts. In either case certain hazards will be encountered, for where the legal situation is uncertain, there is always opportunity for decisions adversely affecting the interests of policyholders and insurance carriers.

The best illustration of this aspect of the legal hazard is to be found in the field of workmen's compensation insurance, where

the tendency is for the state bodies which administer and interpret the law constantly and persistently to transgress the printed statute in favor of claimants. As underwriting experience is acquired, this gradual liberalization of the law by interpretation is slowly reflected in the rates. But there is always a gap between recorded experience and rates for the future, and it follows that until opportunity for interpretation is definitely removed—a status which seems remote at present—rates will never quite catch up with actual costs. Accordingly, insurance carriers are exposed to certain loss unless other elements affecting costs should be strong enough to counteract this influence.

Then it is not uncommon for the state authority without warning to announce a sweeping decision affecting numerous cases, thus suddenly creating losses which could not have been anticipated when rates were promulgated, for it must always be assumed that the loss conditions existing at the time rates are formulated will continue until changed by legislative enactment. An example of this character was the famous Phonville decision in New York,* which required the use of a \$20 weekly compensation limit for injuries involving partial loss of use instead of a limit of \$15 previously applied. This materially increased the cost of a numerically large class of cases and created an unexpected loss for insurance carriers.

Physical hazards are those which appeal to the senses. They are always in evidence and can be detected by a survey of the project which is the subject of insurance. Thus, if a bank burglary and robbery risk is under consideration, it is possible for the carrier to obtain exact information concerning the following items:

- The name and location of the bank;
- Its financial standing;
- The name and location of the town in which the bank is located;
- The nature and size of the population of the town;
- Its industries;
- The extent and efficiency of the municipal police force;
- The character of the neighborhood surrounding the bank;
- The construction of the building housing the bank;
- The occupancy of this building;

*Phonville vs. New York and Cuba Steamship Company, 226 N. Y. 622.

The arrangement of the bank's quarters;
 The number and classification, as to occupation, of the bank's employees;
 The methods of selecting these employees with particular reference to investigation as to personal traits of honesty and reliability;
 The kind of property for which protection is desired;
 The construction of safes and vaults in which this property is kept;
 The safeguards employed for the protection of the insured property, such as watchmen and alarm systems;
 The record of the bank as to burglaries, thefts and robberies:

a great volume and variety of information—more, in fact, than is needed for ordinary underwriting purposes.

A similar analysis can be made of any casualty risk; all that is necessary to develop the information in the detail required by the carrier is an investigation of records, supplemented possibly by a personal inspection of the risk. It may be no simple task to unearth all the pertinent data, but the information is there, and diligent search will always disclose the physical facts concerning the risk with absolute definiteness and accuracy.

Not so with *moral hazards*. They represent the human element in the insurance transaction; and because human nature is elusive, changeful and uncertain, it is not always possible to assemble an array of facts conclusively demonstrating the presence of such hazards. The hazards themselves may be undisclosed; or they may lie dormant, awaiting the proper occasion for their manifestation. Usually their detection requires a most careful analysis and interpretation of all the available information concerning the risk.

It is not necessary, however, to dismiss the subject without further discussion. It is possible at least to indicate the points in the transaction where moral hazards may be encountered and to outline the measures which the carriers may adopt for combating such hazards.

In this connection it is well to point out that casualty insurance covers a wide territory. It embraces accident and health insurance, a form of personal insurance; plate glass, collision, burglary, theft and robbery insurance, forms of property insurance; and a great variety of employers' liability, public liability, property damage and workmen's compensation cover-

ages which are commonly classified under the general designation of "third party insurance" because they protect the policyholder against his responsibility for injury to the persons or property of others.* Because of this diversity of coverages, the problem of moral hazard in casualty insurance is not in all respects similar to the corresponding problem in fire, marine and life insurance.

PHASES OF MORAL HAZARD IN CASUALTY INSURANCE

In casualty insurance, phases of moral hazard are encountered in connection with (1) the policyholder, (2) those intimately related to or associated with the policyholder, and (3) employees, members of the public and others who may be involved, principally as causing the misfortune insured against, or as suffering as the result of the occurrence of such misfortune.

The Policyholder. There are two distinct phases of the moral hazard so far as the policyholder is concerned. Where he may obtain personal profit or advantage from the transaction, his honesty and integrity are of vital consideration. Where he may control the occurrence of the misfortune insured against, his physical condition, habits, mental processes and similar characteristics are important.

In one case he may not be able to resist the temptation to defraud the insurance carrier. This moral weakness may reveal itself in many ways. He may fail to disclose or he may misrepresent essential information, thus obtaining insurance under false pretenses; he may suppress or distort the conditions surrounding his risk for the purpose of securing an erroneous classification or an improper allocation of exposure for rating purposes; he may report incorrect exposure, thus avoiding payment of a proper premium; where he is beneficiary and his physical condition determines the extent of benefits, he may malingering, seeking thus to collect greater benefits than he should legitimately receive; or, as claimant under other conditions, he may concoct crooked claims and thus attempt by dishonest means to realize upon the indemnity guaranteed by his insurance policy.

In the other case his ignorance, carelessness, inattention or recklessness may involve the carrier in claims which the ordi-

*The so-called "mechanical lines" embracing steam boiler, engine, flywheel, machinery and electrical equipment insurance may also be mentioned. They do not fit into the analysis, as given, because they are a combination of property and third party insurances.

narily prudent policyholder would avoid. The unsafe automobile driver; the employer whose attitude toward safety is not proper; the careless person who loves display and is notoriously lax in the protection of his jewelry: these and many others are "bad risks" for the insurance carrier because they prevent the proper functioning of the law of averages and introduce the certainty of loss into the insurance transaction.

It will be noted that the term "moral hazard" as employed in this discussion is used in a much broader sense than the following definition, which is typical of common usage, would imply:

"The hazard is the deflection or variation from the accepted standard of what is right in one's conduct. Moral Hazard is that risk or chance due to the failure of the positive moral qualities of a person whose interests are affected by a policy of insurance."*

It is held that "moral hazard" should be accorded broad treatment because it is quite obvious that human nature may manifest itself in ways other than dishonesty. In fact, Mr. Hill, whose definition of the term is quoted above, must have had this in mind, for later, in the same address, in referring to danger signals of moral hazard in liability insurance, he mentions "record of accidents or a reputation for recklessness or carelessness," thus indicating that he was not bound by the limitations of his definition.

Persons Immediately Surrounding Policyholder. It is not usual to find persons of this class in a position to profit, except indirectly, by dishonest practices. In a few cases such persons may be beneficiaries under the insurance contract. Thus, in residence burglary insurance, property of members of the immediate family of the policyholder is covered, and it is not unlikely that the son or daughter residing in the home of the father may present a fraudulent claim. Or, in the case of personal accident and health insurance, the relative named as beneficiary may conspire to cause the death of the policyholder by accident or disease, seeking in this manner to obtain benefits under the insurance policy. It is likely also that there may be collusion between these persons and the policyholder, as, for

*Hill, Walter C., "Some Observations on the Moral Hazard in Insurance." Address before Insurance Advertising Conference, October 26-28, 1925.

example, where members of the family sue the parent for damages as a result of injury sustained in an automobile accident, or cooperate with him to perpetrate any of the dishonest practices previously referred to.

It is more probable, however, that such persons will present risks because of their ability to control the occurrence of the misfortune insured against. The care-free, jazz-mad youth, who has the use of his father's car; the ruthless superintendent who drives his employer's workers and ignores every established rule of safety; the business associate who surreptitiously utilizes the firm's funds for stock gambling and then invents a burglary claim: these and their kind must be classified as undesirables by the insurance carrier. The policyholder himself may be an eminently respectable citizen, honorable in his business relationships and otherwise beyond reproach; but the desirability of the risk cannot always be judged by his status alone, for others immediately surrounding him and playing an important part in the insurance transaction may create serious hazards which cannot be overlooked.

Other Persons. Outside the group composed of the policyholder and those immediately related to him, are countless other persons who may become involved at some stage of the insurance transaction as employees, as members of the public exposed to the operations covered by the policy, as jurors who may be called upon to determine questions of fact where disputed claims are in litigation, or as criminals who may seek to ply their nefarious trade. Every conceivable manifestation of human nature adverse to the interests of insurance carriers may be found within this crowd.

The inefficient or inexperienced employee may cause a serious accident, injuring himself, his co-workers or members of the public; the claimant who has been injured may simulate a condition more serious than actually exists; the unreasonable automobilist, whose car has been damaged, may present an exorbitant claim; the tenant who has a grudge against his landlord may demand damages for injuries alleged to have been sustained in an accident which never occurred; the trusted watchman may be in collusion with a gang of criminals; the juror who, though prejudiced, by some means or other may

evade the watchfulness of counsel and take his place in the jury box: these and other types, too numerous to mention, surround casualty insurance with hazards unknown to other forms of insurance.

PROTECTIVE MEASURES

It would never do to ignore these moral hazards, for the result of such an attitude would certainly be calamitous. They must be combated with every known preventive device. Some of these measures are worthy of mention.

Investigation. The most obvious safeguard for the carrier lies in the careful investigation of risks before they are assumed. The moral hazard elements of the risk cannot always be isolated and studied as such. But it is possible to obtain information concerning certain phenomena which experience has demonstrated are in some manner linked with those human elements which create costly situations for insurance carriers. The bank clerk who is living beyond his means is an unsafe prospect for residence burglary insurance. The habitual drunkard is uninsurable for automobile public liability insurance. The daredevil who is forever taking needless chances is a disastrous personal accident risk. A machine shop housed in a tumble-down shack with poor equipment, careless housekeeping, inefficient management and superannuated employees, has all the earmarks of undesirability for workmen's compensation insurance from a moral as well as from a physical point of view.

The inspection of each risk which is doubtful should develop complete information concerning all its elements as they exist today. Then there are data which may be available concerning the past loss record of the risk. If there is anything detrimental in this record which cannot be explained by existing physical hazards, the inference must be that some intangible moral hazard factor is present.

But assuming that the record is clear and the risk is written, the process of investigation must nevertheless continue because there is never any assurance that moral hazards will not develop some time later during the policy period. In fact, it may take some crisis not apparent at the time the risk is accepted to bring into play the factors which create moral hazards.

Interpretation. Given complete information, the next necessity is that the carrier should have technical talent to analyze this information, and to deduce correct conclusions from it. In some cases the relationship between the external data and moral hazards is so well established that the mere presence of the indications produces a warning which the insurance technician dare not disregard. But more often the circumstances are not susceptible of accurate analysis; then judgment and intuition must guide the technician in his treatment of the situation. The best term for this process is "interpretation," since it involves the construction of miscellaneous facts and the deduction therefrom of a satisfactory conclusion.

The burden of the effort of interpretation necessarily falls upon the underwriter, whose task it is to reject risks which promise to prove unprofitable to the carrier. But other technicians may encounter some of the many phases of moral hazard in the course of their activities, for after the risk has been insured by the underwriter, the first intimation that a moral hazard is present may be discovered in some other department. The inspector may find traces of degeneration in his periodical surveys; the auditor may detect dishonesty in his audits of exposure; or the claim executive may obtain a clue in his disposition of a questionable claim. Eternal vigilance is required on the part of every representative of the carrier who comes in contact with the risk; but more important is the requirement that the danger signal will be properly understood when it is encountered.

Education. Efficient investigation and interpretation of the facts disclosed thereby will enable the carrier reasonably to cope with the present situation. But it will not go to the root of the problem; some more fundamental process must be evolved to do that. The best method available seems to be that of education.

A valuable service of all carriers is the prevention of the misfortune insured against. The principal purpose of this service is to transmit to the policyholder definite information concerning the hazards of the risk, together with advice as to appropriate means which may be employed to eliminate or to modify these hazards. This is essentially an educational process, since the actual prosecution of preventive measures must be left to policyholders. All that the carriers can do is to bring hazards

to the attention of policyholders and to instruct them how best to apply remedial treatment. If the attitude of policyholders is proper, the result will either be elimination or modification of certain physical and moral hazards within their control, provided, of course, that the preventive methods suggested by insurance carriers are efficient.

Then there are educational movements of broader scope which the carriers may sponsor individually or collectively.

Thus, the National Surety Company in 1923 announced the organization by it of the National Honesty Bureau, the purpose of which was explained by Chairman William B. Joyce as follows:

"The ideas of honesty and uprightness, the abhorrence of crime, must be carefully, gradually and persistently instilled into the young and impressionable mind during the character forming period of life, through everything it receives in the course of its regular training. The occasional tract or moral preachment will, of course, do good, but the occasional mention of honesty is wholly inadequate to cope with the pressure in the other direction incident to modern life. We must clearly show the positive punishment that comes to the dishonest, the tortures of mind and body that fall to imprisoned criminals and the almost certain capture and punishment that await every breaker of the law. We must, in other words, make the whole concept of dishonesty and criminality abhorrent and terrible to the child. Then we may get somewhere with the movement to curb the growth of criminality. The schools cannot handle this great problem alone, but they can do the fundamental and most important part of it."

Similarly, the National Bureau of Casualty and Surety Underwriters in at least two of its activities is seeking by education to remove hazards from certain branches of the casualty insurance business. In one case a strong effort is being made to introduce safety education into the public schools. In the other, a survey is being made to produce facts which may be used to convince the executives of industry that safety and efficient production are inseparably related. Concerning these projects Albert W. Whitney of the National Bureau has made the following comments:

"When safety is made a matter of serious study two fundamental relationships come into view that are in themselves sufficient to orient the movement. These are first, that safety is

only one of the manifestations of a deep thorough-going efficiency that will show itself not merely in production but in safety and morale as well and, second, that safety is primarily a matter of the head rather than the hand and hence pre-eminently educational.

"The development of the implications in each of these relationships will have the same general effect of moving safety out of the foreground and of putting it in its natural place in the picture. It will appear on the one hand as a particularly vivid and human aspect of the problem of organizing industry along fundamentally efficient lines, and it will appear on the other hand as a particularly vivid and human aspect of the problem of getting an education in the true sense, namely, an attitude toward life. It is already evident that the safety movement, after going through the preliminary maneuvers of finding itself, is settling down to having its main development along these lines."*

The value of these movements is problematical at this juncture for it will take time to ascertain whether they are effective. For the present their value lies in the fact that they demonstrate an interest on the part of insurance carriers in something more than the mere indemnification of those who suffer as a result of the occurrence of misfortune. They prove that the executives of insurance carriers recognize the principle that prevention is ". . . a logical and necessary corollary of the concept of insurance, that the institution of insurance is not a complete social instrument, not merely not adequate for work that needs to be done but not complete in the sense of fulfilling its own intrinsic nature, until it makes use of mass action not merely in averting the evil effects of misfortune but in preventing the misfortune itself."†

Legislation. But suppose education fails to accomplish results, what then? Is there no further remedy available? There is another method which may be employed, namely, that of legislation, but this is suggested with hesitation because of the radical

*Whitney, Albert W. "Safety Education in the Public Schools"—Pamphlet reprinted from *The Annals of the American Academy of Political and Social Science*, Philadelphia, January, 1926.

†Whitney, Albert W. Discussion before joint session of American Economic Association, American Statistical Association and American Association for Labor Legislation. *Papers and Proceedings of the Thirty-fourth Annual Meeting of the American Economic Association*, p. 164.

extremes to which legislative activities in this country have been carried.

We seem to be obsessed with the insane idea that legislation will cure all the ills to which flesh is heir. It has been estimated that we have in our country, in addition to what remains of the English Common Law, some 2,000,000 written statutes. In addition, law is being created annually at the rate of 12,000 or more statutes and 13,000 or more permanently recorded decisions by the highest courts in the land.* We are regulated in all our activities from the date of our birth until our remains are laid to rest in the family plot. There are laws prohibiting eating, drinking, dancing, gambling; laws forcing us to do this and warning us to refrain from doing that. We are going through a veritable orgy of legislation affecting human conduct.

It may be safely inferred that the moral hazard problem in the field of insurance has not escaped the attention of legislators. But much of the legislation which has been enacted is ill-advised, half-baked, illogical, and hence does not accomplish the desired purpose. The idea should be to make mental and moral lapses unprofitable and unattractive. The problem of malingering should always be considered in framing workmen's compensation laws; the penal code should prescribe adequate punishment for crimes of various descriptions; the parole law should not favor the criminal; the laws and regulations with respect to the licensing of automobilists and the operation of cars upon the public highways should be so framed that the unsafe driver will disappear. Not only is it essential that there be proper legislation on these and other subjects, but it is also extremely important that legislation, when it is enacted, shall be vigorously enforced. Here is a big field requiring research and public consideration.

CONCLUSION

It is not strange under the circumstances that there are no well-defined rules for dealing with moral hazards, and that the methods employed vary widely, depending upon the point of view and the experience of the technician. In fact, there is so little standardization that the factor which is classified as a moral hazard by one is not recognized as such by another. Perhaps

*Blumenthal, Walter Hart. In *New York Herald-Tribune*, Sunday, September 12, 1926.

the reason for this is that casualty insurance itself has not reached the stage of standardization. It has grown so fast in such a short period of time and yet has covered so little of the territory that fine points of technical procedure have not received adequate attention but have been disposed of in the most expeditious and satisfactory manner available. This has developed a situation which certainly merits the earnest consideration of everyone who is interested in the development of the business in accordance with scientific principles.

If anything can be said by way of conclusion, it is to express the hope that this phase of casualty insurance will receive its proper share of attention by the cooperative organizations maintained by the insurance carriers. The National Bureau, as has already been indicated, has taken a step in this direction. Another similar movement now under way is represented by the so-called Burglary Investigation Bureau, the purpose of which, in accordance with the constitution of the organization, is ". . . to improve conditions surrounding the writing of burglary, theft and robbery insurance in Greater New York; to prevent burglaries, thefts and robberies; and, in cooperation with the public authorities, to apprehend and prosecute burglars and false or fictitious claimants under burglary, theft and robbery insurance policies, and to recover stolen property." These are worthy causes; yet they represent nothing more than scratches on the surface of a problem which is universal in the sense that it confronts every insurance carrier.

It is too much to expect that moral hazards will be entirely eradicated. Human nature is inexorable and changes but slowly. Our efforts should be to control the development of human nature so that its desirable aspects will be strengthened and its undesirable aspects banished from the insurance transaction.

THE PROGNOSTIC VALUE OF SCHEDULE RATING

BY

CHARLES N. YOUNG

INTRODUCTION

Since the inception of schedule rating, more than a dozen years ago, there has been a respectable minority of casualty men who have believed that the particular plan in use at any given time was hopelessly inadequate as a measure of differences in physical hazard. A somewhat smaller number, impressed with the unquestionable importance of the human element in industrial safety, have felt that any attempt to differentiate between plants on the basis of physical hazard was, and must forever remain, futile and unsatisfactory.

Thanks to the "noble discontent" of these men, and of those friends of the schedule who have recognized and have been willing to correct its apparent faults, several important changes in contents and structure have been made. Probably the most ardent opponents of schedule rating will concede that these changes mark progress, and that the present Industrial Compensation Rating Schedule comes closer to measuring the physical factors in industrial injury than did those which preceded it. At any rate, its use is now almost universal in this country; no effort has been made in this paper to compare it with any other schedule now in effect.

It is significant that those who speak of abolishing schedule rating generally affirm at the same time their faith in experience rating and in the possibility of obtaining thereby not only a more equitable risk rate, but also an even greater stimulus for the correction of unsafe conditions than is now afforded by the combined plans. It is with the relation of the schedule to equitable rates that this paper is primarily concerned. Equitable rates are and should remain the first concern of underwriting and of merit rating. After the underwriter has done his part, schedule and experience rating should converge on one object—the production of an equitable rate for the individual risk. If the application of the schedule does not, on the average, result in a closer approximation to actual cost of the individual risk than would be pro-

duced by the manual rate, then the necessity for modification or abolition of the schedule may be regarded as established. It was with the idea of substituting a definite analysis of this question for varied opinions, too often predicated on a background of isolated cases, that this paper was undertaken.

METHOD OF ANALYSIS

A group of sixty risks was taken by the simple process of including data for the current policy year on all risks consisting of one plant, subject both to schedule and experience rating, under consecutive letters of an alphabetical file. The total subject premium (Column 51 of Application for Experience Rating) for these sixty risks amounted to \$366,593, a figure which is believed to be sufficiently large to justify the conclusion that the characteristics here investigated are not likely to differ widely from those of other random groups of similar size. Probable differences in the loss ratio of other groups are of only incidental interest in this connection, and will not affect the comparability of the results. It should be clearly kept in mind that the question is not whether any particular classification schedule, classification or state should be rated or not; however, as a matter of information, the distribution of risks by classification schedules is given in Table VI., and the distribution by states is given in Table VII.

The aggregate loss on any risk is subject to extreme variations, the swing of which is exceeded only by that of the "Excess" portion. The same considerations, therefore, which prompted the general adoption of a higher credibility factor for the "Normal" experience, dictate the use of Normal Expected Loss (Item 19) and Total Modified Normal Loss (Item 16) in measuring the degree of correspondence obtained by the application of the schedule. In other words, the value of the schedule is better measured by its possible reflection of the "Normal" cost of all injuries, than by the "Excess" cost of the less frequent and more fortuitous serious cases.

To determine the effect of eliminating schedule rating, Item 19 was recomputed at manual rates, for each risk. This quantity is herein referred to as "Normal Expected Loss, at Manual Rate," and is summarized in Column 3 of Table I., under eight items representing the various conditions encountered. A direct comparison of the approximation in each condition is then possi-

ble. For example, Column 10 shows that in 15 cases the manual premium was below the losses but approximated them more closely by \$1,829, than did the schedule premium. These results together with corresponding totals for Columns 11, 12 and 13 are shown in the Summary of Results below this table. The findings are discussed under a subsequent heading.

A check on the method employed in Table I. was made in the following manner. The sixty risks were divided according to size, into two groups, aggregating approximately equal Normal Expected Loss, at Manual Rate. The first contained ten risks, aggregating \$76,785 for this quantity, and \$171,751 for the Total Premium Subject to Experience Rating. This is shown in Table II., together with the actual schedule and experience rates, expressed as index numbers, and the corresponding values of Items 19 and 16, from the Application for Experience Rating. The second contained fifty risks, each having a Normal Expected Loss, at Manual Rate, less than \$4,000 and aggregating \$80,797 for this quantity and \$194,842 for the Total Premium Subject to Experience Rating. This is shown in Table IV., as indicated for Table II., above. Each of these groups was computed separately.

The Normal Expected Losses, at Manual Rate for each risk served as common denominators for two series of index numbers, whose numerators were the corresponding values for Items 19 and 16 respectively. It is apparent that, as the classifications subject to schedule rating contribute widely varying proportions of the total risk premium, no valid conclusions can be drawn from the schedule rate alone; this item is included, however, as a matter of information. It will perhaps be equally apparent that the difference in size of the risks in each group will prevent the arithmetic average of the index numbers described in this paragraph from being an acceptable average for the group. The true values are the weighted averages based on the aggregate ratios at the bottom of Tables II. and IV. From these averages the deviations of Tables III. and V. are computed. The items in all four tables have been arrayed in the order of decreasing values of the Schedule Premium Index.

The two series of index numbers described above are pairs of variants, the correlation of, or causal relation between, which can be subjected to rigid statistical analysis. Their degree of

correspondence or divergence is a definite and ascertainable quantity, and the probable error due to sampling can easily be obtained. This gives at once the limits within which half of any similar tests might be expected to fall. Unfortunately, the theory of correlation has not been as freely applied by casualty insurance men as its importance would warrant. It is very extensively used in the fields of biology, medicine and pedagogy. Consideration is here given only to the standard or "product-moments" method developed by Prof. Karl Pearson, well-known biometrician of the University of London. Those who may desire a rigid derivation of this formula by the integration of the correlation surface can find it in Forsyth's "Mathematical Analysis of Statistics," pp. 212-213. A satisfactory general discussion of this subject, with examples, may be found in Chaddock's "Principles and Methods of Statistics," Chapter XII. The coefficient, r , may be obtained as follows:

Let x_1, x_2, x_3 , etc., be the deviations of the items of the subject from the average,

and y_1, y_2, y_3 , etc., be the deviations of the items of the relative from the average.

Let σ_1 be the standard deviation of the subject,

and σ_2 be the standard deviation of the relative.

Let n be the total number of pairs of items.

Then

$$r = \frac{\Sigma (xy)}{n \sigma_1 \sigma_2}$$

$$\text{and the probable error} = \frac{.67 (1 - r^2)}{\sqrt{n}}$$

RESULT OF ANALYSIS

From the Summary of Results, Table I. it appears that in 35 risks out of 60 the schedule was more successful than the manual in approximating the losses. The margin of 10 risks in favor of the schedule may be expressed, for purposes of comparison, as a Numerical Coefficient of Risk Equity, equal to:

$$\frac{\text{Schedule} - \text{Manual}}{\text{Schedule} + \text{Manual}} = \frac{35 - 25}{35 + 25} = + \frac{10}{60} = + .17$$

A similar margin against the schedule would then be expressed as $-.17$, and the possible values would vary from $+1$ to -1 .

There is also a monetary balance of \$6,200 in favor of the schedule. That is, after making due allowance for the 25 cases in which the manual approximated the losses more closely than the schedule, the fact remains that on the entire group the schedule came \$6,200 closer to the individual losses than did the manual.

From the Summary of Results, Table I., as in the preceding paragraph, this may be expressed as a Monetary Coefficient of Risk Equity, equal to:

$$\frac{\text{Schedule} - \text{Manual}}{\text{Schedule} + \text{Manual}} = \frac{8839 - 2639}{8839 + 2639} = + \frac{6200}{11478} = + .54$$

Against the above results must be placed the fact that for the sixty risks under consideration, taken as a whole, the schedule produced a premium shortage of \$6,736, as compared with the manual premium. This should not be interpreted as indicating that the schedule is necessarily out of balance by 4.3%, but does direct attention to the importance of careful periodic revision of the tabular values, to keep them in line with existing conditions. Such revisions, as they may be needed, will certainly not lessen the prognostic value of the schedule.

From Tables II. and IV., it appears that both Schedule and Experience Premium Indices were materially lower for the small group of large risks than for the large group of small risks. The importance of determining whether or not these indications are sustained by the combined experience of individual companies and groups has been forced on the attention of the companies upon more than one occasion. This is of vital interest in determining the results which should be produced by both schedule and experience rating plans, but is of only incidental interest in the present investigation.

Table III. shows the coefficient of correlation for the ten large risks to be $+ .38 \pm .18$. This value is large enough to afford significant evidence of direct correlation between physical conditions as measured by the schedule and the incurred experience. It is vitiated somewhat by the fact that it is only a little more than twice as large as the probable error. An idea of the extent of this objection may be derived as follows: The coefficients resulting from a number of similar tests may be expected to group themselves in a normal frequency distribution. The probable error, that is, the limit within which half of these coeffi-

clients may be expected to fall, is $\pm .18$ from the ascertained value. But in a normal frequency distribution, the probable error equals $.6745 \sigma$, where σ is the standard deviation. Hence $\sigma = .18/.6745$ or $.27$. Tables of probability integrals expressed in terms of x/σ are available (e. g., Medical Biometry and Statistics, Appendix IV., Raymond Pearl). Hence, $.38/.27 = 1.41$, and the corresponding area is $.421$. Adding to this the area above the norm, $.500$, it is seen that in 100 similar tests, 92 may be expected to result in a positive correlation, that is, a coefficient between 0, denoting absence of correlation, and $+ 1.00$, denoting perfect direct correlation.

Table V. shows the coefficient of correlation for the fifty smaller risks to be $+ .31 \pm .09$. Here $\sigma = .09/.6745$ or $.13$, and $.31/.13 = 2.38$, the corresponding area being $.491$. Adding $.500$, it is seen that 99 out of 100 similar tests may be expected to show a coefficient not less than 0. The coefficient of $+ .31 \pm .09$, here obtained, while it does not show marked correlation, is nevertheless determined with sufficient certainty to have evidential value.

The higher coefficient obtained for the larger risks, while not definitely established, is yet not without significance; it is at least indicative of the greater stability recognized in the credibility factors of the experience plan. Similar evidence of interest is found in a comparison of the coefficients of dispersion, (ratio of average, or standard, deviation to average value of variant) for Tables III. and V. For the large risks, the coefficient of dispersion based on average deviation for the Schedule Premium Index is given by $.084/.92$ or $.091$. The corresponding value for the Experience Premium Index is $.203/.79$ or $.257$. The average swing of the losses is thus seen to be 2.8 times as great as the effect of schedule rating. For the smaller risks the corresponding coefficient for the Schedule Premium Index is $.057/.99$ or $.058$, and for the Experience Premium Index is $.731/1.20$ or $.609$. Here the average swing of the losses is 10.5 times as great as the effect of schedule rating, for risks having an average subject premium of nearly \$3,900.

COST OF SCHEDULE RATING

The sixty risks here investigated probably develop an annual premium not far from \$100,000. The saving which might be

expected to result from the abolishing of schedule rating may fairly be estimated at .3 per cent, or \$300 for this premium.

CONCLUSIONS

1. Whether measured by a direct comparison of the closeness with which it approximates the losses of the individual risk or by recognized methods of determining causal relationships, the schedule shows a materially closer agreement with the risk experience than is shown by the manual rate. Except in the case of comparatively large risks, only a small portion of this advantage is offset by experience rating.

2. The extreme variations in the experience of the smaller risks, even of those large enough to qualify for experience rating, indicate that a given premium modification obtained through experience rating alone would entail a material sacrifice of stability as compared with the present plan of distributing a portion of such modification over all risks presenting similar hazards. A further consideration is that the definite and determinate character of a schedule modification makes it a more powerful incentive to safety activity by the employer than is the fear of a possible future loss from the same cause. Even though the entire cost of such losses, if and when they occur, were paid by the employer, that inherent, optimistic faith which cannot be escaped leads him to an ill-founded confidence in the immunity of himself and his employees. This mental attitude on the part of the employer even now operates to discourage safeguarding. Substandard guards on contracting and other risks not subject to schedule rating are the rule rather than the exception.

3. The saving which would result from abolishing schedule rating is too insignificant in comparison with its prognostic value to deserve serious consideration.

SUGGESTIONS FOR FURTHER INVESTIGATION

1. Systematic attention should be given to the residue of the schedule, with the object of isolating such more important non-mechanical hazards as may be remediable. Recent changes in the schedule indicate a tendency toward simplification at any price. It would seem that a more accurate reflection of the causes of industrial injury would be secured by closer cooperation between claim, statistical and engineering departments of the com-

panies, together with intensive efforts to educate the assured in more careful reporting. Exact knowledge of how injuries occur is an absolute necessity if insurance is to fulfill its recognized obligation in helping to prevent them.

2. Attention should be given to the possibility of retaining, on a specific charge basis, if necessary, recognized hazards, even though seldom occurring and therefore having slight effect on the aggregate loss. The real question is not whether a particular hazard increases the resulting total loss one-half of one percent or some other figure, but (to paraphrase a well-known couplet regarding church members):

What kind of rate would my rate be,
If every employer were just like me?

In other words, the primary purpose of schedule rating is to reflect the hazards of *individual risks*. It is successful only insofar as it reflects the measurable and potential causes of loss in each risk, even though some of such causes may seldom appear in other risks, and therefore may not have a material influence on the aggregate loss. The inclusion of such items on a specific charge basis would direct the employers' attention to their importance in his plant, and facilitate their elimination, as well as assist in balancing the safety organization credits upon a more defensible basis. It would charge only those risks having conditions which a real safety organization should remedy, rather than penalize those risks which have an effective organization, by offsetting a portion of their earned credit.

3. It is suggested that other carriers make tests on a random sampling of their business, similar to that outlined above, and submit same to the National Council as a basis for such correction of the above conclusions as the facts so disclosed may warrant.

TABLE I

Column 1	2 No. of Risks	3 Normal Expected Loss, at Manual Rate	4 Normal Expected Loss, at Schedule (Item 19)	5 Modified Normal Loss (Item 16)	6 7 Margin by which Losses Exceed Premiums		8 9 Margin by which Premiums Exceed Losses		10 11 12 13 Margin by which Losses are More Closely Approximated by				14 Risk Numbers	
					At Manual (5-3)	At Schedule (5-4)	At Manual (3-5)	At Schedule (4-5)	Manual		Schedule			
									Below	Above	Below	Above		
Schedule Charge:														
1. Both Manual and Schedule below Losses.....	16	25,386	26,540	46,993	21,607	20,453						1,154		11, 13, 14, 16, 17, 18, 22, 24, 25, 26, 27, 28, 29, 30, 31, 32.
2. Manual below and Schedule above Losses.....	1	4,833	5,575	5,076	243			499	256					1.
3. Both Manual and Schedule above Losses.....	10	24,962	25,772	17,521			7,441	8,251		810				2, 3, 12, 15, 19, 20, 21, 23, 35, 41.
Schedule same as Manual:														
1. Both Manual and Schedule below Losses.....	1	680	680	1,268	588	588			.....	.....	.....	.....		33.
Schedule Credit:														
1. Both Manual and Schedule below Losses.....	12	25,931	24,392	37,431	11,500	13,039			1,539					8, 36, 40, 42, 45, 46, 47, 48, 50, 51, 52, 55.
2. Manual above and Schedule below Losses.....	1	1,173	1,131	1,169		38	4							43.
a. Manual nearer Loss	1	7,474	6,486	6,574		88	900		34			812		9.
b. Schedule nearer Loss														4, 5, 6, 7, 10, 34, 37, 38, 39, 44, 49, 53, 54, 56, 57, 58, 59, 60.
3. Both Manual and Schedule above Losses.....	18	67,143	60,270	42,050			25,093	18,220					6,873	
	60	157,582	150,846	158,082	33,938	34,206	33,438	26,970	1,829	810	1,066	6,873		

SUMMARY OF RESULTS

	Number of Risks on which Losses are More Closely Approximated by		Numerical Balance in favor of Schedule
	Manual	Schedule	
Losses Exceed Premiums.....	15*	17	2
Premiums Exceed Losses.....	10	18	8
Totals.....	25	35	10

	Margin by which Losses are More Closely Approximated by		Monetary Balance in Favor of Schedule
	Manual	Schedule	
Losses Exceed Premiums.....	1,829	1,966	137
Premiums Exceed Losses.....	810	6,873	6,063
Totals.....	2,639	8,839	6,200

*Excludes the one case where schedule does not exceed manual.

TABLE II

EXHIBIT OF RISKS HAVING A NORMAL EXPECTED LOSS, AT MANUAL RATES, GREATER THAN \$4,000

Risk No.	Schedule Rate Index	Experience Rate Index	Normal Expected Loss, at Manual Rate	Normal Expected Loss, at Schedule (Item 19)	Modified Normal Loss (Item 16)
1	1.161	.976	4,833	5,575	5,076
2	1.047	.933	5,445	5,590	5,171
3	1.003	.971	7,940	7,964	7,441
4	.982	.895	4,059	3,988	2,886
5	.950	1.007	7,650	7,285	7,142
6	.913	.718	18,157	16,886	10,489
7	.884	.793	5,095	4,523	2,554
8	.882	1.162	4,570	4,036	5,955
9	.866	.976	7,474	6,486	6,574
10	.711	.923	11,562	8,297	7,465
Totals Simple Averages	.940	.935	76,785	70,630	60,753

Schedule Premium Index = $70,630/76,785 = .92$

Experience Premium Index = $60,753/76,785 = .79$

TABLE III

CALCULATION OF KARL PEARSON'S COEFFICIENT OF CORRELATION FOR RISKS HAVING A NORMAL EXPECTED LOSS, AT MANUAL RATES, GREATER THAN \$4,000

Risk No.	Schedule Premium Index	S. P. I. Deviation	S. P. I. Deviation ²	Experience Premium Index	E. P. I. Deviation	E. P. I. Deviation ²	(S. P. I. Dev.)(E. P. I. Dev.)	
							+	-
1	1.15	.23	.0529	1.05	.26	.0676	.0598	
2	1.03	.11	.0121	.95	.16	.0256	.0176	
3	1.00	.08	.0064	.94	.15	.0225	.0120	
4	.98	.06	.0036	.71	.08	.0064		.0048
5	.95	.03	.0009	.93	.14	.0196	.0042	
6	.93	.01	.0001	.58	.21	.0441		.0021
7	.89	.03	.0009	.50	.29	.0841	.0087	
8	.88	.04	.0016	1.30	.51	.2601		.0204
9	.87	.05	.0025	.88	.09	.0081		.0045
10	.72	.20	.0400	.65	.14	.0196	.0280	
	(9.40)	.84	.1210	(8.49)	2.03	.5577	.1303 - .0318 (Subtracting)	.0318
Simple Averages	(.94)	.084	.0121	(.85)	.203	.0558		
Standard deviations (Root-mean-square)			$\sigma_1 = .110$			$\sigma_2 = .236$	$.0985 = \Sigma (xy)$	

Premium Indices
(Weighted-from Table II.)

.79

$$r = \frac{\Sigma (xy)}{n \sigma_1 \sigma_2} = + \frac{.0985}{10 \times .110 \times .236} = + \frac{.0985}{.2596}$$

$$= + .38$$

$$\text{Probable Error} = \pm \frac{.67 (1 - r^2)}{\sqrt{n}} = \pm \frac{.67 (1 - .38^2)}{\sqrt{10}}$$

$$= \pm .18$$

$$\text{Then } r = + .38 \pm .18$$

TABLE IV
EXHIBIT OF RISKS HAVING A NORMAL EXPECTED LOSS, AT MANUAL RATES, LESS THAN \$4,000

Risk No.	Schedule Rate Index	Experience Rate Index	Normal Expected Loss, at Manual Rate	Normal Expected Loss, at Schedule (Item 19)	Modified Normal Loss (Item 16)
11	1.260	1.107	1,131	1,378	2,301
12	1.225	.950	1,340	1,641	1,285
13	1.215	1.031	1,242	1,491	1,826
14	1.121	1.565	496	556	3,930
15	1.100	.938	629	692	381
16	1.177	1.170	911	997	2,442
17	1.099	1.024	1,310	1,410	1,600
18	1.069	.994	745	794	796
19	1.065	.840	1,620	1,722	487
20	1.048	.894	1,242	1,300	686
21	1.053	.815	1,739	1,830	151
22	1.052	1.655	2,690	2,781	6,694
23	1.083	.863	1,092	1,124	92
24	1.018	1.181	821	835	1,923
25	1.050	1.226	816	831	1,897
26	1.020	1.252	2,745	2,796	5,342
27	1.069	1.128	1,542	1,573	2,107
28	1.027	1.052	1,660	1,696	2,131
29	1.018	1.016	2,900	2,954	3,283
30	1.010	1.267	1,150	1,160	2,712
31	1.010	1.234	1,632	1,646	3,172
32	1.016	1.133	3,595	3,642	4,837
33	1.000	1.098	680	680	1,268
34	.995	.950	1,238	1,281	924
35	1.026	.828	3,430	3,439	1,610
36	.990	.997	2,493	2,469	2,566
37	.963	.980	856	851	800
38	.986	.856	3,296	3,279	1,704
39	.986	.879	942	934	113
40	.974	1.074	2,460	2,397	3,121
41	.970	.950	485	470	217
42	.926	.993	1,160	1,114	1,193
43	.917	.994	1,173	1,131	1,169
44	.945	.834	1,375	1,319	647
45	.940	1.561	1,998	1,909	7,134
46	.940	1.246	1,805	1,719	3,095
47	.946	1.025	2,125	2,021	2,329
48	.930	1.014	1,717	1,628	1,759
49	.953	.881	1,512	1,444	739
50	.937	1.044	1,318	1,236	1,532
51	.918	1.080	2,320	2,185	2,692
52	.906	1.000	1,678	1,585	1,713
53	.940	.929	1,149	1,081	575
54	.879	.945	559	524	224
55	.915	1.356	2,287	2,093	4,342
56	.900	.906	2,272	2,085	1,517
57	.910	.874	1,045	954	242
58	.893	.924	940	846	421
59	.882	.997	3,761	3,338	3,049
60	.829	.900	1,625	1,355	559
Totals			80,797	80,216	97,329
Simple Averages	1.002	1.050			

Schedule Premium Index = $80,216/80,797 = .99$

Experience Premium Index = $97,329/80,797 = 1.20$

TABLE V

CALCULATION OF KARL PEARSON'S COEFFICIENT OF CORRELATION FOR RISKS HAVING A NORMAL EXPECTED LOSS, AT
MANUAL RATES, LESS THAN \$4,000

Risk No.	Schedule Premium Index	S. P. I. Deviation	S. P. I. Deviation ²	Experience Premium Index	E. P. I. Deviation	E. P. I. Deviation ²	(S. P. I. Dev.) (E. P. I. Dev.)	
							+	-
11	1.22	+ .23	.0529	2.03	+ .83	.6889	.1909	
12	1.22	+ .23	.0529	.96	- .24	.0576		.0552
13	1.20	+ .21	.0441	1.47	+ .27	.0729	.0576	
14	1.12	+ .13	.0169	7.92	+6.72	45.1584	.8736	
15	1.10	+ .11	.0121	.61	- .59	.3481		.0649
16	1.09	+ .10	.0100	2.68	+1.48	2.1904	.1480	
17	1.08	+ .09	.0081	1.22	+ .02	.0004	.0018	
18	1.06	+ .07	.0049	1.07	- .13	.0169		.0091
19	1.06	+ .07	.0049	.30	- .90	.8100		.0630
20	1.05	+ .06	.0036	.55	- .65	.4225		.0390
21	1.05	+ .06	.0036	.09	-1.11	1.2321		.0666
22	1.03	+ .04	.0016	2.49	+1.29	1.6641	.0516	
23	1.03	+ .04	.0016	.08	-1.12	1.2544		.0448
24	1.02	+ .03	.0009	2.34	+1.14	1.2996	.0342	
25	1.02	+ .03	.0009	2.32	+1.12	1.2544	.0336	
26	1.02	+ .03	.0009	1.94	+ .74	.5476	.0222	
27	1.02	+ .03	.0009	1.36	+ .16	.0256	.0048	
28	1.02	+ .03	.0009	1.28	+ .08	.0064	.0024	
29	1.02	+ .03	.0009	1.13	- .07	.0049		.0021
30	1.01	+ .02	.0004	2.36	+1.16	1.3456	.0232	
31	1.01	+ .02	.0004	1.94	+ .74	.5476	.0148	
32	1.01	+ .02	.0004	1.35	+ .15	.0225	.0030	
33	1.00	+ .01	.0001	1.86	+ .66	.4356	.0066	
34	1.00	+ .01	.0001	.72	- .48	.2304		.0048
35	1.00	+ .01	.0001	.47	- .73	.5329		.0073
36	.99	.00	.0000	1.03	- .17	.0289	.....	.....
37	.99	.00	.0000	.93	- .27	.0729	.....	.....
38	.99	.00	.0000	.52	- .68	.4624	.....	.....
39	.99	.00	.0000	.12	-1.08	1.1664	.....	.....
40	.97	- .02	.0004	1.27	+ .07	.0049		.0014

Risk No.	Schedule Premium Index	S. P. I. Deviation	S. P. I. Deviation ²	Experience Premium Index	E. P. I. Deviation	E. P. I. Deviation ²	(S. P. I. Dev.)(E. P. I. Dev.)	
							+	-
41	.97	-.02	.0004	.45	-.75	.5625	.0150	
42	.96	-.03	.0009	1.03	-.17	.0289	.0051	
43	.96	-.03	.0009	1.00	-.20	.0400	.0060	
44	.96	-.03	.0009	.47	-.73	.5329	.0219	
45	.95	-.04	.0016	3.57	+2.37	5.6169		.0948
46	.95	-.04	.0016	1.71	+.51	.2601		.0204
47	.95	-.04	.0016	1.10	-.10	.0100	.0040	
48	.95	-.04	.0016	1.02	-.18	.0324	.0072	
49	.95	-.04	.0016	.49	-.71	.5041	.0284	
50	.94	-.05	.0025	1.16	-.04	.0016	.0020	
51	.94	-.05	.0025	1.16	-.04	.0016	.0020	
52	.94	-.05	.0025	1.02	-.18	.0324	.0090	
53	.94	-.05	.0025	.50	-.70	.4900	.0350	
54	.94	-.05	.0025	.40	-.80	.6400	.0400	
55	.92	-.07	.0049	1.90	+.70	.4900		.0490
56	.92	-.07	.0049	.67	-.53	.2809	.0371	
57	.91	-.08	.0064	.23	-.97	.9409	.0776	
58	.90	-.09	.0081	.45	-.75	.5625	.0675	
59	.89	-.10	.0100	.81	-.39	.1521	.0390	
60	.83	-.16	.0256	.34	-.86	.7396	.1376	
Totals	(50.06)	2.86	.3080	(62.89)	36.53	73.8247	2.0018 - .5224 (Subtracting)	.5224
Simple Averages	(1.00)	.057	.0062	(1.26)	.731	1.4765		

Standard deviations

(Root-mean-square)

Premium

Indices .99

(Weighted-from Table IV.)

$$\sigma_1 = .078$$

$$1.20$$

$$\sigma_2 = 1.215$$

$$1.4794 = \Sigma (x y)$$

$$r = \frac{\Sigma (x y)}{n \sigma_1 \sigma_2} = + \frac{1.4794}{50 \times .078 \times 1.215}$$

$$= + .31$$

$$\text{Probable error} = \pm \frac{.67 (1 - r^2)}{\sqrt{n}} = \pm \frac{.67 (1 - .31^2)}{\sqrt{50}}$$

$$\text{Then } r = + .31 \pm .09$$

TABLE VI
DISTRIBUTION BY CLASSIFICATION SCHEDULE.

Schedule	No. of Risks
Food and Tobacco.....	9
Textiles.....	3
Laundries.....	2
Leather.....	4
Paper and Pulp.....	1
Paper Goods.....	3
Printing.....	4
Wood.....	10
Metal Forming.....	10
Machine Shops.....	8
Clay Products.....	3
Chemicals (Groups 558 and 561).....	3
Total.....	60

TABLE VII.
DISTRIBUTION BY STATE.

State	No. of Risks.
Alabama.....	4
California.....	1
Georgia.....	12
Illinois.....	11
Kentucky.....	1
Louisiana.....	1
Maryland.....	1
Massachusetts.....	6
Michigan.....	1
New Jersey.....	2
New York.....	18
Texas.....	1
Virginia.....	1
Total.....	60

SOME DEVELOPMENTS IN SCHEDULE RATING SINCE
THE ADOPTION OF THE INDUSTRIAL COMPENSATION
RATING SCHEDULE, 1923

BY

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The theory underlying the "Industrial Compensation Rating Schedule-1923" which is the schedule rating plan now in use for rating workmen's compensation insurance risks has been previously discussed before your Society. At the Spring meeting in 1921, (*Proceedings*, Vol. VII, page 225) Prof. Whitney outlined the mathematical theory which had been approved by the Joint Actuarial and Engineering Committees of the then National Council on Workmen's Compensation Insurance, as the basis which should be used for building up a new Schedule for compensation insurance purposes, and at the Fall meeting of 1922, (*Proceedings*, Vol. IX page 11) a paper was presented by Messrs. Perkins and Wheeler describing how the theoretical formula had been adapted for practical use, and how it was proposed to apply the theory to the various accident causes that were retained in the schedule rating plan. They also described the methods that were used, and the data available, to place the new schedule upon a statistical basis.

Both of these papers were prepared and presented before the Industrial Compensation Rating Schedule—1923 had been put into effect or even approved for use by the various rating organizations having rate administrative authority. In fact the new Schedule was not put into general operation until July 1, 1923, when it became effective in most states. Shortly after all other states where private carriers are permitted to write compensation insurance (except Pennsylvania and Delaware) adopted the new plan, so that we can say that the present system of schedule rating has been in effect for about three years.

It is the writer's purpose to review briefly the work which has been done since the original adoption of the plan to keep it abreast with the times and to discuss certain questions now under dis-

*This paper presented by invitation of the Committee on Program.

discussion by the Engineering Committee of the National Council on Compensation Insurance, which is responsible for the technical details of the Schedule. Before taking up these matters in detail, however, it may be well to recall some of the basic principles underlying this Schedule and to describe in a not too technical way the manner in which it operates.

1. The Schedule is divided into items which may be allocated into groups as follows:

a. "Physical items." These are accident producing causes which in most manufacturing plants are capable of physical measurement. The 1923 Schedule includes the following items:—

I. Elevators.

II. Power transmission.

III. Dangerous machine parts (other than point of operation).

Note: This item is a recent consolidation of two separate types of machine hazards.

IV. Point of operation of machines.

V. Protection of feet, legs and eyes from molten metals. (This item is applicable only in classifications where foundry operations are normal and important).

b. "Residue." Included in the "residue" are all accident producing causes not specifically included among the physical items. They comprise, among many others, such accident producers as "falls of persons," "falling objects," "hand tool accidents," etc.

c. "Morale items." These items do not cover specific accident producing causes but comprise certain elements to prevent accidents or to reduce their seriousness. The "morale items" include:

I. Safety organization.

II. First aid and hospital equipment.

2. The application of the several items is as follows:

a. Percentages of the total rate for each classification are established showing what part of the rate is designed to cover each of the physical items and the residue. These percentages are termed "pure premiums" and indicate the relative importance of the several items as loss producing factors. They are based upon loss costs and vary from industry to industry depending upon the nature of the operations involved and the type of equipment used.

b. In applying the Schedule to a particular risk, the

"residue" pure premium is not modified. This is not because the importance of the causes included in this Item is held lightly, or because it is believed that they actually operate in the same degree in all risks within a classification, but because no satisfactory or practical method of measuring them has presented itself. Therefore the residue pure premium is established for the classification and is applied to all risks within the classification without change.

c. The "physical items," however, are modified. By determining the degree in which the physical condition of the risk departs from the average physical condition, we determine the degree in which the average pure premium must be modified to obtain the proper pure premium for the risk in question. The basic formula underlying the application of each of the physical items may therefore be expressed as follows:

$$\frac{\text{Risk pure premium}}{\text{Average pure premium}} = \frac{\text{Risk physical condition}}{\text{Average physical condition}}$$

whence it follows that

$$\text{Risk pure premium} = \frac{\text{Average pure premium}}{\text{Average physical condition}} \times \text{Risk physical condition}$$

It should be noted that if the Schedule is to be accurate as a rating instrument, and if it is to maintain a balance of credits and charges, it is essential that:

- I. The pure premiums accurately represent the relative importance of each Item. If a pure premium value is too low the corresponding risk premium will be lower than should be the case. Conversely, the "swing" of any item will be too great if the pure premium for that item is higher than it should be.
- II. The "index" representing average physical condition for the classification must be correct if the condition of balance is to be attained. If the average "index" is too high there will be a preponderance of credits, whereas the charges will outweigh the credits if the average "index" is too low.

In practice the fraction $\frac{\text{Average pure premium}}{\text{Average physical condition}}$

is computed for each physical item in each classification. These computations give a series of so-called "schedule rating factors." In rating an item from an inspection report

the "index" of the risk condition is multiplied by the schedule rating factor to determine the risk pure premium.

d. The "morale items" provide for flat percentage credits based upon the compliance of the risk with certain standard requirements. Such credits are justified upon the premise that the prevention of accidents and prompt medical treatment tend to reduce loss costs.

With the foregoing *resumé* of the Schedule structure as a basis let us see what steps have been taken to improve the statistical basis underlying the schedule rating factors since the plan was first introduced and what further changes have been made or proposed in the Schedule.

PURE PREMIUMS

When the Industrial Compensation Rating Schedule—1923 was first prepared the volume of statistical data available for the determination of the "pure premiums" which indicate the relative seriousness of the accident causes corresponding to schedule items, was comparatively limited. Although a volume of losses reaching almost \$8,000,000 seems large, it should be remembered that it was necessary to divide these losses among more than 400 classifications and so it can be seen that for many classifications analogies and assumptions were necessary.

In the Fall of 1924 the National Council laid out a statistical program with a view, among other things, of more accurately determining the pure premium values of the Schedule. As a result of this call, accident loss data in the form of punch cards and hand tabulations were received from nearly forty carriers as compared with ten carriers reporting in the original preparation of the Schedule. A considerable proportion of the new data had been coded in accordance with the revised "Workmen's Compensation Statistical Plan"—which superseded the former statistical plan shortly after the new Schedule became effective—the remainder of the cards had been punched under the old plan but a co-relation of the data punched in accordance with the two plans was comparatively simple.

Realizing that even with an increased volume of data there would be many classifications for which only a small volume of losses would be reported, it was decided to concentrate the filings on the larger and more typical classifications. With this in mind 93 classes were selected—consideration being given the

volume of business in the class; the geographical distribution of the business; and the nature of the operations. Preference was, of course, given to the classes having the largest payrolls and those in which the operations were uniformly distributed over the country. Also, because many of the smaller and localized classes would derive their pure premiums by analogy, the selection of classes in which the manufacturing operations were varied and typical was essential.

A tabulation of the data filed was made in March of this year and the grand total of losses involved reached nearly \$30,000,000 or over four times the volume reported in the previous tabulation for the same classes. The data tabulated included losses incurred in policy years 1920 to 1923 inclusive, although they do not represent all of the losses incurred during those years for some of the carriers reporting.

The results of this tabulation indicated that the pure premiums originally selected were not far out of line although in certain individual classifications the new data did show notable differences. The following tables show the original pure premiums and those indicated by the last tabulation. Table I shows a comparison of the old and new indicated pure premiums for all items—the 93 selected classifications having been segregated into 9 industry groups. In Table II, 15 representative classifications have been shown with the original selected pure premiums for point of operation and the residue, and the pure premiums indicated by the new data. Pure premiums for the less important items are not shown because, even with the large volume of data available, the losses had to be split so fine that the results could not be considered dependable. For that reason the pure premiums for the less important items were selected by groups of analogous classifications rather than from each individual class.

A study of the two tables shows that there have been, apparently, certain factors which have been producing changes in the distribution of accident costs. There has been a slight increase in accidents due to the driving mechanism of machines, but there has been a consistent reduction in the proportion of losses due to "other moving parts." Also the percentage of "residue" losses has shown a considerable increase. It would probably be difficult to put one's finger on the cause of these

TABLE I

Industry	Elevators		Power Transmission		Driving Mechanism		Dangerous Moving Parts		Point of Operation		Foot and Leg Protection		Residue	
	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New	Old	New
Chemicals.....	1.4	2.5	.8	2.4	.4	0.7	5.5	0.5	14.5	6.3			77.2	87.6
Food Products	4.1	3.7	1.5	3.0	.7	1.0	5.9	1.1	18.1	17.8			69.7	73.4
Leather Goods	.9	3.5	1.9	.9	1.6	1.9	1.6	1.8	35.8	33.7			58.2	58.2
Metal Products	.8	1.2	.8	.9	.6	1.2	4.0	.8	28.0	30.5	3.8	3.7	62.0	61.7
Paper & Printing	6.3	2.4	1.7	2.5	.8	.8	5.8	3.1	34.8	27.2			50.4	64.0
Rubber & Com- position Goods	.2	3.6	.5	.5	.5	1.1	8.0	2.1	35.5	33.7			55.0	59.0
Stone, Clay & Glass Products	2.4	.5	4.6	2.7	.4	1.6	9.4	1.6	9.9	7.5			73.3	86.1
Textile Products	1.8	3.4	2.0	1.8	2.2	3.1	8.0	5.0	28.6	24.1			57.4	62.6
Wood Products	1.4	1.1	3.1	2.1	1.1	1.6	6.8	1.3	44.8	47.0			42.5	46.9
Grand Total	2.0	2.1	1.6	1.7	.8	1.6	5.3	1.9	28.7	28.8			59.8	62.6

TABLES II
COMPARISON OF "PURE PREMIUMS" BY CLASSIFICATIONS

Code No.	Classification	Point of Operation		Residue	
		Old	New	Old	New
2000	Bakeries	40.	35.8	50.0	56.0
2222	Cotton Spinning and Weaving	30.	20.0	56.0	64.3
2501	Clothing Mfg.	20.	22.0	63.5	69.7
2581	Laundries	40.	39.2	46.5	54.4
2623	Tanning	25.	29.4	69.0	62.2
2660	Boot and Shoe Mfg.	50.	33.5	42.5	58.0
2710	Saw Mills	40.	38.8	44.3	52.0
2730	Sash, Door and Assembled Mill-work Mfg.	50.	51.6	39.9	40.7
2883	Furniture Mfg.	55.	51.1	34.0	44.8
3081	Iron Foundries	10.	7.7	67.0	66.2
3400	Metal Goods Mfg.	65.	62.5	28.4	32.5
3632	Machine Shops	30.	26.5	62.8	67.9
3808	Automobile Mfg.	20.	18.4	71.5	76.0
4239	Paper Mfg.	45.	20.7	45.2	69.2
4304	Newspaper Publishing	25.	26.5	64.5	65.0

changes in accident distribution. It might be argued that the credits allowed under the 1918 Schedule Rating Plan have offered sufficient incentive to bring about a reduction of machine accidents thereby increasing the residue percentage. The former Schedule did not stress the point of operation of machines (which may account for these accidents remaining approximately uniform) but did give large credits for guarding the other machine parts. The reduction in the percentage for "dangerous moving parts" accidents would seem to support such a theory; but it is hard to understand why there should have been an increase in the accidents due to driving mechanism. We shall probably have to wait for a later tabulation to see if the present trends are continued before a satisfactory explanation can be made of these changes.

When the tabulations were being made, the data were sorted by state or region to determine whether there were substantial differences in the indicated pure premiums in different sections of the country. In most of the classifications the losses were not sufficiently distributed about the country to lead to any definite conclusions. A few classes did give some interesting results, showing that the territorial values do not vary materially from the national averages. Table III shows the point of operation pure premium for a few classifications by regions—the volume of losses being shown in thousands of dollars.

TABLE III
POINT OF OPERATION PURE PREMIUM BY REGIONS

	Code No. 2000 Bakeries		Code No. 2883 Furniture Mfg.		Code No. 3400 Metal Goods Mfg.		Code No. 3632 Machine Shops	
	Losses	Pure Prem.	Losses	Pure Prem.	Losses	Pure Prem.	Losses	Pure Prem.
National Average.....	..	35.8	..	51.1	..	62.5	..	26.5
New York.....	\$313.	34.9	\$319.	51.5	\$266.	54.7	\$597.	27.6
Massachusetts.....	56.	26.0	55.	49.4	43.	63.0	246.	21.6
New Jersey.....	32.	34.8	10.	53.7	35.	84.3	59.	37.2
Wisconsin.....	39.	35.9	59.	54.0	68.	47.4	197.	28.3
California.....	38.	37.6	24.	60.2	..	..	53.	21.4
Southeastern States.....	29.	29.8	101.	51.2	27.	53.0	145.	28.4
Mich., Ill., & Ind.....	76.	33.0	356.	47.5	297.	71.5	495.	33.1

The figures indicate that apparently there is little difference in accident distribution in different sections of the country and, inasmuch as the pure premiums do not affect the balance of the Schedule, the use of national figures was decided upon.

The actual selection of the pure premiums to be used was a straight forward proposition. Analogies based upon types of operation and equipment used were relied upon for the selection of pure premiums for classifications where no data were available; also for the less important items, which produced only limited volumes of losses, combinations of classifications were made to secure adequate exposures.

In connection with the selection of the pure premiums the Committee gave serious consideration to the idea of eliminating from the Schedule those items which were producing only a small proportion of the loss cost—particular attention being directed to those showing percentages of less than 2%. The only change in items that was adopted was the combination of the “driving mechanism” and “moving parts” of machines into a single item, thus cutting down the machine items from three to two, *viz.*, “machine parts” and “point of operation.” In addition to the considerations of economy and simplicity in application, the combination of the two machine items was decided upon because of the difficulty encountered in coding accidents to “driving mechanism” or “moving parts.” One of the chief reasons for retaining the other items was the fact that even the latest accident reports did not represent experience developed under the present plan of schedule rating, and it was felt that no items should be entirely eliminated until data based upon the operation of the new schedule was available.

PHYSICAL INDICES

The indices indicating the “average physical condition” within any classification play a very important part in the rating of every risk in that classification because a direct comparison of the risk condition is made to the “average” condition. If the “average” values are too high large credits will be prevalent and the charges on debit risks will be too low. Similarly if the values are too low charges will predominate and what credits there are will be curtailed to less their correct amounts. The balance of the Schedule, at least so far as the physical items are

concerned, is therefore dependent upon the accurate determination of these indices.

When the new schedule was originally prepared the physical indices were obtained from information taken from a large number of inspection reports of risks inspected and rated by the several independent rating bureaus. In view of the fact that these inspection reports had been prepared for use in connection with a Schedule of somewhat different form numerous assumptions had to be made;—in the machine items particularly it was difficult to determine the proper information necessary for an absolute calculation of the proper indices. Because of the lack of complete dependability of values based upon these data, immediate steps were taken, after the introduction of the new Schedule, to secure new reports based upon inspections made in accordance with the new plan. Two tabulations of these new reports have been made: the first in the Fall of 1924 covering inspection data collected during the first year the revised Schedule was in operation; the second in the Spring of the present year covering inspections made in the twelve months ending in November 1925. Approximately 12,000 reports covering risks employing nearly 800,000 workers were summarized for the first revision of the indices—the second involved the tabulation of 27,000 new reports on risks with 1,700,000 employees.

Both these tabulations were conducted along the same general lines and so only the more recent one will be discussed. The principle underlying the determination of the "average" index is to combine all of the data from all the inspection reports for a classification and then calculate an index from this combined data in exactly the same way we would calculate the index for an individual risk,—in other words we consolidate all the individual risks into one huge risk from which we obtain an index representing the "average" condition.

Data sheets (see Fig. 1) were prepared for each classification. The information on risks located in Massachusetts, New Jersey, and New York was compiled by the independent bureaus in these states and sent to the National Council in summarized form,—the data for other states were tabulated in the Council direct from inspection reports filed there from time to time as inspections were made. Although the data for each state covering elevator, transmission, driving mechanism (item 363 D. M.) and moving

parts (item 364 M. P.) were collected, these data were not separately recorded because of the limited volume in any one state and because of the relative unimportance of these items. The totals for these items were therefore used as the basis of the indices for all states. For the point of operation item, which carries the greatest weight in the present Schedule, the data were recorded for each state separately and individual state indices were calculated where the volume of data were sufficient to justify it. The P. O. index is calculated by the following method:—

$$\frac{\text{Total unguarded weights} - \text{Total weights eliminated}}{\text{Total points of operation}} = \text{P. O. index}$$

It will be recalled that for measuring the point of operation hazard, weights of varying amounts are assigned to each machine depending upon their respective hazards. If a hazardous machine is guarded, however, a part of the total weight is "eliminated," the amount of the deduction depending upon the effectiveness of the guarding. It will therefore be seen from the above formula, that the P. O. index is really the "average net weight per point of operation."

In the upper right hand corner of the data sheet (Fig. 1) you will notice a series of calculations under the general heading of "balance calculations." In these calculations the current schedule rating factor for each item was applied to the indices developed from the "grand total" data reported on other parts of the data sheet. The results of these calculations were called "balance pure premiums" which when compared with the current "class average pure premiums" showed how far the Schedule was out of balance for the classification, item by item.

With the information shown in the data sheets it was a comparatively simple matter to determine for which items and classifications changes should be made in the physical indices to bring about a balance of the plan, and for the point of operation item, where state exceptions were desirable. In selecting the indices the principle of making as few state exceptions and as few changes in values was adopted in so far as this course could be followed and still maintain a satisfactory balance of the plan. After new pure premiums and physical indices had been selected

revised schedule rating factors were calculated by dividing the first by the second. Although numerous changes in schedule rating factors were made at both revisions on account of revised indices, most of these changes were in classifications where the volume of experience is small. Moreover, in the second revision the number and the amount of the changes were decidedly less than at the first revision, and it is confidently hoped that the changes will be reduced in number at succeeding revisions. A review of the indices, particularly those for point of operation, does not show any decided trend indicating an improvement in the average physical condition of the risks reviewed. Perhaps it is still too early to expect a reduction in the average indices as a result of the application of the new schedule.

MORALE ITEMS

As stated earlier the morale items, which cover safety education, supervision and inspection service, first aid and hospital equipment, are applied by granting credits for the fulfillment of certain standard requirements. No charges are levied on risks which do not maintain these services. The original basic formula as outlined by Prof. Whitney provides that every risk would be rated by comparison to the average risk condition (so far as morale items are concerned) and that the ratio be applied multiplicatively to the results of rating the physical items. For certain practical reasons the provisions of the basic formula were not introduced into the plan and so up to the present time the Schedule has been producing a preponderance of credits largely due to the flat credits allowed in many risks for the morale items.

The question of how these items should be balanced has been the subject of serious consideration ever since the new schedule was introduced and it may be well to briefly outline the methods of balancing these items that have been considered.

With the former Schedule the question of balancing for all items was taken care of by inserting a loading factor in the manual rates for all classifications to which the Schedule applied. This method was discarded, however, with the introduction of the 1923 Schedule because (a) the Schedule itself, except for the morale items, provided ways and means for balancing, and (b) because such a loading in the manual rate, when applied to the

small risks unable to qualify for Schedule treatment, seemed unjustifiable. It, therefore, was decided that the balance of the plan should be accomplished within the Schedule itself and early in the discussions on the subject, some adjustment of the "residue" values suggested itself as the most practical solution. The exact form that this adjustment should take has been carefully considered: should it be a uniform factor; should it vary by state, by classification, or by size of risk; should it apply to all risks or only those not fulfilling the standard requirements of the morale items; should it include the off balance due to credits based upon the "loss cost test." All these were considered.

The outcome of these studies has been the adoption of a loading which shall be added to the residue value—the loading to vary by classifications but to be uniform so far as states are concerned. These loadings are to apply to all schedule rated risks and include provision for balancing all the morale items including the loss cost test. Two or three states have adopted values which are exceptions due to unusual conditions but, in general, the loadings are national in scope.

Dating from the late Fall of 1923, numerous separate tabulations of the effect of the morale items have been made. All of these tabulations have consistently shown that the average credit due to these items amounts to approximately 3%. The tabulations have also shown that the amounts of these credits do not vary to any considerable extent by states, except for those states where the credits allowed are greater than normal or where some other unusual conditions apply. The desirability of having uniform factors for all states, particularly for carriers writing business upon a countrywide basis, is of course apparent, and the fact that the off-balance did not vary materially was decidedly advantageous.

It was found, however, that by size of risk and by classification there were quite decided differences in the amount of loading required to balance the morale items. Table IV shows a tabulation of over 7,000 risks so divided as to show the net credit being developed in risks of different sizes.

TABLE IV
VARIATION IN MORALE ITEM CREDITS BY SIZE OF RISK

Size of Risk (Employees)	Number of Risks	Aver. Safety Organization Credit	Aver. Loss Cost Credit	Aver. Hospital Credit	Average Total Credit
1 to 10	1271	.29	.01	.48	.78
11 to 25	2166	.34	.05	.49	.88
26 to 50	1588	.75	.22	.60	1.57
51 to 100	1107	.88	.20	.68	1.76
101 to 500	1009	1.91	.53	1.18	3.62
501 to 1000	92	2.47	.66	2.86	5.99
over 1000	39	3.21	1.04	4.19	8.44

Table V shows a similar tabulation but divided among certain typical classifications.

TABLE V
VARIATION IN MORALE ITEM CREDITS BY CLASSIFICATION

Classification	Number of Risks	Average Employees Per Risk	Average Total Morale Credit
2000 Bakeries.....	398	19	2.23
2150 Ice Mfg.....	110	10	1.04
2222 Cotton Spinning and Weaving	168	495	5.98
2501 Clothing Mfg.....	569	86	1.76
2660 Boot and Shoe Mfg.....	332	168	4.48
3632 Machine Shops.....	425	33	2.38
3808 Automobile Mfg.....	47	147	5.29

It is probable that the variation of the net credits by classification is due in considerable measure to the average number of employees per risk, although the manner in which the operations in any particular classification are conducted undoubtedly has a great deal to do with the final result. Numerous difficulties in connection with the application of different loading values by size of risk led to the abandonment of such a plan in favor of one providing distinct values for each classification. The latter plan does to a certain extent recognize the size of risk and at the same time takes into account other peculiarities of each industry such as differences in superintendence, character of labor, nature of operations, etc. Having reached the decision to vary the loading by classification it was noted that the volume of information available in many classifications was too small to be entirely depended upon and so a plan was adopted whereby both the indications of the particular classification and those of the industry group in which the classification fell, were both taken into

consideration,—greater credibility being assigned to individual class data as its volume increased. The actual formula used was:

$$x = G + (C - G) \frac{P}{P + 20,000}$$

where

x = the proposed increase in "r" value for the individual classification.

G = the "morale" credit shown for the group of analogous classifications.

C = the "morale" credit for the particular classification.

P = the premium volume for the particular classification.

It will be noted that this method of selecting the "x" or loading values is similar to that used in experience rating and in selecting pure premiums for manual rates where individual state experience is used. It was also decided that in no case should the value exceed 6% because this is as much as a small risk could reasonably be expected to offset through the installation of a safety organization and first aid equipment. A minimum value of 1% was agreed upon as it seemed reasonable to expect that every risk should have first aid facilities. A similar plan of balancing the morale credits has been in effect in Massachusetts and New York for some time and appears to be working satisfactorily.

POSSIBLE FUTURE DEVELOPMENTS

The foregoing outlines briefly the major developments of the Industrial Compensation Rating Schedule—1923 from the time it was introduced down to the present. No attempt has been made to describe technical changes in standards or rules of application as it has been felt that they would be of no particular interest to you. It may be well to point out, however, that the statistical work in connection with the Schedule has not ended—in fact we are in a better position now than ever before to satisfactorily record data relating to pure premiums, physical indices, and morale loading values, statistical data are coming in and are being recorded in such ways that future revisions of the several values can be conducted on a routine basis instead of requiring many of the laborious processes necessary in the past. Moreover these data are coming in in greater volume than in the past and so

future revisions will produce results of even greater dependability.

At this point it may be well to mention a study that is now under way for the purpose of eliminating one of judgment items of the Schedule. In the paper by Messrs. Perkins and Wheeler, and also previously in this discussion, mention has been made of the weights which are used to measure the comparative hazards of different machines. Although the "weights" have considerable statistical foundation based upon the original loss data, it is a fact that a goodly portion of engineering judgment had to be applied on account of the paucity of data available. With the decidedly greater volume of loss material at hand, and with better facilities for determining the relative exposure to machines of different types, it is hoped that a more satisfactory statistical basis for these weighting values will result.

Another study, although not of a statistical nature, that is under way relates to the method of applying the safety organization items. At the present time it is the practice to grant a flat credit for the installation of organized safety measures in accordance with certain standards, and to offer, in addition, further credits under the loss cost test if the experience of the risk (using data compiled under the experience rating plan) has been favorable. The difficulty of determining whether a safety organization is functioning in accordance with the spirit of the safety idea or whether it is being maintained in a perfunctory way merely for obtaining the alluring credit, has long been one of the objections to retaining the safety organization items in the Schedule. Moreover, the fact that the credits allowed under the loss cost test may have developed from experience collected at periods when the safety organization was not functioning has led to considerable dissatisfaction to its use. In Wisconsin, where the loss cost test has only recently become available with the advent of experience rating, and where flat credits double those ordinarily allowed for safety organizations, have been in force, the difficulties resulting from the perfunctory or "paper" organizations reached proportions where some corrective measures were imperative. The Wisconsin Compensation Rating and Inspection Bureau, with the cooperation of the National Council, has developed a plan that it hopes will improve the situation surrounding the application of these Items. Briefly the plan provides that after a safety organization has had a chance to

really get into operation, the amount of credit will be dependent upon the results produced. The underlying principles provide:

(a) The guaranteed credit for safety organization is gradually reduced when the loss cost test becomes available to prove the effectiveness of the organization.

(b) The credit for loss cost test, on the other hand, gradually increases until it becomes the major determinant of the safety organization credit. Moreover, the loss cost test does not become available until experience which has developed under the safety organization is available.

(c) Provision is made whereby a lapse in a safety organization does not permit the risk to again qualify for full guaranteed credits until after a lapse of five years. This prevents a risk having poor experience under the loss cost test to disband the organization temporarily and then re-establish it in order to obtain the full guaranteed credit.

This plan has received favorable comment and is being studied for national adoption,—it is too early to say now if this or some other similar practice of applying the safety organization items will be introduced but in our opinion, some amendments to improve the present conditions are highly desirable.

Before closing, it may be of interest to point out that the experience of the National Council in its rating offices has found the new Schedule a reasonably satisfactory rating instrument, and that the comment which we have received from independent rating bureaus leads us to believe that the introduction of the Industrial Compensation Rating Schedule—1923 was a distinct advance in compensation rating methods.

SUMMARY OF DATA BY STATES AND BALANCE CALCULATIONS FOR SCHEDULE RATING FACTOR REVISION—1926

NATIONAL COUNCIL ON COMPENSATION INSURANCE

BAKERRIES

2000

State	Number Rtd.	Employees	ITEM 170—ELEVATORS								Number Elevators	Risks with Elevators No. Total Emp.	CLASS	CODE	2000
			171A	171B	Number Elevators	174	Number Ladders	177	181	Number Elevators					
Alabama	9	357													
Georgia	31	433													
Illinois	11	512													
Indiana	24	680													
Kentucky	14	358													
Louisiana	18	472													
Maine	12	522													
Maryland															
Michigan	7	241													
Oklahoma	8	451													
Region 48															
Region 49	18	329													
R.I. & Conn.	7	143													
Tennessee	16	501													
Virginia	12	310													
Vt. & N.H.	15	160													
Wisconsin	126	1232													
Sub-Total	327	6412	370	61	669	504	580	23	21	179	148	4554			
Mass.	113	3257	91	4	286	227	250	66	66	71	53	-			
New Jersey	27	1573	117	8	223	165	174	27	46	56	43	-			
New York	274	4134	189	6	210	395	428	91	104	134	110	-			
Grand Total	801	15425	767	77	1368	1291	1432	213	237	440	364	4854			

State	Number of Power Machines	ITEM 320—TRANSMISSION			ITEM 361 D.M.	ITEM 364 M.P.	SECTION 370—POINT OF OPERATION				Risks with one F. Elev. No. Total Emp.	405-Y. (Grand Tot.) No. Total Emp.	407-F. (Grand Tot.) No. Total Emp.	
		322	324.5	326 (Class)			Total P. O.	Unrepaired Works	Works Elim.	Index				
Alabama							153	247	-					
Georgia							352	554	5	1.48				
Illinois							281	385	23					
Indiana							555	753	14	1.36				
Kentucky							255	345	1					
Louisiana							214	313	-					
Maine							250	354	1					
Maryland														
Michigan							179	252	13					
Oklahoma							231	337	9					
Region 48														
Region 49							363	527	15	1.31				
R.I. & Conn.							91	135	-					
Tennessee							333	491	43					
Virginia							243	357	2					
Vt. & N.H.							197	267	-					
Wisconsin							1537	2157	10	1.37				
Sub-Total	4354	65	68	15	2792	3027	5240	7443	125	1.40				
Mass.	1392	-	7	1	1096	1119	1405	2267	151	1.48				
New Jersey	1173	42	46	12	595	605	1184	1347	28	1.54				
New York	2767	250	90	13	1033	1218	2798	4326	13	1.53				
Grand Total	9622	355	211	44	5334	5769	10528	16323	324	1.46				

BALANCE CALCULATIONS			
Section or Rate	Index × S.R.F. = Balance P.P.	Class. Am. P.P.	Class. Exemption
170	90. × .034 = .78	1.8	
320	57 (108-12.9) = 1.15	1.8	
363	.580 × 1.30 = .78	1	
364	.524 × 10.00 = 5.20	4	
370	1.46 × 26.1 = 38.10	40	
405	× = -	-	
407	× = -	-	
r	- - 60.00	60.0	
Total P.P.	96.20	100.0	

46 SOME DEVELOPMENTS IN SCHEDULE RATING

SOME OBSERVATIONS ON ACCIDENT AND HEALTH INSURANCE.

BY

THOMAS F. TARBELL

The several phases of the subject of accident and health insurance have been rather extensively treated at various times in our *Proceedings*. The subject, however, is always a live one and as conditions in the business are constantly changing it seems to the writer not inopportune to bring up this subject, for stock taking at least, at the present time.

HISTORY AND DEVELOPMENT

Accident insurance in the United States began in a rather feeble way in 1850 but its real history dates from 1863 with the chartering of The Travelers Insurance Company, Hartford, Connecticut. The original charter granted authority to insure against travel accidents only but in the following year the charter was amended to include insurance against all kinds of accidents.

Health insurance in the United States was undertaken in a small way by a company in Philadelphia in 1847. It did not prove popular and was practically dormant until the middle Nineties when the practice was instituted of attaching to accident policies riders covering certain specific diseases or illnesses. The list of specific diseases was gradually extended under the force of competition until the present forms of separate health policies, giving practically unlimited coverage, were evolved.

The growth of accident and health business has not been extraordinary and has failed to keep pace with the increase in life business. The following table shows the premiums written at five year intervals from 1910 to 1925 by companies admitted to do business in Connecticut as shown by the Connecticut Insurance Department Reports:

<u>Year</u>	<u>Accident and Health Premiums (including Non-Cancellable)</u>
1910.....	\$24,936,793.
1915.....	33,089,447.
1920.....	56,871,214.
1925.....	83,369,974.

During the fifteen-year period 1910-1925 the premiums increased 234%. During the same period the first year premiums

written by the life companies reporting to Connecticut increased 376% and the new business written increased 471%. The percentages given are not true percentages of increase as the companies making up the results are not the same at the beginning and end of the period. This lack of homogeneity, however, is not of sufficient importance to vitiate the general conclusion.

SELLING METHODS

Competition plays a prominent part in the marketing of all forms of insurance. This factor takes different forms in different lines of insurance. In life insurance stress is placed upon financial strength and net cost to the policyholder. In compensation insurance legitimate competition is based upon financial strength and service. In life insurance there is little difference in rates or net cost and in compensation insurance the rates in most states are the same for all stock carriers. In commercial accident and health insurance the situation is somewhat different. Here a *laissez faire* policy of competition has had full play. Companies have been unrestricted in the making of rates, classification of risks and in granting so-called additional benefits generally known as "frills". Consequently competition has been based principally upon these three factors.

There are, of course, other reasons why commercial accident and health insurance has not made as great progress in the personal insurance field as life insurance. Sales resistance always has been a marked feature of these lines. A man cannot deny the certainty of death but in the matter of accidental injury or illness, if he is in full possession of his faculties and in good health, is inclined to be over-optimistic. The business once obtained is hard to retain, the lapse ratio being very high in the early years. Unfortunately also there has been too much shifting of business from one company to another in the past, which is a bad feature in any line of insurance.

Unscientific rate making and competitive rate making requiring subsequent adjustments of rates upward have also contributed to the instability of the business.

Claim settlements in the past have been a source of dissatisfaction to the insured and a certain amount of dissatisfaction from this source will ever be present in the business unless human nature changes materially. The low rates resulting from free

competition in earlier days would scarcely permit of a liberal adjustment of claims and companies found it necessary to be more technical than would have been the case had rates been upon a more adequate basis. Uniform standard provisions laws adopted generally by the states following an investigation of the accident and health business by a committee of the National Convention of Insurance Commissioners in 1911 have been a great benefit to both the companies and the insured and have helped toward stabilization of forms and practices.

Many of the drawbacks to better sales conditions have their sources in other features of the business, but it is apparent that much can be accomplished by concentrating more upon the idea of thoroughly selling the prospect on the coverage, providing him with a form of contract best suited to his needs and keeping him sold in the original writing company. Reducing the number of forms of contracts would also be a benefit to all concerned.

RATES

Rates, as I have previously mentioned, have always been an individual company matter and generally have been based upon judgment or competition instead of statistical experience. If a rate proved inadequate as shown by the subsequent loss ratio the rate was increased. Any such trial and error method of rate making is indefensible for a line of business that has outgrown its infancy.

Rates for accident insurance have been graded roughly by classes (Select, Preferred, Extra Preferred, Ordinary, Medium, Special, Hazardous, Extra Hazardous) according to occupational hazard. As no combined accident experience by occupations has been compiled, the assigning of risks to classes has been based upon certain individual companies' experience and judgment. Classification of risks, however, is uniform among a considerable number of the companies having membership in the Bureau of Personal Accident and Health Underwriters and a special committee of that bureau known as the Committee on Manual Classifications is doing most excellent work.

Commercial health rates at the present time are not graded by age, occupation or residence, except that an increase in rates is usually made for ages over fifty.

In the field of commercial health insurance the Bureau of

Personal Accident and Health Underwriters has done excellent work along statistical lines. The combined experience of a majority of the member companies covering policy years 1921-1923 inclusive and compiled under the direction of the Committee of Five on Statistics of the bureau has recently been issued. This compilation should be very valuable for future rate making and underwriting purposes. Anyone interested in the underwriting or statistical features of health insurance will find this compilation of experience well worth careful study.

It would seem that there is still a large field for statistical and actuarial work in connection with the scientific determination of accident premium rates. While the experience under accident insurance has been satisfactory in the past, it is desirable for future guidance to know as near as possible the cost of the various features covered by the contract. This is especially so because of the increasing claim frequency from automobile accidents, more than 25% of accident claims at the present time arising from this source. There is a tendency to issue policies providing increased or special benefits for automobile accidents and unless the cost of such benefits is predetermined the results are likely to be discouraging if not startling. Compilation of the available combined experience of a group of companies should be a great help in future rate making.

UNDERWRITING

Commercial accident and health insurance present very few astute problems in the selection of risks from the standpoint of physical hazard. The two most important factors in underwriting are occupation and amount of indemnity applied for. The moral hazard must be carefully considered. The experience under certain occupations has been very unsatisfactory. Health insurance in general shows a high loss ratio on policies providing full indemnity regardless of house confinement, also on forms providing life indemnity. It is questionable if health policies providing full and unlimited indemnity for non-house confining disability can be successfully underwritten. In order to improve the underwriting results in health insurance, companies are resorting more and more to the issuing of only policies with a definite waiting period of two weeks or more. This form of deductible insurance has several advantages from the stand-

point of both the companies and the insured but is not effective to overcome the moral hazard incident to policies paying full indemnity for non-house confining disability and life indemnity.

The amount of indemnity applied for must be considered from the standpoint of earning capacity, not only present but future. Consideration must be given to physical impairments which develop at the older ages when business activities usually lessen and earnings frequently decrease. Also if the present occupation is one the earnings from which depend upon the whims of fashion or some transient public fancy, the case must be carefully weighed for latent moral hazard. Accident and health disability insurance should be restricted to indemnity insurance and the speculative element eliminated. The combined health experience, heretofore mentioned, shows quite conclusively that the rate of morbidity increases with an increase in the size of policy (weekly or monthly indemnity) and that constant vigilance in the underwriting of the larger risks is absolutely necessary.

Careful underwriting in the beginning should be stressed. The agent should be impressed with the mutual advantage from a careful selection of prospects on his part and should be instructed to secure complete and accurate information on all questions contained in the application blank. The use of the cancellation clause or refusal to renew is like locking the barn after the horse has been stolen and leaves a dissatisfied customer who can hardly be expected to spread the doctrine of accident and health protection among his friends and acquaintances.

CLAIMS

In order to determine the results of the operations and the adequacy of rates it is necessary to have as accurate an estimate as possible of the incurred cost of unsettled claims. There are at the present time, so far as I am aware, no reliable tables of claim reserves for estimating the incurred cost of temporary (total or partial) disability claims. The bulk of the unsettled claims are of this nature and the practice of basing reserves upon average claim costs extending over a period of years without giving due weight to the amount of indemnity involved or the nature of disability cannot be expected to yield reliable results.

Further, the general nature of injuries resulting from automobile accidents tends to increase the severity and duration of

disability and unless these factors are given due weight we may fall into the error of underestimating our claim reserves, and thus producing a more favorable incurred loss ratio than will ultimately be realized.

A table of claim reserves for temporary disability cases based on a suitable unit of indemnity compiled from combined experience, and subdivided by type of injury or kind of illness, would be of great assistance. I would not suggest tables by individual types of injury or kinds of illness but by groupings of such types of accident or kinds of illness as experience shows produce substantially the same average periods of disability. The effect of age upon duration of disability should be tested in any such analysis in order to determine upon the advisability of further subdividing the claim reserve tables by age groups.

Claim reserves for life indemnity cases are considered at a later point.

NON-CANCELLABLE ACCIDENT AND HEALTH INSURANCE

No paper on accident and health insurance would be complete without some reference to the non-cancellable policy. This form of policy has been issued since 1915 but it was not until 1921 that it took on any considerable impetus. It was looked upon at that time by some as a panacea for all the ills of the accident and health business and several companies pushed the contract with great enthusiasm. The results do not appear to have come up to expectations. In 1925 only seven companies were writing the business in any volume and the premium income amounted to approximately \$4,185,000.00.

There are several reasons for the failure of non-cancellable accident and health insurance to come up to expectations. In the first place adequate premium rates were higher than underwriters or agents anticipated and as companies found it necessary to increase rates, the business became more difficult to sell. The lack of any dependable domestic statistical experience resulted in dividing the companies roughly into two groups on the question of adequate rates and reserves and the rulings of insurance departments on these subjects have not served to clear the atmosphere. Underwriting results, due to failure to appreciate the importance of carefully underwriting this business, or the impossibility of successfully underwriting it, as some maintain,

influenced some of the companies to withdraw entirely from the field or write the business only as an accommodation.

It is possible that this business got off on the wrong foot and still has a big future. It should be possible in the near future to develop sufficient experience to test the adequacy of present rates and determine, if necessary, a new set of rates. The question of incurred claim cost is an important one for this line of business and a proper table based upon combined experience would help solve the problem. At the present time the standard imposed by ruling of the New York Insurance Department for claims of more than one year duration is Hunters' Table of Mortality among disabled lives with $3\frac{1}{2}\%$ interest and there is a question as to whether or not this claim reserve basis is too stringent. There is no question but that both policy and claim reserves should be adequate but if there is a future for this business its development should not be impeded or discouraged by requiring the maintenance of redundant reserves.

The accumulation of combined claim experience would facilitate the problem of the supervising state insurance officials in prescribing a claim valuation basis and would give the companies a better measuring rod for judging the results of the business and determining upon future policy. It would seem desirable to have tables of reserves for temporary disabilities and permanent total (life indemnity) disabilities. In case of the latter, such reserve tables should differentiate between permanent disability resulting from accident and that resulting from illness or disease. The exposure under non-cancellable policies will soon provide sufficient volume to furnish dependable rates of disability and if we have the necessary data for determining the incurred claim cost the problem of rates and reserves based upon domestic experience can be satisfactorily solved.

A further word upon the subject of underwriting. What has been said regarding the underwriting of commercial accident and health insurance applies with even greater force to non-cancellable business. The medical examination has not proved the safeguard that was expected and is in fact of little value except as an underwriting guide in passing upon the physical hazard at the time of application. A defense of fraud is difficult to successfully maintain in the courts. The moral hazard is greater as there is no relief through a cancellation clause. Occupation must

be given most careful attention from the standpoint of steadiness of income and probable future trend of earnings. Last but not least, and this as previously indicated, applies to commercial business as well, speculative contracts should never be issued. Unless the applicant will suffer a financial loss by the occurrence of the hazard or hazards insured against, the policy should not be issued and no policy should be issued for an amount of indemnity in excess of such financial loss.

The foregoing comments upon the accident and health insurance situation cover only a part of the phases which may properly occupy the attention of all interested—agents, underwriters, claim officials, actuaries and supervising state officials. The main point that I desire to bring out is the desirability and ultimate advantage of adopting sound fundamental principles—agency, underwriting and statistical—and building sanely thereon.

MATHEMATICS FOR STUDENTS OF CASUALTY
ACTUARIAL SCIENCE*

BY

JAMES S. ELSTON

The Educational Committee has requested me to write a paper on the mathematics required of students of our Society. Similar papers have been written dealing with Law, Statistics, and Economics.

It seems logical to devote our attention at first to some of the reasons why the mathematics required in the examinations is included. It perhaps is inappropriate here to go into detail as to why mathematics is taught in schools and colleges as a matter of general education and not merely to students who wish to make practical use of them. College courses in Principles of Education, Psychological Basis of Education, and other similar courses are partly devoted to such analyses. Suffice it to suggest that the concepts of mathematics are very different from those in other subjects. Of course logic must be used in every subject but it is generally used so unobtrusively that its presence is not noted. Logic is the essence of mathematics. It is possible that logic should be studied as a separate subject more than it is, but my experience indicates that such a requirement for actuarial students, for instance, would be more difficult than the mathematics.

Another concept of mathematics is that of precision. In most branches of knowledge there is so much truth in different viewpoints that only general conclusions can be drawn, and even these are largely a matter of judgment, different authorities sometimes reaching different conclusions or at least placing different emphasis on the relative importance of conclusions. Of course the same principles of thought apply in mathematics, but here the assumptions are made explicit, so that when they are once understood the conclusions must be reached by every one capable of following the reasoning. Perhaps my thought will be

*Paper No. 4—"Outlines of Studies in the Insurance Sciences." Previous papers in this series: LAW—*Proceedings*, Volume XI, Page 99; STATISTICS—*Proceedings*, Volume XI, Page 102; ECONOMICS—*Proceedings*, Volume XII, Page 283.

clearer if we attempt to imagine a student asked to discuss the influence of insurance on the country. Almost any high school pupil could give such a discussion on the basis of almost no knowledge of the subject, and the surprising feature would be that many of them that gave very poor discussions would consider that they had given very good answers, and would even consider themselves unjustly treated if they were graded on their answers from the viewpoint of what a really good answer should be. In other words, students in general in most subjects have little conception of the difference between a thoroughly satisfactory answer and a halfway answer, but in mathematics there is no middle ground. Even the poorest student, with the possible exception of some of subnormal intelligence, knows whether a proof in mathematics is correct or not, of course within the limits of his knowledge. The precise reasoning must be followed. The student realizes the futility of bluffing. Appreciation of these concepts is fundamental to good education.

Without going further into the reasons why mathematics is almost universally approved by educators and included in their curricula, we may note that elementary algebra and plane geometry are required in practically all high schools in the country, except possibly where a school is teaching a trade largely with the idea of holding pupils in school who would not otherwise go to high school. Algebra is even introduced in the grammar school or in the early years of the junior high school in many of the progressive cities. These subjects are also almost universally required in college entrance examinations. Solid geometry, trigonometry, and advanced algebra are required at entrance of the best engineering colleges. Is it surprising, therefore, that this Society, one of whose aims is to uphold actuarial standards for casualty insurance practice, requires about as much mathematics for the completion of its course as engineering colleges require for the entrance to theirs, when we remember the fundamental mathematics back of some of the casualty actuarial work to which reference will be made later?

From an entirely different viewpoint the student who wishes to develop into an actuary might consider the training that the men now prominent as actuaries have had. I am not in a position to estimate the part that has been taken by different actuaries in the actual calculation of premium rates and other work of casu-

alty bureaus, nor to judge their relative abilities in their company positions, but an analysis of the education had by writers of the papers that have been presented to the *Proceedings* is illuminating. A large share of these papers have been written by Fellows who are also members of the Actuarial Society of America, the examination requirements for admission to which have thus far included considerably more mathematics than the Casualty Society has required of its students. Most of the other papers have been written by college graduates. In general the papers have been written by men who have either received special training or have given themselves enough special training so that they are recognized authorities in their lines.

I fully recognize the success of executives who have had no opportunities for special training, except what they could dig out themselves. In the last analysis success in any line is due principally to perseverance, hard work, and personality as well as to intelligence. But the question for the young man is not whether the executive officers of companies are mathematicians or statisticians, but whether or not they might be better officers if they had had greater opportunities to master the insurance sciences. To be more specific the young man's concern should not, from the present standpoint, be whether he has the qualities that will later make him a success in any event, but whether or not acquiring the mastery of mathematical and statistical tools will increase his usefulness and the consequent probabilities of his greater success. I will not discuss whether or not complete mastery of a person's work, including the fundamental principles, may not improve his personality by instilling confidence and self-respect, and also whether or not the increased respect of his co-workers may also have a favorable reflex action on his personality.

Further, I am convinced that while broad actuarial concepts sufficed for the earliest casualty work, that day is past, and that adequate solutions of problems will increasingly demand greater actuarial technique and insight. In general business a grammar school education was sufficient for men now in their prime. Now a high school education is almost necessary in some lines, and many with the best promise of future success have a college education. This situation is particularly accentuated in casualty actuarial science which has developed so recently. Statisticians and actuaries originally had almost no strictly pertinent data to

which they could apply mathematical principles if they had had mastery of them. At present, I believe, the data are extensive enough so that the full value is not generally derived from it because of lack of understanding of the possibilities of analysis. This situation can be but accentuated in the future.

From the Society's standpoint one of the main objects of its existence is to raise the standards of present day casualty work. This process to be effective means requiring more training of the individual prospective members and to some extent the selection of those showing the best promise of success. Whether or not an examination in mathematics is an entirely satisfactory method of selection, it is about the only method available that can be applied impartially to young men to test this phase of their development. Of course the selection could be on the basis of obtaining executive positions in individual companies or bureaus. This method is applied to some extent by our Society, but it cannot be an effective method of giving the young men a chance. Individual recommendation by members would not be feasible. The mathematical examinations required seem to be a reasonable minimum test of mental ability. The other examinations are minimum tests of practical knowledge of the casualty business and of ability to use that knowledge. Of course great knowledge, or even ability in mathematics, is not a true measure of the possibility of success in the profession. The latter only comes from experience and development of judgment. The examinations are merely a means of selecting those who show most promise of development. From the Society's viewpoint, and at least in some cases from companies' viewpoints, the examinations indicate those who may be worthy of further chances for development. From the employee's viewpoint they may be considered to be indicative of the individual's willingness and ability to better prepare himself for his work and therefore the passing of them an evidence of his having fitted himself for advancement.

Probably the reason for the mathematics in the examination that most interests the student is how it can be practically applied. In discussing the individual subjects I will attempt to illustrate some of their interrelations and uses. My object in this discussion is twofold: first, to show what I believe it is advisable to study for the examinations and, second, indicate what might be studied to more thoroughly master the subjects.

One of the most important branches is the ELEMENTS OF THE THEORY OF LIFE CONTINGENCIES. Of course a comprehensive and thoroughly efficient knowledge of this subject as required by a life actuary is not necessary, but a considerable knowledge of life and morbidity contingencies, etc., is desirable, among other things for pension work and valuation of disability and death claim benefits in workmen's compensation and personal accident and sickness insurance. No text book has been written from the standpoint of the casualty student, so that the only books recommended are very elementary. Though they include some material not really necessary, I believe that they do not give an adequate preparation in certain particulars. More of the theory of life annuities and joint lives should be included and considerable additional work on multiple decrement tables, such as total permanent disability tables and remarriage tables should be included. A real understanding of proper calculation of premiums and reserves for this necessitates considerably more mathematical training than is required for our examinations. A person just able to pass perfectly all the mathematics in the examinations will need to dig much deeper into these very subjects before he can attain competency in premium or reserve calculations where multiple or new contingencies are involved, or in the most pressing problem of the interpretation of past and present data as guides to underwriting for most probable future success. The examinations are intended to cover the subject of non-cancellable accident and health insurance. I doubt whether a man with a mastery of only the required mathematics will have a sufficient fundamental understanding of the calculus and of analytical reasoning to fully appreciate Mr. Hezlett's paper on "Premiums and Reserves for Temporary and Total Disability Benefits Incorporated in Life Contracts" in Volume XXIV of the *Transactions* of the Actuarial Society. Of course this paper is written from the standpoint of life insurance but the same principles are applicable to non-cancellable accident and health insurance, and I believe that the companies should study this problem from every conceivable standpoint.

It will thus be seen that the Syllabus requirements of *Mathematics of Life Insurance* by L. W. Dowling, *Life Assurance Primer* by Henry Moir, and *Mathematical Theory of Life Insurance* by C. H. Forsyth are minimum. Most of the books men-

tioned later under Interest and Annuities include at least an introductory chapter on this subject. Older books replaced by the modern ones just mentioned are *Actuarial Science* by Ninian Glen and *Notes on Life Insurance* by Gustavus W. Smith.

A more thorough knowledge of the subject would involve reading principally the Institute of Actuaries Text Book on *Life Contingencies*, by E. F. Spurgeon. Chapter XXI dealing with multiple decrement tables would be specially valuable. This book replaces the *Text Book II* by George King which was the standard for about thirty-five years. *Actuarial Theory* by Robertson and Ross supplements this, *Practical Lessons in Actuarial Science* by Miles M. Dawson and *Graduated Exercises and Examples* by Thomas G. Ackland and George F. Hardy are older books of intermediate grade. More searching books are *Mortality Laws and Statistics* by Robert Henderson, *Sources and Characteristics of the Principal Mortality Tables*, *Construction of Mortality Tables from the Records of Insured Lives*, and *Total and Permanent Disability Benefits in Relation to Life Insurance*, the latter three being among the actuarial studies published by the Actuarial Society of America. The casualty actuary uses mortality tables comparatively little, except when combined with remarriage rates or occasionally with disability rates, so that parts of these books may well be passed over for such future reference as he may require. If he wishes to be thoroughly familiar with the sources and characteristics of present mortality tables and to be in a position to employ the principles in tabulations of his own, more extensive and intensive study of these books would be very valuable indeed. *Construction of Mortality and Sickness Tables* by W. P. Elderton and Richard C. Fippard is the most elementary book dealing particularly with its subject. Numerous papers appear in the *Journal of the Institute of Actuaries*, *The Transactions of the Faculty of Actuaries*, *the Record of the American Institute of Actuaries*, and *the Transactions of the Actuarial Society of America*. The papers on disability benefits in the latter are particularly valuable.

The whole subject of life contingencies, as indeed the whole subject of insurance, is dependent upon the THEORY OF PROBABILITY. In the language of college catalogs it is a "prerequisite" of life contingencies. The references given in the *Recommendations* are all very elementary, and deal entirely with *a posteriori*

probabilities. The chapter in Hall & Knight's *Higher Algebra* requires most thought and previous knowledge. The other references are included largely because it is felt that solution of many simple problems is almost as valuable, especially in such a subject as this, as working a few difficult problems. Not only the original algebraic treatment should be considered but the relationship of probabilities to statistics, and especially to the normal probability curve and its characteristics should be included. Here again chapters recommended, even including that in Hall & Knight, give only an elementary concept of the subject. Books such as *Choice and Chance*, by William A. Whitworth, based on the algebraic treatment, *Mathematical Theory of Probabilities* by Arne Fisher, introducing the student to *a priori* probabilities, and to the modern Scandinavian methods of approach, and *A Treatise on Probability* by John M. Keynes, devoted largely to the logical bases, may be consulted to obtain a more thorough knowledge. The most readable of the more comprehensive books is *An Introduction to Mathematical Probability* by Julian L. Coolidge. Little effort has as yet been made in texts to apply the theory of probabilities to casualty lines of insurance, but Professor Whitney indicated some of the possibilities in his papers on "Theory of Schedule Rating, Particularly with Reference to Fire Insurance" and "An Inquiry into the Nature of the Fundamental Principles of the Contract of Indemnity" in the *Transactions*. Albert H. Mowbray in early papers in the *Proceedings*: "How Extensive a Pay Roll Exposure is Necessary to Give a Dependable Pure Premium"—"A New Criterion of Adequacy of Exposure"—and "Notes on Poisson's Exponential and Charlier's Curves" contributes partial solutions of the most perplexing problem of insurance of any line: how extensive an exposure is necessary in order that premium rates calculated upon it may be found proper. It is my belief that extension of these methods or further applications of probabilities and mathematical theory of statistics will be very fruitful in the future.

The DIFFERENTIAL AND INTEGRAL CALCULUS in the Examinations include only the elementary applications of differentiation and integration, with some knowledge of maxima and minima. For several years the questions have been set so that not only differentiation and integration of trigonometric functions

has not been required, but not even has the use of trigonometry in differentiation and integration of algebraic functions been involved. In other words, only a fractional part of an ordinary college course is presupposed. The student may well use the text with which he is already familiar. The principal application of calculus is in Makeham's law of mortality in life contingencies which is the fundamental principle made use of in most tables of joint life annuities. The integral calculus is also extensively used in obtaining expressions for complicated benefits in life contingencies. Fundamental formulas expressing the value of life annuities payable momentarily are first derived in the form of integrals and then approximations obtained for the actual evaluation. Of course the integral calculus is also involved in studying the normal probability curve. It might be mentioned that most French and German texts on actuarial science are developed largely from the view point of the calculus.

The CALCULUS OF FINITE DIFFERENCES parallels the differential and integral calculus. It embraces two practical processes; interpolation and summation, of which the former is most useful, as it can be used to obtain more accurately than by any other method intermediate values of functions such as the reserves at individual ages in Mr. Cammack's table of "Reserves for Non-cancelable Accident and Health Insurance," *Proceedings*, Volume VII, page 300. It can frequently be employed to save considerable work in calculation: as for instance, in obtaining the values of complex annuities, it may be accurate enough and avoid considerable work with complicated formulas to obtain the values for quinquennial or decennial ages and interpolate intermediate values. The principles of interpolation are fundamental in the more complicated processes of graduation, by which mortality, disability, and remarriage rates, or any important numerical experience data may be smoothed out to eliminate the effects of accidental fluctuations due to inadequacy of exposure and thus disclose a more meaningful empirical or even physical law of progression, so that the data will serve more conveniently and more dependably in the calculation of premiums, reserves and other values. Reading of *Lectures on the Theory of Construction of Tables of Mortality* by G. F. Hardy—*Frequency Curves and Correlation* by Elderton—*Graduation of Mortality and Other Tables* by Robert Henderson—*Interpolation*

by J. F. Steffensen about to be published, and numerous papers in the *Journal of the Institute of Actuaries*, the *Transactions of the Actuarial Society of America*, and the *Record of the American Institute of Actuaries* presupposes more mathematics than these examinations now require.

Again the casualty student is unfortunate in that no book or article on finite differences has been written from his viewpoint. *A Treatise on the Calculus of Finite Differences* by George Boole is the classic and has just been reprinted, but is more suitable for advanced study. *Elements of Finite Differences* by J. Burn and E. H. Brown, and the chapters in the second edition of *Text Book II* of the Institute of Actuaries are perhaps the best to study, but these are out of print and may not be available to everybody. Up to the present the more complicated sections, particularly of the latter, have not been required in the actual examinations. The chapters in the *Introduction to the Mathematical Analysis of Statistics* by C. H. Forsyth are probably inadequate, so that *Calculus and Probability for Actuarial Students* by Alfred Henry must almost necessarily be resorted to by many students, though the examinations so far have not presupposed mastery of everything included therein. The best advice to the ordinary student, to enable him to pass the examinations, appears to be to study carefully the type of questions previously asked and regulate his study of Henry accordingly, trying to include somewhat more of the easier operations than has been included in the past, because of the possibility of the standard being raised slightly.

The possibilities for the casualty executive's use of DESCRIPTIVE AND ANALYTICAL STATISTICS have been well suggested by Edwin W. Kopf in "Statistics in the Service of Insurance Administration". *Proceedings*, Volume XI, Page 102*. It perhaps will be sufficient to note here that while considerable value may be derived from intelligent use of statistics without conscious application of mathematical principles, dependable utilization of statistical measures commonly involves considerable mathematics entirely

*Since the above was written several interesting contributions to the subject of "Requirements for Statisticians and Their Training" have appeared in the December 1926 number of the *Journal of the American Statistical Association*. The one by H. L. Rietz and A. R. Crathorne on "Mathematical Background for the Study of Statistics" is most pertinent to this paper.

within the range of that complex known as the calculus of observations, and yet in many cases beyond the present requirements of our examinations. *Principles and Methods of Statistics* by R. E. Chaddock, *Economic Statistics* by W. L. Crum and A. C. Patton, *Introduction to the Theory of Statistics* by G. Udny Yule are included in the *Recommendations*. Among other elementary books on statistics that may be consulted to clear up doubtful points and throw additional light on other points are: *A First Course in Statistics* by D. C. Jones; *Elements of Statistics* by Arthur L. Bowley. More comprehensive books include *Statistical Method* by Truman L. Kelley, *Handbook of Mathematical Statistics* by H. L. Rietz, Editor in Chief; *The Combination of Observations* by David Brunt, and *The Calculus of Observations* by Whitaker and Robinson. *Introduction to Mathematical Statistics* by Carl West, and *Introduction to Mathematical Statistics* by James W. Glover and Harry C. Carver contribute little additional material. It may be anticipated that *Mathematical Statistics*, by H. L. Rietz, to be published soon, will be very helpful.

The subject of COMPOUND INTEREST AND ANNUITIES CERTAIN is similar to Descriptive and Analytical Statistics, and Elements of Accounting in the fact that it is advantageous in many lines of business, and therefore probably will be useful even to students who fail to make good in actuarial work and turn to other lines of work. It is also similar to the Statistics in that there were almost no satisfactory books covering the ground ten or at least fifteen years ago, while now there are a large number of elementary books, and courses are now given along this line in many colleges. The actuary must not only be able to compute the value of bonds or the rate of yield of bonds by the mere use of bond tables, but he must understand the principles involved enough to perform similar calculations on bonds with peculiar terms or where for other reasons the bond tables are not sufficient. In some companies he may find occasion to draw up amortization schedules of bonds. He must be able to understand the computation of rates of interest earned on investments more fundamentally than he could without such a course. He must realize the significance of the interest factor if premiums are paid more often than annually or if discount is allowed for in a single premium to cover several years' insurance. Of course this subject is also fundamental to any problem involving life contingencies

and any problem involving computation of reserve to cover benefits continuing a long time.

This subject is one that many students have to learn themselves, and here again it seems best to read several of the easy texts mentioned and work a great number of easy problems. *Mathematical Theory of Investment* by E. B. Skinner, *Mathematics of Finance* by Rietz, Crathorne and Rietz, *Mathematics of Investment* by W. L. Hart and *Interest and Bond Values* by M. A. Mackensie are recommended. Other similar texts are: *Mathematical Principles of Finance*, by Frederick C. Kent, *Mathematics of Finance* by L. L. Smail, and the first part of *Actuarial Theory* by Robertson and Ross. *The Mathematics of Finance*, by H. W. Kuhn and C. C. Morris has just been advertised as relating the whole subject to a small number of fundamental formulas and their simple transformations. The standard work is the Institute of Actuaries' Text Book—Volume I, but this is written from the English viewpoint and also from the standpoint of logic without much consideration to developing the student's concepts gradually. It is a book greatly to be admired by a person already familiar with the subject. The earlier English work on "The Theory of Finance" by George King is much more readable and still valuable where available. Books not especially suitable are *Finance and Life Insurance* by William A. Dudley, *Mathematics of Accounting and Finance* by Seymour Walton and H. A. Finney, *Mathematical Theory of Finance* by T. M. Putnam, and *Mathematics for the Accountant* by Eugene R. Vinal. Most of the elementary books on actuarial science include introductions to interest and annuities.

The ADVANCED ALGEBRA needed for the examinations corresponds in general to an intermediate high school course, but also includes selected chapters from high school advanced algebra. Special emphasis is placed on geometrical progressions, because these are needed to understand the interest and annuities. The subject of logarithms is very important, as they are necessary in some problems in interest and annuities, and statistics; are needed in the calculus and are useful elsewhere. Convergency and divergency of series is included to assure some conception of the limitations under which algebraic processes are valid. Summation of series is included to form an introduction to the calculus of finite differences and to suggest some of the other methods

of summation not treated therein. Treatment of the binomial theorem is fundamental to all subsequent mathematics. In particular, consideration of the coefficients immensely simplifies various problems in probabilities. Permutations and combinations are one of the most important features of the algebra, because they constitute the foundation on which probabilities is largely built. For this subject the student can use any high school or college algebra with which he is already familiar, but the inclusion of Hall & Knight's *Higher Algebra* in the *Recommendations* indicates that a more thorough treatment of the special topics recommended is implied than would be obtained from most American texts.

To summarize, I might suggest that the mathematics needed for the Society's examinations cover approximately as much ground as a good high school course. This statement needs some explanation, because a high school graduate although he has had all the mathematics there, could not pass the examinations without considerable extra studying, and also because calculus and finite differences are not as a rule taught in high schools. As a matter of fact most of the matter required under calculus is the mechanical operations of differentiation and integration of algebraic and exponential functions. Little of the fundamental theory is required and none of the applications found in ordinary text books except the maxima and minima. Furthermore I understand that corresponding high school courses in Europe frequently introduce such concepts in mathematics corresponding to our high school grade. There is also a tendency in this country to introduce courses giving an elementary conception of such branches of mathematics in one course instead of devoting all of an ordinary student's time to a more comprehensive study of one or two subjects. Finite differences is also not given in high school, but if only the subject matter required were presented in one article I doubt whether it would occupy more than twenty-five pages. Again these extra subjects may offset the plane geometry, solid geometry, trigonometry, and a large share of the advanced algebra taught in high school because most of the time in the usual such course in the latter, after a review of previous algebra studied, is devoted to the theory of equations. This is eliminated entirely from our *Recommendations*.

I wish I could include helpful suggestions on how actually to

study mathematics, but I am afraid that learning how to study is an accomplishment that must be attained by the individual. One of the principal points is learning to recognize the most important features, and devote correspondingly more effort to these. As far as the examinations of the Society are concerned, I have already tried to indicate which subjects and sections of subjects are so elementary that everything included is important, and which texts are of the more advanced nature so that selection should be exercised. The principal criterion here, from the standpoint of the immediate present, is which subjects appear to be most closely connected with the examination questions previously asked.

Of course merely reading the text, even understandingly, in mathematics has comparatively little value. As soon as the student has read it sufficiently to understand it he should put aside the text and try to reproduce the reasoning, preferably not in the exact words of the text but so as to bring out clearly the significance of each step. Furthermore only a partial understanding of the subject is obtained unless many if not all of the problems have been worked. Of course it is not necessary to work every problem where the subject is being reviewed and the student really has a good knowledge of it, but practically every problem should be worked on, the subject matter that is new or not thoroughly understood.

It may assist the student to secure a better perspective to read a small amount of material ahead without thoroughly understanding every detail, but only a limited amount of the subject matter should be covered in this way before time is taken to thoroughly understand what has been read. Whether or not the subconscious mind works on problems that have seriously engaged the attention of the conscious mind, it does seem to me that it is worth while to review a subject several times. Matter studied one night assumes additional meaning the second night. The subject reviewed a few weeks or months after the first study attains a much richer meaning. It therefore seems especially advisable to commence preparation for the examinations early enough so that perhaps a month will be left for merely a review.

The object of this paper is partly to help students realize the reasons why elementary mathematics is required of candidates seeking admission to the Casualty Actuarial Society and to sug-

gest the possibilities in their study for the examinations, and partly to indicate how they may conduct their own post-graduate studying. It should be emphasized that the essential point in the examination, as well as later, is what knowledge and power of reasoning a student *has* and not what he may have *had* sometime in the past that counts. In general the applicants for admission to the Society that have the best attributes of success are those who tackle the subjects recommended with the idea of mastering the sections required instead of only brushing up merely enough to pass the examinations. A man that masters whatever he undertakes is developing himself so as to be entrusted with more difficult problems in his business. A man who does merely enough work to get by stands much less chance of success; in fact, I believe that the examinations should be considered as one of the man's principal opportunities of proving how much brain power and ability to apply it he has acquired. Most college graduates need only to review some of the subjects and find it easy to study the new subjects required. A high school graduate will probably have to work considerably harder to master the subjects, but the examinations furnish the opportunity of testing his ability and showing that he is able to overcome the handicap with which he starts. Our recommendations are designed to guide him to an equivalent of the parts of a college course most vital to this profession.

Of course the examinations are not entirely an end in themselves. Some men will pass who will not be able to develop the judgment and breadth of view necessary for real success. My conception of the examinations is that they are a means of selecting groups of promising young men who have given evidence of more than usual ability and which groups will make eventually a large proportion, though not all, of future actuaries. They may be likened to the qualifying rounds of a golf tournament. Among the qualifiers may be a few who play above their standard and will not be reckoned eventually among the successful. A few others that fail to qualify may do so in the succeeding year. How great the eventual success of those passing will be, depends mostly on how well they apply their ability to study all problems they meet in their business and all allied problems. The examinations are merely one stage in their development intended to indicate fitness for further study. Part of the emphasis of this

paper is upon the fact that the matter required of candidates is only the elements in each subject. Future development depends upon acquiring a further breadth of view and ability to look beyond the immediate present, which with actual experience should develop the judgment that is the ultimate goal of study and one of the attributes of success.

SELECTION AND TRAINING OF MEN FOR CASUALTY AND SURETY FIELD POSITIONS

BY

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SECRETARY, ACCIDENT AND LIABILITY DEPARTMENT, ÆTNA
LIFE INSURANCE COMPANY

It is encouraging to note the increasing interest in educational work in our business. A number of casualty and surety companies now have training schools, and this seems certain of having a most favorable effect on the business in general.

I am sure that other companies find, as we do, that the very fact that they have training courses materially assists them in attracting desirable men to their organizations. The business needs men of good education—men who have been trained to think—and such men will seek to cast their lot with companies which offer them the best opportunities for learning the business and for future advancement.

The company with which I am connected has conducted special courses of personal instruction at the home office during the past several years for the training of men for various types of field office positions, such as special agents, underwriters, bond superintendents and group department representatives. These courses have been conducted along usual school lines by instructors who give their entire time to the classes during the school terms.

DEPARTMENTAL TRAINING

Another type of instruction has consisted of what we call "departmental training." Our accident department has trained a number of underwriters for field offices and our automobile department has given a very thorough training to several men who serve as traveling representatives of that department. Other departments have also trained men for field positions.

We do not conduct schools at the home office for the training of adjusters, cashiers, payroll auditors and inspectors. Such employees receive their training at field offices under experienced men in these branches of the business.

*This paper presented by invitation of the Committee on Program.

HOME OFFICE EMPLOYEES

No training school is maintained for home office employees. Such employees receive the required instruction in the departments to which they are assigned. It would undoubtedly be of benefit to us if this method of instruction could be supplemented by a system of regular study, particularly along lines which would give the employee a broader knowledge of our business than is usually obtainable in the specialized work of the departments.

At least one Hartford insurance company requires all new home office clerical employees to take a short course of training, at the start of their employment, which gives them a general picture of the organization and the nature of the business.

CASUALTY AND SURETY SCHOOLS

In our casualty and surety schools, conducted since and including 1920, we have given training to 255 men, 219 of whom were salaried employees of the company, and 36 were trained in behalf of general and local agencies.

We have three separate courses in the casualty and surety lines; one in accident and health, which runs for nine weeks; another in general casualty lines of fifteen weeks' duration, and the bond course, which also runs for fifteen weeks.

The classes have usually started in July, and we have had only the one school term each year. It is likely, however, that we will have classes more frequently in the future.

We seldom have a student take more than one of these courses. The men are trained for underwriting and production work in the field, and generally speaking, we give more attention to underwriting procedure than to sales work. This is a reversal of our former practice, as we have found it best to give the men a good grounding in a knowledge of the manuals, policy and bond coverages and selection of business, and to give them their agency and sales training largely in the field. In our accident and health course, however, we give more attention to sales work as the men who take this course are usually assigned to sales positions, and as a general rule have had previous business and sales experience.

GROUP SCHOOL

The course of training in our group school, in which home office representatives of the group (life and disability) division

are trained, covers a period of two months. This is essentially a sales training course which involves a short period of field training preliminary to the school work. The group school has been conducted twice a year (January and February—July and August) for the past three years, and approximately 75 men have received training.

SELECTION OF MEN

Before dealing further with our casualty and surety school work, it seems desirable to tell you something of the sources from which we obtain our men, the types of men desired, and the methods used in selecting them. The men employed usually come under one of the three following classifications:

1. College graduates, who have been referred to us by college vocational departments. The majority of our men have entered our schools immediately following their graduation from college.

2. Applicants referred and recommended to us by men connected with the company. A considerable number of our men have come from this source, and we are encouraging the extension of this method in getting in touch with desirable men.

3. The large group of men whose applications for positions have not been invited by us, or who have not been referred to us by members of our organization. We have, in recent years, employed a comparatively small number of men in this group.

I might add here that many of the men we have trained in our casualty and surety schools have not had college educations.

In filling sales positions we of course look for men who have the commonly-known (but not so commonly-possessed) attributes or indications of sales ability. We do not, however, put these "sales ability" factors first in rating the men for our general casualty and surety schools. These men will either temporarily or permanently fill underwriting positions in the field; some of them will later become agency and production men, but we have found that it is best—and here I am speaking only of our casualty and surety men—to train them first, in our schools and in field offices, as underwriters, and then, if desirable, give them agency and sales training in the field. Under these circumstances, we search for men who have not only good personality and education, but who also give some tangible indication of having native

mental ability above the average—men who seem to have the qualities of thoroughness and good judgment necessary in underwriting positions.

We are supposed to have two distinct types of men in business—the “thinkers” and the “doers.” In the insurance business I presume the salesmen would be listed among the “doers,” and the actuaries and the underwriters would be classed as “thinkers.” However, we recognize a third type of man—the combination “thinker-doer”—and this is the type we want for our schools and for our field positions.

The selection of men for our casualty and surety schools is handled in different ways. In some instances the men are employed upon the recommendation of managers, general agents, supervisors or others in our field organization, and in other cases they are employed at Hartford after interviews with officers and others.

We have established valuable contacts with a number of colleges (and I might say that we have given preference to colleges which have well-developed business courses) and our present method is to have two of our field supervisors visit these colleges each spring and interview applicants referred to us by the college vocational departments. In this connection, let me say that the colleges keep in touch with their graduates and usually know whether the men have been given the opportunities as represented by the employer. If, in this respect, the record is favorable, the continued cooperation of the college in placing men may be counted upon.

In most instances the applicant is interviewed by both supervisors. The applicant's record in college is carefully reviewed, and in this connection it is interesting to note that almost without exception the men we have employed have earned 50% or more of their college expenses.

If the applicant makes a particularly good impression, the supervisors may employ him immediately, subject of course to satisfactory reports from his references. In other cases the matter of employment is held open for a few weeks until we can check all of the applications and select the men, within our school quota, who seem to be best qualified.

Each supervisor interviewed from 300 to 400 college undergraduates this year. It should be understood that all of these

men did not apply to us for positions, but that they were interested in learning something of the opportunities in our business. Following the interviews, applications were given to probably 60 or 70 men, and of these 42 were employed. Incidentally, this group came from 28 colleges.

THE NATURE OF THE CASUALTY AND SURETY COURSES

The success of any school training plan of course depends to a very great extent upon the ability of the instructors, and we believe that we have been very fortunate in having instructors who have had extensive field experience and who have developed very good ability as teachers. It might be of interest to note here that our instructors are the supervisors who visit the colleges and select the men for their respective schools.

Following are the schedules of subjects—and time given each subject—of our casualty and surety courses, together with specimen detailed outlines of certain subjects:

General Casualty Course

- | | |
|--|------------|
| 1. General Introduction | Three days |
| (a) Talk by Vice President | |
| (b) "Opportunity for a Career"—Saturday Evening Post ad (read) | |
| (c) "Business Insurance a Universal Need" (read) | |
| (d) The <i>Ætna</i> Year Book—President's Report (read) | |
| (e) Historical sketch of companies— <i>Ætna-izer</i> magazine | |
| (f) The Theory of Risk—by Willett | |
| (g) The Law of Average—by Hoffman | |
| (h) Insurance Education—(article by Henry Moir) | |
| 2. Accident and Health | Two weeks |
| 3. Burglary | Two " |
| (a) Study of all policy contracts and endorsements | |
| (b) Study of manual and applications | |
| (c) Practical rating problems | |
| (d) Circulars and advertising material | |
| (e) Article—Burglary Insurance—A. C. Skaife | |
| (f) Study of pamphlet—Burglary Insurance—Casualty Actuarial Society by Michelbacher and Carr | |
| (g) Sale of Bank Burglary policy—Field Supervisor | |
| (h) Lecture—Department Secretary | |
| (i) Final Examination | |
| 4. Plate Glass | Three days |
| 5. Combination Residence | " " |

6. Water Damage	Three days
7. Sprinkler Leakage	" "
8. Liability and Compensation	" weeks
9. Automobile	" "
10. Check Forgery	" days
11. Engine and Electrical Machinery	" "
12. The Aetna Plan of Insurance and Bonding Protection	" "
13. Branch Office Procedure	" "
14. General Review	" "

Bond Course

1. General Introduction	Two days
2. Fidelity Bonds	Three weeks
(a) Read Mackall and Lunt on Fidelity Bonds	
(b) Study the use of Fidelity forms (about 60 forms)	
(c) Study and memorize Aetna Fidelity Bonds	
(d) Study manual and problems	
(e) Read actual files (about 300)	
(f) Read miscellaneous articles on Fidelity Bonds	
(g) Read Aetna Fidelity and Surety Lecture course on Fidelity Bonds	
(h) Read claim files	
(i) Read circular letter on Fidelity Bonds	
(j) Examination	
3. Public Official Bonds	Three days
4. Fiduciary Bonds	Two weeks
5. Court Bonds	One "
6. Contract Bonds	Two "
7. Depository Bonds	Three days
8. Miscellaneous Indemnity Bonds	One week
9. Bankers Blanket Bonds	" "
10. Blanket Fidelity Bonds	Three days
11. Burglary Insurance	One week
12. Compensation and Public Liability	" "
13. Review of Bonds	" "

We make a special feature of the study of actual cases, taken from our files, which illustrate various points we want to bring out. Lectures are given frequently by home office department heads and by field representatives. Oral and written examinations are frequently held, and each student is given a list showing the standings of all students. The students are required to

devote from ten to twelve hours each week, outside of school hours, to reading assignments given them.

To give you a better idea of the scope of the work, part of one of the casualty examinations is given below:

Part I—Without Manuals or Notes

1. State the eligibility requirements for experience rating a Compensation risk in Illinois.
2. Define the credibility factor.
3. What is the maximum number of policy years experience that is used in Illinois in figuring experience rates?
6. Give the formulas for obtaining the experience modification factor.
7. How is the maximum influence of a single claim limited in the experience rating plan?
8. How is the maximum effect of a catastrophe limited in this plan?
9. What effect do losses which have occurred during the expiring policy year have on the renewal rate?
10. (A) What is the maximum charge it would be possible to obtain from the experience rating plan?
(B) How would you answer an objection based on limits imposed by this plan as to possible rate reductions and rate increases?
11. State the eligibility requirements for schedule rating a compensation risk in Illinois.
12. Name the sections which the schedule rating plan provides for the determination of risk pure premiums.
14. What is an interim inspection?
15. Which of the following classifications could be schedule rated:

1. Electric light plant operation	6. Department stores
2. Paving	7. Wire nail manufacturing
3. Paper hanging	8. Cement quarry
4. Printing	9. Oil refining
5. Typewriter manufacturing	10. Flour milling
16. Is the application of the experience rating plan mandatory?
21. Give the manual rule for the division of payroll into different classifications for compensation insurance rating and name the standard exceptions.

22. Define governing classifications.

23. State the coverage provided, the limits, and the major obligations imposed upon the insurance company by the Universal Workmen's Compensation policy.

25. What is the extra-territorial provision in some compensation acts? Is the Illinois act extra-territorial?

32. Give the manual rule in the compensation manual dealing with additions, alterations and repairs.

37. (A) In general is the employer legally responsible for the acts of independent contractors?

(B) Name five exceptions to the general rule cited by Moll.

38. Is it possible for a claimant asking damages to sue both the contractor and the insurance company carrying the contractor's public liability policy for limits of 40/40,000?

43. In Liability Department's letter to the field under date of June 11, 1926 seven important points were listed which must be followed in accepting compensation risks. Name the points mentioned.

46. (A) State the coverage provided by an employers liability policy.

(B) How is this coverage sold as to medical aid?

(C) What states have no compensation act?

48. (A) What are base limits for druggists liability insurance?

(B) Is Physicians Liability Insurance sold to all physicians, or what limitations are placed on its sale?

(C) Why is it possible to sell Physicians Liability policies on the group form at reduced premiums?

49. Name five major points which in practice make the inter-insurance principle of handling insurance risks fundamentally unattractive to a subscriber as explained by Burns in his article on this subject.

Part II—With Manuals

(This section consists largely of rating and classification problems.)

The casualty written examinations this year consisted of a total of 894 questions and problems.

TRAINING IN THE FIELD

When we have completed the preliminary training of the men at Hartford, we assign them to field positions and endeavor to see that they are given well-directed training under experienced field men. The results under this method are usually very satisfactory, and we follow up the work of the school men by having the school instructors spend some time with the men at the field offices.

Our school men are encouraged to continue their study of the business, and are informed as to various sources of information which are available to them. There are a number of excellent publications which we have recommended to our men, and we have found that it has paid us to give attention to this matter.

THE PROBLEM OF FURTHER TRAINING ALONG ADVANCED LINES

There is unquestionably a need for a definitely organized system of training along advanced lines for the men who have completed the usual instruction courses for beginners. We are now planning a field instruction course—to be conducted at field offices—for our special agents and others, which will be based upon lesson material furnished by the home office. Most of our field offices now have regular meetings for the instruction of their men, but much of this work does not follow any very definite plan.

In some instances we bring field office men to Hartford for training along special lines. For example, we have given a number of our field office underwriters and inspectors two or three weeks of special training at the home office in workmen's compensation business. This has involved a study of rate-making, a study of manual classifications, and rules governing payroll division, etc., a study of the policy contracts, and of the functions of the claim, medical and payroll audit departments. Attention is also given to causes of accidents in various types of industry. We have found this short course of instruction very useful, and it is possible that as time goes on we will make greater use of this method in providing additional training in other lines to our field men.

IN CONCLUSION

It is not possible here to go into detail regarding all features of our school work. I have said very little about our group school,

which we believe has accomplished excellent results, and I have not touched on any particular features of our accident and health sales training school, in which many of our most successful field men in those lines have received their preliminary training. School training is a comparatively new thing in our organization, and we still have much to learn regarding this work.

We have welcomed the opportunity to explain our school system in the hope that it may lead to a broad and open discussion of the subject by all companies which are interested.

INSTALLMENT PURCHASE ACCIDENT AND HEALTH INSURANCE

BY

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INDEMNITY COMPANY

A few years ago when intensive drives on behalf of Liberty Loans were the order of the day, sums totally beyond the comprehension of most were readily referred to on the part of the average individual not so constituted, in a business way, as to be interested in huge sums of money, as being something wonderful, big, but at the same time something that was beyond the understanding of the average person. Such amounts had never been collected in any one year before, and in all probability never would be again, was the feeling of most. But how conditions have changed!

To-day such huge sums no longer appall the average man of the street—in fact, he goes beyond and insists upon being a very important factor in the upbuilding of those huge sums. At this time, the "Poor Man's Credit System," otherwise known as the purchase of articles on one of the many time payment plans in vogue, assumes the proportions of a Liberty Loan in the course of one year. Whether we are in accord with the rapid development of this credit system or not, is not a matter of consequence; I believe that we will all be in accord with the thought that it is here to stay. Present practices are giving way to improvements. Many changes are direly needed at this time. The parasite of this credit system must become a thing of the past, and be replaced by instruments that will protect, that will aid, the installment purchaser, rather than permit of the continuance of the usurious practices only too frequently found to be in effect at this time.

Insurance has played a part in remedying some of the evils of this "Poor Man's Credit." I wonder if the opportunities are understood. Is it appreciated that it is questionable whether there exists a home or a family in the United States to-day that

*This paper presented by invitation of the Committee on Program.

is not at this time profiting by the tremendous credit extensions not available a few years ago? The underwriters of the various forms of insurance written, alone can answer that question.

There has recently been introduced in a more or less substantial measure a new form of insurance protection that is destined to play an important part in bringing about an improvement in the installment purchase situation as it exists to-day. This protection is known as "Deferred Payment" insurance. It agrees with the insured institution that in the event of any purchaser of that company's produce on any one of the time payment plans of which use is made on the part of that organization, being accidentally killed, the balance outstanding at the time of death will be immediately paid by the insurance company to the holder of the notes or chattel mortgage, who in turn assign full right and title to the estate of the deceased, without any subrogated rights; in other words, the article is then owned by the estate, and no further payments need be made.

Or, which is perhaps of greater importance, in the event of disability resulting from either injury or sickness, the amount of the note due each month is paid by the insurance company to the holder of the mortgage, and which is also without any subrogated rights. A receipt for the sum involved is then placed in the possession of the disabled individual who is the purchaser of the article.

From time to time we see in the public prints comment which is usually in a humorous vein, on the many subterfuges that are employed to inveigle the purchaser or prospective customer to spend more money than he had contemplated spending, or in fact than he can afford to spend. In the instance of the automobile, it would be found to be the case in the instance of a great many owners, that, in spite of the fact that the car they are driving is perhaps the second, third or fourth car that they have owned, they have not a full realization of the cost of upkeep, with the result that today will be found in many instances individuals who are operating a car that is really one grade beyond their financial strength.

A sales manager of one of the popular cars not so long since told me that one of their greatest problems is to keep the average purchaser from buying their most expensive model of car rather than one that is in keeping with their pocketbook. When you

consider that the number of cars replevined is comparatively small, you wonder why such an attitude is assumed.

We will all agree that the vast majority of purchasers on the installment plan are honest individuals. They intend to pay their notes, do pay their notes, but very few have an understanding of the hardships that they frequently encounter in paying those notes. A few years ago, necessities such as homes, real estate, etc., were the only articles purchased on the time payment plan. To-day the average individual is buying not alone the necessity but the luxury as well. Included in this class is to be found perhaps a better type of furniture than was heretofore enjoyed, the automobile, the radio, household utilities, such as washing machines and electrical devices of various kinds, and only too frequently clothing and jewelry come within the list.

The average individual will have no hesitancy in admitting to his friend that he is buying his home on the installment plan, or his automobile; he is reluctant, however, to include in that list his furniture; seldom will he admit the household article, and never clothing or jewelry. Yet this is our friend that we encounter in business daily. His income is mortgaged temporarily to the limit.

What happens if the unexpected arrives in the form of disability on the part of the wage earner? In most instances, he will meet his outstanding notes, but none outside of his immediate family will have any conception of the hardship entailed in doing so. Only too frequently the payment of the note is represented in quantity as well as quality of the food on his table, the clothing for his family. He returns to his business duties in debt. This is the usual, not the unusual case I am citing. With the volume of merchandise purchased on the installment plan today being in excess of \$5,000,000,000 annually, and with the morbidity tables available, we have a very definite knowledge of how far real protection such as this could be made to reach.

Group principles are applied to the issuance of this protection. No application is required, and where permitted by law, a group or master contract is placed in the possession of the manufacturer or merchandiser, who in turn acquaints the purchaser of the protection he has secured through the medium of a certificate. Where the group policy is not permitted, an individual form is issued and presented to the purchaser with the usual copy of the

sales agreement. The charge may be paid by the merchandiser, or the consumer by adding the small premium to the cost of the article. It is reasonable to assume that this latter method will be followed ultimately, irrespective of whether or not the storekeeper or manufacturer is willing to admit of an adherence to such a plan for the collection of the premium.

The coverage carries with it no protection for a disability less than fourteen days. Protection may be extended on the pro rata basis of the monthly indemnity involved beyond the fourteenth day, or like compensation insurance, if the disability extends to the fifteenth day, coverage becomes retroactive to the beginning.

During the first of three years that one company has experimented in this business, little interest was aroused. During the present year, many requests have daily been received from all types of merchants and manufacturers, direct rather than through the medium of an insurance agency. Economically the plan has been judged sound by reputable concerns on the order of the General Motors, Westinghouse Electric, Federal Electric, as well as by some of the larger banking institutions and bond houses.

While the automobile has been largely used as an example, protection is applied to any article that is purchased on a time payment plan. Automobile premiums have amounted to many hundreds of thousands of dollars, for the reason that that was the line which was followed by the company to which I refer in its original experiments. The household utility is rapidly forging to the front, and recently an increased interest has been evidenced by building and loan organizations, real estate concerns and bond houses selling all forms of bonds and mortgages on a time payment plan; likewise savings accounts.

In connection with the latter, the life insurance companies have for some time past issued a form of life insurance policy that applied to savings accounts, but which was issued in most instances for a definite sum which remained stationary throughout the life of the account. To-day a number of banks are including in their protection this Deferred Payment, which in effect is applied the same as would be true were an individual to purchase an article of merchandise involving the same amount that he agrees in writing to save over a given period with the bank. This involved long term deposits. In the instances where

life insurance is today being coupled with the Deferred Payment coverage in the protection of banks and other articles, the amount of life insurance at risk diminishes with the fulfillment of the obligation on the part of the purchaser or depositor.

This insurance is sold, not as first might appear to be the case, as additional collateral, but as a sales augments. It is to protect the individual purchasing against the only contingencies utterly beyond his control that will not permit of his meeting his obligation, for which it was necessary for him to mortgage his future income. It has a very definite economic value to a community. Most people are reluctant to purchase on the time payment plan, feeling that if they are disabled as the result of an accident or sickness, the original amount they have invested would be lost to them because the automobile or other article would be replevined when they were unable to meet their subsequent notes. This protection offered by the storekeeper or dealer deletes that particular fear.

A rather interesting statement was made to me the other day by a representative of one of the nationally known houses who have enjoyed this protection for some time past, that this Deferred Payment insurance was bringing to their sales organization a desirable class of people, the so-called white collar class predominating; also the industrial risk of the higher order, which in this particular instance was the class they desired to solicit. They attributed this to the fact that the protection that we are extending had abridged the fear that frequently existed in the minds of the conservative buyers against mortgaging future earnings.

The dealer does not permit his salesmen to sell insurance. The reason for this is, of course, obvious. Salesmen of furniture, for example, are not equipped, nor in most instances have the ability, to sell insurance. In referring to such protection they would be building up a sales resistance against the articles they most desired to dispose of. Reference is to be made to the protection that the dealer extends, after the sale has been consummated; or, if the circumstances warrant it, or in fact make it necessary, reference can be made during the course of the sale, but not to insurance. The salesmen must constantly emphasize the big, whole hearted merchandiser that the individual is going to buy from, and just what he, the merchandiser, does for his

customers through protection that he has arranged, in the event that the customers are disabled or accidentally killed.

It would be of interest to know in analyzing the many thousands of claims that have resulted from this insurance so far, that in very few instances are we subject to the "repeated" hazard. By "repeater," I refer to a condition that is frequently found to be true in the instance of individual accident and health policies, where certain holders will be known as chronic claimants. In but the rare instance does the purchaser who presents claim at all ever present but one claim. Of course, this is largely due to the fact that most of the notes we are covering are for a period not in excess of twelve months. However, when you take into consideration the fact that we are including, without examination or application, industrial as well as commercial classes, this particular feature strikes me rather forcefully.

The moral hazard is also worthy of some comment. To safeguard the interests of the insurance carrier, the selection of business in the various states has been such as not to permit of a preponderance of industrial business in large manufacturing centers, such as is to be found in certain sections of Pennsylvania, racial and other characteristics also being taken into consideration. The size of the risk is, of course, governed by the amount of notes outstanding and due monthly. This, in the instance of the individual, is invariably a small amount as compared to the total income of the purchaser, whatever his occupation or profession may be. An underwriting practice that is also to be recommended is that no dealer or merchant be protected unless a guarantee in writing is given that not less than 90% of the merchandise handled under a time payment plan will be covered under the insurance contract. Complete instructions must be furnished the dealer at the time the agreement is entered into, in order that the company's interest may be properly safeguarded.

In the instance of an individual not engaged in some gainful occupation for remuneration or salary, such as a housewife, of course coverage cannot be extended, but it is within their province to name some member of the immediate family upon whom they are wholly or partially dependent for support to be the covered individual under the agreement.

Before the finance company or storekeeper will permit of the article leaving his premises, in other words sell it on a time pay-

ment plan, naturally he conducts an investigation that is usual to his business. If, during the course of payment, the purchaser is disabled, the money is paid by the insurance carrier to the finance company or dealer, in keeping with the arrangement entered into, who in turn marks the note paid or furnishes a receipt for the equivalent to the purchaser. This deletes the moral hazard to a material extent. If the actual money found its way into the hands of the purchaser, it could be squandered and the notes still remain unpaid. The receipt has the same collateral value, but in itself will not provide the necessities of life or permit of the individual continuing being disabled for the purpose of merely procuring payments on the article. The disability in addition must be certified to by a regularly licensed medical practitioner.

The interest of the field representatives of some of the more substantial companies engaged in the production of accident and health insurance is found to be quite keen at this time, with the result that the Bureau of Accident and Health Underwriters has appointed a committee to discuss and report upon this subject at length, and in which report undoubtedly will appear the findings of the committee of actuaries who will be called upon to give considerable thought to the all important rate question, so that this subject will undoubtedly again find its way into your discussions.

THE INTEREST OF THE ACTUARY IN STABLE MONEY

BY

NORMAN LOMBARD*

EXECUTIVE DIRECTOR, STABLE MONEY ASSOCIATION

Possibly there is no group of people who should have a larger scientific interest in the subject of stable money than the actuaries. Large interests depend upon the accuracy and thoroughness with which they do their work, and it should be of the utmost importance to them that the tools with which they work, and the measures with which they mete, be stable and reliable. Let us, therefore, first examine our yard-stick of value—the dollar—to ascertain whether or not it is really stable or unstable.

Many people feel that because the dollar is by law equivalent to a certain weight of a certain precious metal of a certain degree of fineness that, therefore, it is stable in value. Many people suppose that because America is, and for many years has been, on a gold standard, that our dollar is a reliable measure of value. Of course, compared with the fluctuations which have taken place in the purchasing power of foreign monies, due to the inflation and re-adjustments which occurred during and after the World War, the dollar has been relatively stable in its purchasing power. Yet it has fluctuated over very wide percentages.

For example, between 1860 and 1865, the American dollar shrank in its purchasing power by 54%. Between 1865 and 1896, it increased in purchasing power by 190%. Between 1896 and May 1920 it shrank in value 74%. Between May 1920 and February 1921 it increased in value by 70%. During the first seven months of this year the increase in the purchasing power of our dollar was 6.2%.

What would we say of our yard-stick, of our pound, of our gallon, of our watt, of our degree of temperature, if they fluctuated through such large ranges? Where would there be any science in the dry-goods business, or any possibility of entering into long-time contracts for the purchase or sale of any commodity measured in yards, if the yard-stick fluctuated as our

*This paper presented by invitation of the Committee on Program.

dollar fluctuates? No one would then dare to buy or sell commodities by the yard, unless delivery was to be made immediately and before the yard-stick changed in length. And yet we quite calmly, and without thought of the risks which are being run, enter into contracts payable in terms of dollars, which run not over months, but over years and sometimes over centuries. Every lease, every issue of bonds, every savings bank account, every insurance contract, every pension arrangement is, in fact, a contract payable in terms of dollars, and into each one of these contracts enters all of the uncertainty which is attached to the instability of our unit of measurement of value, the dollar.

It is not so very long since the yard was just as unstable as our dollar is today. Originally the yard was the girth (geard) of the chieftain's waist. Later it was established as the length of the arm of Henry the Fourth, and now it has been officially fixed as the length between two fine lines drawn upon a bar of metal alloy, kept in a glass case in a specially constructed brick room, which is maintained at a constant temperature, in the Bureau of Standards at Washington, and which one can view only through telescopes from across the room, in order that the heat of one's body may not affect the length. To such a degree have we stabilized the yard, to such exactitude have we reduced it, that one can now safely contract for goods, measured in terms of yards, with the contract running over an indefinite period, with certainty so far as the measure is concerned that one will receive just what one has contracted for.

But not so our dollar. Our dollar which enters into nearly every contract into which enters the yard, the bushel, the watt, or any other unit of commercial measurement, is still allowed to masquerade as a unit of value when really being a unit of weight of one specific commodity. I could outline to you in a way which would appeal most compellingly to your sense of outraged justice, what are the economic and social consequences of the fluctuations in the unit of measurement of value. I could point out how, in a period when the dollar is decreasing in purchasing power or, in other words, when prices are rising, extravagance is encouraged, unearned profits are realized by the owners of real goods and equities, people with fixed incomes, such as bondholders, owners of savings accounts, lessors, judges, school teachers, etc., are reduced in circumstances and frequently

such a security, which you offer us to-day"; and the result is that in a very short time, the increase in the volume of security holdings of the Federal Reserve Bank becomes apparent, and a corresponding amount of bank credit has been forced into the market, and business has been stimulated accordingly, with a resulting increase in the general price level, and a decrease in the purchasing power of the dollar.

These operations, on behalf of the Federal Reserve System, are facilitated today because of the super-abundance of gold lying in the vaults of the Federal Reserve banks. Ordinary banking procedure and sound banking practice dictates that the gold reserve ratio shall be about 40%, that is to say, that there shall be about 40% of the outstanding obligations in a gold reserve owned by the bank. As it happens, the gold reserve in the United States today, including that actually held by the Federal Reserve banks and that artificially circulated in the form of gold certificates, is around 80%. Therefore, there is a leeway of 40% in the gold reserve ratio, it is twice as large as need be and there is no fear that any procedure which might be adopted by the Federal Reserve Bank would be likely to bring the gold reserve ratio to the traditional danger point. Therefore, a new policy of central bank operation has been inaugurated in the United States. Heretofore, the practice has always been so to govern the outstanding loans that the minimum gold reserve ratio would not be in danger of violation. Now the policy is so to govern the volume of bank credit that the purchasing power of the dollar shall be fairly stable and business shall be kept on a fairly constant level.

It is admitted that the technique used in connection with this new policy has not been perfect and that there is not complete unanimity even among the authorities of the Federal Reserve System, as to what steps should be taken under given conditions to accomplish the desired results; witness the drop of prices during the current year. If a true stabilization policy were in effect, securities would long since have been purchased and credit volume stimulated thereby, so that the drop would not have continued so long nor gone so far. Business cannot stand a long continued drop in the value of inventories equal to $\frac{3}{4}$ of 1% a month. There is considerable doubt on the part of the responsible Federal Reserve authorities as to whether or not their

procedure, in thus stabilizing business and stabilizing prices, would meet with general approval on the part of the people, if it were commonly known; but with all of this it is fair to say that a new policy has been adopted, that conscious management of the currency and credit volume for the purpose of accomplishing stabilization, is now being practised.

Every encouragement should be given to the Federal Reserve System in this connection. It is true that in times past great mistakes have been made. Thus, when prices were rising and a boom was rampant in this country, the powers of the Federal Reserve System were not used to stifle that boom in time. The boom was allowed to go to the point where the utmost delicacy of handling was required, and this was not forthcoming. The people at that time in the saddle, in the management of Federal Reserve affairs, were either indifferent or ignorant as to the results which would follow from drastic action. In May 1920, at a meeting of the Advisory Council of the Federal Reserve System, it was determined to raise the rate abruptly to 7%. The result was an immediate fear in the business world that the boom was going to be brought to an end. But instead of merely that happening, a tremendous crisis was precipitated, a decline in the price level followed which for severity and abruptness has not been equaled in the history of this country. Millions of men were thrown out of employment, over one million farmers lost their farms, owners of securities were subjected to tremendous losses, and general havoc was created.

Compare this condition with the period of stability which has followed the adoption of the new practice, and which has now continued for a period of some four years. We now find that business is on sound and steady foundations. Unemployment is negligible. Production has been kept up to a large volume, and has been met by steady consumption. We find that the American dollar has become the model for stability of all of the currencies of the world, and that New York has become, to all intents and purposes, the financial center of the world. We find on the whole a level of well being and a high standard of living such as has rarely been equaled in the history of this country.

It is not well perhaps to ascribe too much of this desirable state of affairs to the somewhat imperfect stabilization which has resulted from the acts of the Federal Reserve authorities; but

it is not too much to say that the prosperity which has been vouchsafed to us through this measure of stabilization, should permit us to envisage the benefits that would result to society as a whole from the adoption, as part of our monetary philosophy, of the principle that the primary aim in connection with monetary practice should be to achieve stabilization in the purchasing power of the monetary unit. Let us adopt the slogan that no monetary system is sound which does not afford a stable general price level.

Not only is this of importance to actuaries but to every man, woman and child, to every owner of property of every description, to every investor, to every banker, to every borrower, to every producer, to every consumer. A stable dollar means justice and prosperity; an unstable dollar means injustice and adversity.

As indicating the interest, not only of actuaries, but of every American citizen in the problem of stabilization, I quote the words of Mr. Benjamin Strong, Governor of the Federal Reserve Bank of New York, from a letter written by him under date of March 3rd, 1923, and published in *Collier's Weekly*, in which he said, "Is not the fundamental condition of industrial and national tranquillity that of a reasonable stability of prices?"

More power to all the good right arms that are working toward this beneficent end!

ABSTRACT OF THE DISCUSSION OF PAPERS READ
AT THE PREVIOUS MEETING

THE STATISTICAL SURVEY OF THE MASSACHUSETTS COMMISSION
INVESTIGATING THE QUESTION OF OLD AGE PENSIONS—

EDMUND S. COGSWELL

VOL. XII, PAGE 97

WRITTEN DISCUSSION

DR. FREDERICK L. HOFFMAN:

Mr. Cogswell has rendered a genuine service to insurance actuaries by presenting in brief outline the essential facts and findings of the Massachusetts Commission, the most important of its kind that has considered the essentials of the old age pension question.

The minority of that Commission were men of outstanding ability, who have dispassionately considered every phase of the question and presented conclusions entitled to the utmost consideration. Mr. Cogswell, as Secretary of that Commission, was primarily responsible for the methods of investigation and the presentation of the results in the report which constitutes one of the most important contributions to economic science. For economics in its last analysis is the science of wealth, its accumulation and distribution. Non-contributory old age pensions are in all cases a modified form of poor relief, cleverly disguised under a terminology which is wholly inadmissible.

Mr. Cogswell draws attention to the amount of the pension provided, which in no case exceeds \$1.00 a day and runs as low as \$25.00 a month in the state of Montana. This amount does not provide adequate support in old age and is, therefore, but a supplementary form of poor relief. He might have emphasized the point that the amounts provided are a mere entering wedge into a much larger form of relief, as time goes by. That has been the experience everywhere old age pension laws have been enacted. The Massachusetts age limit was 65 years. Here again Mr. Cogswell might have pointed out that the tendency everywhere is towards the lowering of the age, in course of time, certainly to 60, and in the case of women to 55 years.

For the first time a large amount of new information was secured for nearly 20,000 persons not in receipt of public relief. This is precisely the element which it is expected to reach should non-contributory old age pensions be established, and which at

the present time maintains itself, in one way or another, without state assistance. It might have been pointed out that the dependent population will be hindered, rather than helped, by old age pension legislation, for its status, which in many cases is far from what it might be, will not admit of material improvement as long as public funds are expended upon those who can manage somehow to do without them.

In other words the real problem of adequate support in old age concerns those who are now entirely dependent and in need of better care, particularly in the event of illness. The squandering of public funds in small amounts, totally inadequate for personal needs, must needs deprive them of what might otherwise be available.

The plan followed by the Massachusetts Commission, under Mr. Cogswell's direction, was wholly admirable and it is hoped will be adopted in similar inquiries elsewhere. Particularly does this apply to the investigations now in progress by the National Civic Federation, which also fortunately have the benefit of Mr. Cogswell's assistance, but it is doubtful if equally satisfactory records as were available in Massachusetts are likewise available for many other States.

As Mr. Cogswell points out, about ten per cent. of the population in each of the counties considered was interviewed, and this for the present purpose may be considered a satisfactory cross-section of the actual conditions affecting the whole of the aged population.

In my judgment the procedure of not weighting the figures obtained added to their value. It is certainly gratifying to find that of the aged population of 65 years and over, 84.4 per cent. in the state of Massachusetts were found to be non-dependent. But of the population of 70 years and over the proportion was only 79.2 per cent. Upon more careful analysis it would probably have been found that nearly all the strictly dependent cases were persons more or less impaired in health or physically incapacitated otherwise.

With reference to the property returns the analysis might possibly have been carried somewhat further, but it is extremely difficult to do so. Those possessing properties of substantial amounts or of more than \$5,000 are usually the people who are most reticent to discuss the facts.

Mr. Cogswell draws attention to an extremely important

result of the investigation to the effect that "the economic condition of married persons was better than that of single or widowed women or of the single or widowed men." In an age in which the marriage institution is assailed from many sides, in which the trend is rather towards the non-marriage on the part of many who ought to be married, this statement should prove of value.

It is also decidedly suggestive that of the persons interviewed, who had property of less than \$5,000 in value, or less than \$1,000 income, nearly 35 per cent. were still self-supporting. It might have been emphasized in this connection that the suitable employment of the aged has never received, on the part of economists or social reformers, the attention of which it is deserving.

Of exceptional interest are Mr. Cogswell's observations on life insurance. He points out that nearly two-thirds of the aged persons interviewed carried no life insurance, while most of the remainder had industrial policies. Here it might be pointed out that in many cases, no doubt, the policies previously in force had probably been on the endowment plan and had terminated. As I understand it inquiry was not made into the facts of previous insurance, but only into the facts of insurance in force at the time the inquiry was made. For industrial insurance the results are a gratifying indication of the progress which is being made in this direction, for most of the policies were of amounts of over \$200, which in any event would provide an adequate burial and for the last medical attention. The life insurance inquiry might have been carried further, but considering the large amount of information gathered on other questions this was probably not considered feasible, but life insurance is such an important factor in the economic life of the people that future investigations are more likely to concentrate attention upon its incidence in cases of dependence, as well as economic independence in old age.

It is not going too far to say that life insurance, more than any other form of thrift, fosters the habit of systematic saving, not only for life insurance purposes, but for many economic purposes otherwise. No form of insurance has been more beneficial in this respect and in this direction than industrial insurance, or insurance on the weekly payment plan.

Finally, Mr. Cogswell draws attention to another supremely

important result of his investigations and that is the incontrovertible fact that the large majority of persons, not dependent in old age, were persons who had living children. Just as the investigation supports the institution of marriage, as a safe-guard against dependence, it equally supports the larger family as a safe-guard in this direction. There is a further conclusion also of importance that "the ability of children to support their aged parents in full and without outside assistance increased with the number of children living." In view of the decline in the size of the family, and the increase in the proportion of families without children, these figures are of great practical significance; for, in quoting Mr. Cogswell's own statement: "A large family of children is a great advantage. Among other things it helps to keep one out of the poorhouse."

Old age pension legislation is a flimsy pretense on the part of social reformers who use a pleasing terminology to hide the sordid truth of poor-relief. All such relief or support, which has not been earned, is public support and never a right or the result of unearned benefits on the part of the population concerned. The minority members of the Massachusetts Commission, therefore, wisely rejected the pernicious proposal to establish non-contributory old age pensions in the state of Massachusetts, than which no state in the Union prides itself more on the thrift and economic independence of its people.

Mr. Cogswell deserves the thanks and appreciation of the members of society for his scholarly and painstaking contribution to the important question under consideration.

ACCOUNTING METHODS FOR CASUALTY COMPANIES BY USE OF THE
HOLLERITH SYSTEM—THOMAS F. TARBELL

VOL. XII, PAGE 215

WRITTEN DISCUSSION

MISS A. C. DARKOW:

Mr. Tarbell's analysis, at once comprehensive and detailed, of the uses of the Hollerith premium card may, I believe, be supplemented by a brief account of the development of the premium card in a casualty company of a few years' growth.

It is now a fact, generally known and as generally acknowledged, that the business of casualty insurance could not be

transacted on a scientific basis without elaborate mechanical equipment. In fact, it could not be carried on at all without punching, sorting, and tabulating machinery of some type, since to keep all necessary records by individual clerical labor would involve prohibitive expense—expense, indeed, so great that the insurance premium would almost be an expense pure premium plus a loading for losses.

The records involved in the successful conduct of any insurance company fall broadly into three classes:

First. Those needed to inform the company of its progress and the progress of its agencies;

Second. Those needed to provide information in considerable detail to rate-making bureaus; so that equitable cost may be assured the policyholders;

Third. Records on which are based current statements of the status of the company's affairs, and these are required by law.

The mechanical equipment used in the entry and collocation of data for these records consists, as is well known, of punch, verifier, sorter and printer-tabulator.

These machines reduce what would be an impracticable task for, say, fifty clerks to a simple practicable procedure for one-fifth as many. The use of some such machinery is common to all insurance companies but each company works out its own salvation in the matter of extracting the maximum benefit from the use of this equipment. It may be illuminating to illustrate the development of the premium punch card in the recent years of a young casualty company. From this premium card, incidentally, must be derived information for keeping the records enumerated above.

The premium card originally devised had on it information satisfying the requirements of the three types of records enumerated above, *i. e.*

1. Information regarding the issue year, term, and expiration of the policy, all necessary for the calculation of the premium reserve.

2. Information regarding the writing agent.

3. Information on state, or state and city, chargeable with the policy; and further information needed for ratemaking.

In addition, of course, it was necessary to indicate a designating number. Two sections were allowed for premiums, one for premiums written (on the cancelation card this was punched for

original premium canceled) and the second for return premiums, used on the cancelation card only. For premium tabulation purposes, because the same section of the card was used for premium written and the original premium canceled, it was necessary to run the writing cards and the cancelation cards separately. This involved two-fold sorting and two-fold tabulating and greater awkwardness in balancing the sheets in the clerical section. This consideration and the fact that in the next year the amount of information necessary for rate-making purposes had increased, led to the development of two premium cards instead of one. The two new cards were:

1. A card bearing premium reserve, agency, and state information, on which three sections were allotted to premiums, in the following order; original premium canceled, premium written, and return premium. In tabulations for balancing purposes and in tabulations of agency figures these cards—premium and cancelation—were sorted together and put through the printer together, thus effecting a considerable saving of time in sorting and tabulating.

2. A second card bearing information for rate-making, on which separate sections were allotted to positive exposure and negative exposure, and positive premium and negative premium. These premium and cancelation cards were also sorted and tabulated together. Difficulty arose, however, when it became necessary to balance the two sets of cards, one against the other, by policy year and by state. Moreover, the amount of labor expended in punching and verifying the second set of cards was a considerable additional expense.

By the third year the system of two sets of cards was abandoned, and all necessary premium information was included on one card by the old expedient of allowing only one exposure section (used for exposure and premium written on the writings card and for exposure and premium canceled on the cancelation card); and by the additional device of showing the original premium canceled in dollars only so that the section reserved for it used only four columns. This plan of operation while dispensing with a second set of cards, and the disadvantages inherent in that method, made it once more necessary to sort separately and tabulate separately premiums and cancelations.

In the meanwhile other companies had used successfully the

complement method of punching cancelations (*i. e.*, 99998.75 for minus 1.25). The use of complementary figures made it possible with only one exposure and one premium section to sort and tabulate premium and cancelation cards together and, still better, produced net figures in the tabulation instead of gross and net. On the other hand a section was still needed for original premiums canceled (for premium reserve purposes), and this together with the fact that for complement use exposure and premium sections should consist of not less than eight columns, made the use of two sets of cards apparently inevitable. To the best of my knowledge all companies punching cancelation figures in complements have used two sets of cards.

The ideal solution was obviously one combining the advantages of the complement system with the advantages of using only one set of cards. Whether such a solution was available seemed doubtful for some time but at last an expedient was hit upon. This expedient lay in a revision of the current method of dealing with term cancelations. It is customary to punch the original premium (canceled) and the return premium, the difference between the two being automatically thrown into earned premium. But the same result can be obtained from punching the original premium (canceled) in red, as the return premium, and punching the earned premium in black. For instance, a premium of \$15.00 canceled after eight months with a return premium of \$5.00 was originally cut:

<i>Cancellation card</i>	Orig. Prem.	Canc.	\$15.00
	Ret. Prem.		5.00

the difference of \$10.00 being earned.

By the new method the original premium of \$15.00 is cut in the only section for premiums, in red, and another card is cut showing the earned premiums of \$10.00 in black. The balance of—\$5.00 with the accounting department, is maintained and correct information regarding the earned premium is secured. The new card embodying this modification is devised for use with complements. It contains all premium information needed for all purposes and has one exposure section of eight columns, and one premium section of eight columns. The premium and cancelation cards are tabulated together producing net figures.

The punching of the additional card for earned premium will make additional punching, it is estimated, of only 10%. The

saving effected is a saving not only of the punching of practically an entire set of cards, but also an avoidance of the necessity of constant balancing between the two sets. For a company writing an annual premium volume of from eight to nine million dollars, the use of this specially designed complement card involving only 10% additional punching actually saves:

1. As against the punching of one card with all information, cancelations punched in direct figures:

The separate sorting and tabulating of premiums and cancelations and

The netting of figures in the clerical section, approximately the time of two clerks in the year.

2. As against the punching of two sets of cards, cancelations punched in complements:

The punching and verifying of 90% of the second set of cards, approximately the time of one punch clerk and one verifying clerk in the year, and

The balancing of one set of cards against the other.

3. As against the punching of two sets of cards, cancelations punched in direct figures:

The punching and verifying of the additional 90%.

The netting of figures in the clerical section.

The balancing of one set of cards against the other.

One, at least, of the companies furnishing this machine equipment, is working on the preparation of a card which, of the same size as the 45 column one, is to contain a greater number of columns. Sorter and tabulator will have to be rebuilt to conform with this change. Work is also being done in the direction of direct subtraction on the tabulator but it will probably be years before these innovations are developed and perfected.

In the meantime, on the basis of the saving set forth above, the fire companies (because this method applies to fire insurance as well as to casualty insurance) and the casualty companies combined would have saved in 1925 something between four hundred thousand and a million dollars.

If the practice of setting up the premium reserve, as described by Mr. Tarbell, is in common use, it may be pertinent to describe another method which depends, to be sure, upon the use of complements on punch cards, yet is a cogent argument for their use.

The common practice is to enter the "in force" premiums by

class of business on a working sheet and is usually done by hand from the tabulator results. Debits and credits are entered separately and policy year, term, and month and year of expiration are indicated. In addition, a second sheet is used upon which decimal equivalents or fractional equivalents are entered against the "in force" figures. Either on the first sheet, or, as is the practice with some companies, on the second sheet, monthly increments have currently to be added to the cumulative totals as of the end of the previous month. Finally, at stated intervals, a transfer is made from one year's reserve set-up sheets, to a new set of sheets for the coming year. In our company the transfer until this year has been effected annually, and in January, at the very time when the clerical section of the Statistical Department is overwhelmed with pressing work. The alternative plan proposed is as follows:

Let us begin with the end of the year 1926. Premiums in force as of December 31, 1926 are now on the reserve sheets by class of business, policy year, term and expiration. Master cards are cut for the "in force" items as they appear on the sheets showing class of business, policy year, term and expiration. Master cards are cut for the expired items also, these by class of business and policy year only. These master cards are drawn up so that column for column the fields involved coincide with the corresponding fields on the premium cards. Regular premium cards may be used, leaving blank the fields that are not pertinent but in either case the master cards should be a distinctive color. They are also gang-punched to indicate the month to which they are applicable. At the beginning of February, the January premium cards are for reserve purposes sorted in with these master cards and put through the printer, so that the printed sheet, designed to carry the necessary defining columns, bears the net figures as of January 31st, and against these net figures the decimals may be directly applied. The figures are net because the debit premium cards sorted and tabulated with credit cards cut in complements produce a net total.

Once the reserve has been printed, the master cards are sorted out from the January premium cards, which then go through the machines to produce state, agency and other information. The master cards are filed away in a dead file. The process is then repeated. Master cards for January 31st are cut from the printed sheets and balanced to them; the February premium cards are sorted in; the reserve for February 28th is printed. The printed

sheets, of the form illustrated below, are filed in a binder, thus constituting a permanent record. So much for the gross premium reserve.

INDEPENDENCE INDEMNITY COMPANY														Street No. _____				
Gross (and Net) Premium Reserve														Date as of _____				
ONE YEAR AND UNDER														OVER ONE YEAR				
Year of Policy	Month	Year	Net Premium		Total Premium		Unearned		Year of Policy	Month	Year	Net Premium		Total Premium		Unearned		
			Dollar	Cents	Dollar	Cents	Unearned	Premium				Dollar	Cents	Dollar	Cents	Dollar	Cents	Dollar	Cents	Dollar	Cents

The ceded reinsurance reserve is printed in total (not by company) monthly by the same process as that outlined for the gross reserve. On June 30th and December 31st and whenever necessary the reserve by companies is printed directly from the ceded reinsurance premium cards without reference to master cards.

As with every other class of business the compensation figures are run irrespective of state for the reserve calculation. In addition to this, for the current policy year, the reserve information is printed monthly by states and master cards are cut monthly by states so that on December 31st, compensation earned premiums by states will be available.

The expense incurred in this system is the time spent in punching, balancing and sorting the master cards, but this is far outweighed by the time saved in:

1. Printing the reserve instead of tabulating and entering by hand. (The possibility of error in transcription is here avoided.)
2. Adding the current monthly increments and balancing the totals brought forward.
3. Transferring the figures monthly from one set of sheets to another and rebalancing the totals.
4. Transferring the figures annually from one year's sheet to those of the next year.

RETIREMENT SYSTEMS FOR PUBLIC EMPLOYEES IN NEW YORK
STATE—RAINARD B. ROBBINS

VOL. XII, PAGE 238

WRITTEN DISCUSSION

MR. GEORGE B. BUCK:

The four retirement systems which Dr. Robbins describes in his paper include the oldest systems in this country operating on a reserve basis.

The New York City Teachers' Retirement System appears to be the first retirement system for public employees in the United States to call for contributions by and in behalf of new members added to the system, which are set by actuarial calculations to provide on a reserve basis during the active service of the teachers the benefits to be paid as the result of the teachers' service. The system was established to replace one which had become insolvent by reason of a failure to observe fundamental actuarial principles, and represented a very considerable forward step on the part of the city.

The city administration in approving the system had to agree to increasing the city's annual contributions nearly six fold. In adopting the new system the teachers were called upon to increase their own contributions nearly three fold. When it is recalled that the benefits provided by the new system are less costly than those promised under the old system, it is not difficult to imagine the tremendous efforts which were required on the part of the Commission on Pensions and certain leaders of the teachers in securing the adoption of the plan by the city, the teachers and the legislature.

The advisory actuarial committee of the Commission, consisting of Mr. William A. Hutcheson, Mr. Robert Henderson and Mr. Henry Moir certainly deserve credit for their unselfish efforts in bringing home to the city authorities and the teachers the value of adopting a plan based on sound actuarial principles. Without a precedent in the country to which to point, it was by the sheer weight of argument alone that they were able to have sound methods followed. It was doubly difficult because the legislature had other plans presented to it with considerable support, and these plans promised not only better benefits but

required smaller contributions from both the teachers and the city.

The City of New York was the first organization in this country to establish a pension fund. No public or private organization has an older fund, so that when the reserve system was adopted in 1917, the city departed from the previous practice which had obtained for sixty years, that is, the paying of pensions on the assessment basis or from current receipts.

The actuaries supported the new fund but they did not claim that the benefit or contribution provisions were ideal. They were an improvement over the old provisions; they compared favorably with other plans in existence at that time and certainly the method of financing was a great improvement, although even it was short of what the actuaries really desired. But public retirement systems rarely are the result entirely of expert work, nor do they reflect the opinion or desire of any one person. Probably no fund in this country shows the result of more compromise to opposing groups than the existing New York City teachers' fund, and none has been subject to more public argument and consideration than has this fund. That it has endured the attacks that have been made upon it by those desiring more liberal benefits, that it has survived the efforts of those who would reduce the required contributions, that the law has not received any material change and that after nine years of operation the valuation balance sheet shows the fund to be in a sound financial condition with a slight surplus, and a reserve of over \$32,000,000 in cash and investments means that New York is beginning to realize that these funds are important.

The city teachers' retirement system marked a turning point for the State of New York in the matter of pension funds. The funds that followed the New York City teachers' plan all show improvement, both in the method of funding the obligations on a reserve basis and in the care with which the benefits are adjusted to cover the needs of the employee and the government as an employer.

Dr. Robbins has very appropriately called attention to a number of points in the funds which are properly the subject for improvement and directs attention to other points which are of a controversial nature.

The first point to which attention is called is that of optional

benefits. For many years pension funds abroad have allowed employees upon retiring to arrange to receive a regular annuity or to use the reserve for the provision of a joint and survivor annuity covering the wife or other beneficiary, or to provide some form of insurance. The New York City teachers' plan was the first in the country to adopt such provisions. Many plans have since adopted the precedent set by New York City but with safeguards which have prevented the tendency which has developed in the New York City teachers' plan where the optional benefit has been turned into an insurance benefit payable on death in active service. Even in the New York City plan the board of retirement has authority to adopt mortality tables which would offset the selection and both the actuary and legal advisor of the system have indicated methods by which the present misuse of the optional benefits can be avoided. So far the city has been willing to appropriate the additional funds to provide the death benefits and the teachers have supported the payments, so that until one or the other objects, the payments are likely to continue.

The discontinuance benefit or what is sometimes called in the older English systems, the compassionate allowance is surely the subject of many controversies. It has been introduced into the systems in the state by amendments of the original laws and it seems a matter of opinion as to whether the systems have been improved or not. In most cases the matter seems to have been decided on the basis of whether the employer is willing to pay the extra cost involved.

Dr. Robbins proposes the funding of the obligations of a retirement system at establishment by having the employer pay on account of each employee a rate according to his attained age and service which will liquidate the entire liability on account of the employee. If this rate be set on a level basis in amount or as a percentage of salary it offers an ideal method of taking care of accrued liabilities. The method has been proposed in connection with a number of plans and was suggested as a method of taking care of liabilities by the special Commission on Pensions in Boston in their report in 1914. The method was also considered at the time the New York systems were proposed.

System B, described by Dr. Robbins, provides that the city shall pay each year for a number of years a level appropriation

of six per cent. of the single premiums at the date of entrance on all pensions to those entitled to prior service credit, and then the law provides that this appropriation shall gradually decrease until it finally disappears. In this fund there will be no point where the appropriation will stop abruptly, but it will actually decrease gradually until it disappears. The provision was not written into the later laws because some city financiers consider the method under which payment runs at a level rate for a period of years and then discontinues entirely equally good. They argue that they can arrange their bond maturities or other obligations so that there is no material effect on the tax rate and the latter method gives the government the opportunity of definitely appropriating the difference for other fixed obligations when a substantial reduction is due; whereas, with the decreasing amount the small reduction each year is not enough to use for a financing program, and is likely to be lost in appropriations for current operations. However, Dr. Robbins calls to our attention a matter which should be the subject of careful consideration in establishing any new system.

The question as to what benefits should be included in a retirement system is one that will probably not be answered in this generation. Dr. Robbins seems to suggest that probably the most important is the superannuation benefit, then follows the disability benefit and so on down the line. The actual benefits to be adopted in funds which are organized with proper knowledge of what is involved in including the benefits will probably vary according to the business in which the employees are engaged, and the general attitude of the public toward benefits at the time the system is established. To protect the business, there must be a superannuation benefit to take care of the old employee. Without this benefit the business will surely suffer more than it will from the absence of any other. The need of an old age or service benefit is the one that caused the establishment of most of the existing retirement plans. The next greatest need seems to be for the disability benefit because the disabled employee continues to make his presence felt by both employer and employees, and consequently he can not be discarded.

By a peculiar coincidence, due to the rapid spread of group insurance in the last few years, many industrial employers have

failed to give proper attention to the old age and disability benefits because of the attention they have given to the provision of death benefits. For this reason, the provision of a death benefit is not uncommon, and will without doubt receive increasing attention in retirement funds in the future. The passage of workmen's compensation laws has been the cause of many retirement systems including accident benefits as a simple means by which an employer may make provision for such benefits.

And so the benefits are added, as need arises, and we find funds which include sickness benefits because the employer does not have any provision for leave with pay for his employees, and he desires to take care of those who are sick. To answer the question properly the employer must study the question carefully with his employees and if he knows what the benefits are going to cost, if they are included in the system, he can decide whether from his viewpoint or from the employees' viewpoint the money would be well spent for the benefits, or whether the money could be used to better advantage elsewhere.

Dr. Robbins raises a question as to discretionary benefits. In a public retirement system an officer is guided in using his discretion by entirely different considerations from those guiding a private employer, who is increasing or decreasing the actual cost which he must pay. On this account, it has generally been considered advisable to have all of the conditions set forth as definitely as possible in the rules or in the law, so that the service of the employee alone will be the determining factor as to the extent of his benefits in the retirement system.

I think we are all appreciative of Dr. Robbins' paper and to those of us who are keenly interested in pensions and retirement plans, the paper will be especially helpful.

INVESTMENTS FOR CASUALTY COMPANIES—H. A. PORTINGTON
VOL. XII, PAGE 294

WRITTEN DISCUSSION

MR. THOMAS F. TARBELL:

The lack of a fair underwriting profit for the casualty business during recent years has a most important bearing upon the

questions of investment returns and investment policies. It is difficult, if not impossible, to forecast or predict underwriting results. Rates for coverages are constantly being forced down. State control of rates is expanding and the situation in compensation insurance is far from satisfactory. In general the outlook for better times in underwriting results is not particularly encouraging. Consequently it is necessary to give most careful consideration to investment returns.

The investment of funds from the standpoint of security of principal should present no very great difficulties. The problem, however, at the present time is two-fold, security of principal and the highest return obtainable without sacrificing such security.

A factor of investment policy that might be given more prominence is marketability. This factor is extremely important in case of fire companies but not of great importance in case of life companies. Casualty companies occupy a middle ground and while the probability of a casualty company having to liquidate any appreciable amount of its security holdings is not great, the possibility of such a situation should not be lost sight of.

United States Government bonds possess the factors of marketability to the highest degree but interest returns are low and, as pointed out by Mr. Fortington, will probably be lower in the future.

The defects of state, county and municipal bonds as investments for casualty companies have been well pointed out.

In case of railroad bonds, my own preference is for those issues having a comparatively short unexpired term. While it seems at the present time that there is very little likelihood of any default on underlying bonds it is well to keep in mind that methods of transportation, both freight and passenger, are in a state of transition and that motor and air transportation are constantly and effectively competing with the railroads, especially those whose traffic is principally of the short haul variety.

Public utility bonds as investments for insurance companies are constantly becoming more prominent. For the reasons stated by Mr. Fortington, and I believe because of the present status of the transportation situation, there appears to be a swing from the railroad bonds to the public utilities. Public utilities occupy a strong position at the present time and there

is little hesitation in recommending investments in the best issues.

Most of us will subscribe to what Mr. Fortington has said regarding investment in real estate. The question is one of academic rather than practical interest at the present time as the laws of most states prohibit insurance companies owning real estate except such as is requisite for the convenient transaction of business and such as shall have been acquired through foreclosure of mortgage loans or in satisfaction of debts, etc.

There are certain collateral advantages to a company owning its own home office building such as advertising value and probably more efficient carrying on of its operations. Real estate investment and operation is a business in itself and the average company is not equipped to enter the field from a pure investment standpoint.

In the non-liquid security class, mortgage loans, because of the generally high interest returns hold first place. The successful carrying on of mortgage investment operations, however, requires extensive knowledge of a specialized field and involves too large an overhead for a small company to undertake. A large company should find this a profitable outlet for its surplus investment funds.

A large proportion of the mortgage loans of insurance companies are in farm mortgages but unfavorable conditions in the agricultural industry and over-valuation of property as a result of competition for loans has induced some companies to turn to the city mortgage field. Companies favorably situated may profitably cultivate the local field but in general the city mortgage field should not appeal to casualty companies. The problem of city mortgage investment is entirely different from that of farm mortgage investment. Other things being equal, city property values are influenced by several factors that are not present in farm values. The complexion of a city district may change rapidly from various causes. A high class residential district may become a second rate business or manufacturing district in a short time, a high class business district may deteriorate rapidly. New York City has furnished many examples of such changes. Consequently in passing upon the desirability of a city loan, it is necessary to consider not only the present value

of the property but factors which may have a bearing on the value of the property during the period of the loan.

The question of investment in stocks is one on which there is a wide divergence of opinion. Guaranteed and preferred stocks appeal because of the somewhat higher interest return as compared with high grade bonds and the urge for increased interest return has brought them into a more prominent position in the casualty investment field in the past few years. Common stocks as a rule possess the speculative element to such a degree that the small or medium sized company must hesitate to invest any substantial proportion of its assets therein. Many insurance companies have profited during recent years from appreciation in their stock holdings and have been able thereby to offset in whole or in part their underwriting losses. Whether the ultimate effect of this situation is to be beneficial is open to question. Past successes may encourage companies to take too great chances in stock investments and adverse economic conditions bring about a rather serious situation in case of companies who have gone in too heavily on such securities. I would hesitate to subscribe to an investment policy embracing speculative securities. It is true that insurance companies frequently take greater risks in their underwriting than in their investment operations. It is necessary to take the underwriting risks but I see no justification for taking still further risks and thus increasing the chances of failure. Of course the financial condition of a company has a bearing upon this question and no inflexible rule can be laid down. The financial condition of a company, in fact, has an important bearing on its general investment policy.

In judging the desirability of an investment two of the important factors to be considered, as has been previously pointed out, are security of principal and interest or dividend returns. Security of principal in case of government, state, county and municipal securities as a rule require little attention on the part of the prospective investor. In case of other securities, this factor must be carefully weighed. The first consideration is the ranking of the particular security and the value of the assets behind it. In this connection it must be kept in mind that physical assets generally have a much lower conversion value on a liquidation basis than in connection with a going proposition. Railroad property furnishes a good example of this distinction. Interest

return in case of fixed return securities requires consideration from the standpoint of security or continuity of interest return. In case of bonds this factor is, as a rule, dependent upon the same conditions as affect security of principal. In case of stocks and debenture bonds there are several additional considerations to be taken into account. We have the record of the past as a guide and this is valuable. Of equal, and in many cases, greater importance, is the question of future prospects. This applies to certain classes of mortgage bonds, such as railroad, public utility and miscellaneous, and to practically all classes of stocks and debenture bonds. Ability to continue to pay interest or dividends depends upon future earning power. Therefore we must consider what is the probable future of the enterprise whose security is under consideration. Is the demand for the product or service likely to continue? Are more efficient methods, means, inventions or discoveries likely to force the corporation into retirement and liquidation? Is there a prospect of adverse legislation affecting the earnings of the issuing corporation? Whoever can answer or guess correctly on these questions will be in a position, other things being equal, to guide his company to a successful investment policy.

Mr. Fortington has furnished us some interesting data and comments relative to the proportions of the various classes of investments held by casualty companies and the trend in investment policies. In order to elaborate somewhat on these matters I have drawn off certain data relative to the investment holdings of nineteen of the largest stock and foreign (United States branches) casualty companies as of December 31, 1921 and December 31, 1925. In selecting the nineteen companies in question I have purposely omitted all companies affiliated with life insurance companies in order to obtain a reflection of the investments and investment trend of independent casualty companies. Some of the companies, however, are affiliated with fire companies.

The following table shows the percentages of the various classes of investments as of the two dates in question together with the increases or decreases in such percentages. Bonds and stocks have been subdivided according to the sub-division required by the present convention annual statement blank.

The percentages shown are based upon book values:

Investment	Per Cent. Dec. 31, 1921	Per Cent. Dec. 31, 1925	Increase or Decrease
Bonds:			
Government.....	29.83	22.54	-7.29
State, Province, County and Municipal.....	19.28	16.56	-2.72
Railroad.....	23.63	25.73	2.10
Public Utilities.....	3.36	9.00	5.64
Miscellaneous.....	4.68	5.41	.73
Total Bonds.....	80.78	79.24	-1.54
Stocks:			
Railroad.....	2.66	2.19	-.47
Banks & Trust Cos.....	.68	1.77	1.09
Public Utilities.....	.27	.67	.40
Miscellaneous.....	3.93	5.09	1.16
Total Stocks.....	7.54	9.72	2.18
Mortgage Loans.....	1.50	2.51	1.01
Collateral Loans.....	.08	.10	.02
Real Estate.....	10.10	8.43	-1.67
	100.00	100.00	

The above table although covering only a four year period gives, in my opinion, a fair indication of the general investment trend. The large decrease in the proportion of government bonds is due in part to the fact that during the World War companies bought heavily of the Liberty issues from patriotic motives and now that the market is favorable for disposition the shift to higher income producing securities is going on at a rather rapid rate. Railroad bonds have more than held their own but railroad stocks have lost ground, as would be expected. Public utility securities show a substantial increase as will be noted from the following table showing the percentages of the various subdivisions of bonds and stocks to total bond and stock holdings:

	Per Cent. Dec. 31, 1921	Per Cent. Dec. 31, 1925	Increase or Decrease
Bonds:			
Government.....	36.93	28.45	-8.48
State, Province, County and Municipal.....	23.86	20.90	-2.96
Railroad.....	29.25	32.46	3.21
Public Utility.....	4.17	11.35	7.18
Miscellaneous.....	5.79	6.84	1.05
	100.00	100.00	
Stocks:			
Railroad.....	35.28	22.54	-12.74
Banks & Trust Cos.....	9.07	18.22	9.15
Public Utility.....	3.55	6.89	3.34
Miscellaneous.....	52.10	52.35	.25
	100.00	100.00	

Mortgage loans investments show a fair gain but at present are not an important factor. Collateral loans are almost negligible. Real estate shows a falling off but forms a larger proportion of the investment holdings than one might off hand estimate in view of the statutory restrictions upon this class of investment.

In my paper "Statutory Requirements for Casualty Companies" in the *Proceedings* of this Society, Volume XII, Page 29, I referred briefly to classes of securities generally specified by the statutes as permissive investments for casualty companies. In general, as indicated therein, the statutes are sufficiently comprehensive to enable a company to pursue a sound investment policy unhampered. One rather important state—Illinois—prohibits investment in national bank stocks and it is well known that this class of security has been a source of considerable profit to some companies in the past few years. Several states prohibit investment in any assessable stock.

The statutory provisions of the various states relative to the proportion of value that may be loaned on mortgage security show a decided lack of uniformity. Twenty-one states specify 50%, three states 60% and thirteen states 66 $\frac{2}{3}$ %. Companies domiciled in states specifying a maximum of 50% are at a disadvantage in competing for loans against companies domiciled in states specifying 66 $\frac{2}{3}$ %.

A situation somewhat similar to the foregoing exists in case of collateral loans, the statutory maxima ranging from 80% to 100%, but this is of little importance as such investments are inconsequential at the present time and probably will never prove attractive to casualty companies.

MR. ROBERT K. ORR:

Mr. Fortington's paper is the best article that I have read on this subject and there are some points which are very valuable, especially that in regard to the relation to the Federal Income Tax.

It seems to me, however, that there is one point which might be more fully discussed and that would be the purchase of first mortgages on real estate for western companies. As Mr. Fortington says, there is no speculative profit possible, and he might also add that the occasion might arise when such securities would

not be strictly liquid, and for this reason a casualty company should, of course, have a fair amount of bonds.

At present, through most of the Middle Western states there is a large supply of first mortgages bearing interest rates from $5\frac{1}{2}\%$ to 7% and in some cases even 8% , and of course, a rate of this kind is very attractive in view of the low yield on bonds. Mr. Fortington is entirely right in stating that this is a highly technical business, and this has been emphatically proven by the failure of many western banks which were loaded up with farm mortgages.

A great deal of trouble has been experienced through the western states in connection with farm mortgages. Many loans were made during, and following the World War on highly inflated values, and now that farm values are again back to the pre-war level many bankers have found that their loans are 100% instead of 50% .

In the last two weeks a line of fourteen private banks in Michigan have been placed in the hands of a receiver, and the principle cause of the receivership is over-loans on farm mortgages.

Western companies, I believe, are justly partial to real estate loans on improved urban real estate, however, here again the greatest caution must be exercised and thoroughly competent people must be in charge of the selection of these loans. The greatest danger point is the appraisal, and the difficulties which have been experienced by some of the companies should be a warning and a guide to the purchaser of this class of securities.

The situation has recently arisen in the Middle West in regard to which a note of warning should be sounded. I have reference to first mortgage bonds on apartment houses. It has recently developed that a great many of these bonds are secured by mortgages which are close to 100% of the actual cost of the property. These bonds will of course, be all right so long as there is no industrial depression, but it is more than likely that if production should slow up in the automobile industry, it would not be surprising to find many of the holders of these bonds in the apartment house business.

It would seem that the only safe plan to follow is to be sure that the mortgage does not exceed 50% of the actual cost of the property. It seems that some appraisals have been made on the

basis of income, and the safety of such an appraisal should be seriously questioned.

AUTHOR'S REVIEW OF DISCUSSIONS

MR. H. A. FORTINGTON:

1. I have perused the written discussion by Mr. Robert K. Orr with interest and would like to offer the following observations thereon.

With regard to the farm loans in the Western states, the fundamental influence which has worked undoing of farm mortgages has been the declining scale in commodity prices. Farm products have reverted practically to pre-war levels. This factor has in turn influenced the value of land and many equities have been completely wiped out. There is nothing phenomenal in this and probably the same process is at work in the more urban sections but by reason of artificial props, (for example: the intense degree of unionization of labor in the building industry) the decline has been longer delayed. There are, however, signs that indicate a diminution in urban values.

With regard to the loans on apartment houses, many of these have been made for long terms. Fortunately for the lenders there has frequently been a rapid amortization schedule tending to reduce the loan to satisfactory proportions during the high earning power of the property.

There would seem to be no Golden Rule on mortgages. I can conceive of some loans which do not exceed fifty per cent at the time the advance is made ultimately proving very hazardous. The mortgage loan business calls for a very nice blend of judgment and knowledge of values.

2. The observations of Mr. Thomas F. Tarbell interested me very much. I think his conclusions are invariably sound.

Personally, I am not very disturbed as to the fundamental security of the underlying bonds of the prominent railroad systems. Unquestionably the future holds many revolutionary projects in store in the matter of transportation, but I do not think that there is much that can be discovered which will seriously reduce the freight earning power of the American railroads and it is on that earning power that the fundamental security of their bond indebtedness rests. The transportation

of passengers is a minor source of revenue. These remarks apply chiefly to the long haul roads. Systems which derive a large proportion of their revenue from short hauls will unquestionably encounter increasing competition from motor trucks.

Public utility bonds insofar as they are secured on the operating properties and not on the securities of holding companies seem in a very sound position.

One more word on the subject of common stocks. The degree of success which will attend any one casualty company's efforts in this investment field rests on management. Most casualty companies hardly seem large enough to justify the expense of a special investigation department which is *sine qua non* of any investment program which includes common stocks as a part of it. It may be that the future holds something by way of co-operation between a few of the companies in this matter, particularly where there is some joint or interlocking ownership of the stocks.

One thing seems certain, namely, that the intensive demand for high grade bonds which the immense business of the life insurance companies in the United States brings in its train will cause far-sighted investors to look further afield for outlets for their capital in an increasing degree.

REVIEWS OF PUBLICATIONS

RALPH H. BLANCHARD, BOOK REVIEW EDITOR

The assistance of Prof. Robert Riegel during the absence of the Book Review Editor is acknowledged with appreciation by the Editor.

Compensation for Occupational Diseases. International Labour Office. Geneva, Switzerland, 1925. Series M, No. 3, Pp. 76.

This report on compensation for industrial diseases is obviously not intended to be all-inclusive in scope, but purports to be a brief *résumé* of the social justification for compensation, some of the difficulties of practical application, and compensation legislation in the United States and foreign countries. The sections dealing with the social necessity of compensation are hardly strong enough, and most economists and sociologists would regard with amazement the statements on page 76 that "unhealthy conditions in industry can be tolerated up to a certain point and no further" and "if any work or any product *inevitably kills* the worker it must be abolished." (Italics the reviewer's.) The sections dealing with the administration of compensation are inadequate in scope. Part 2 gives a series of abstracts of the principal features of all the compensation laws, many of them unfortunately being so brief as to give only a very general idea of the systems described. United States' statutes are covered in 6 pages, of which 3 are devoted to lists of diseases covered in Minnesota, New York and Ohio. The summary for the United States appears to be in the main correct, but the reference on page 64, "section 21 of the Pennsylvania Act of 1915 provides for compensation but it has not yet been applied in practice" is in error. This is probably a reference to section 201 of the said act, in which the term "injury" is used, but this section is really a *liability* law (although included in the compensation statute) which deprives employers of certain defences in the event of suit.

ROBERT RIEGEL

Compensation for Industrial Accidents. International Labour Office. Geneva, Switzerland, 1925. Series M, No. 2. Pp. xi, 655.

The outstanding features of this large volume are (1) its comprehensiveness and (2) its ingenious classification of facts. It is a digest of the principal features of 57 "national" foreign compensation acts and gives sufficient information about the various phases of these acts for an intelligent comprehension of their scope and operation. The system of analysis which is followed is such, however, that the numerous details necessarily involved do not obscure the principal problems in compensation legislation and administration. One may examine any section of the book and obtain a clear picture of the various genera and species of legislative acts and administrative methods. At the close of each section appears a table (nine in all), giving a digest of the information in schematic form. The work does not cover United States' legislative, which is treated in a separate volume, elsewhere reviewed.

The introduction is a restatement of the fundamental legal bases of common law liability, employers' liability and the compensation principle. The first section deals with the scope of legislation with respect to the employments and the employees covered. This section furnishes pertinent quotations from the laws, an idea which is wisely relinquished in subsequent sections, because the size of the book would have been thereby tremendously increased. Section II outlines the extent of risk comprehended in the different laws with respect to the interpretation of "accident," the connection of the accident with employment and the question of "fault." It may be noted that the latest Russian law excludes practically no employments, employees or types of accident. The section on the interpretation of an "accident" may be interesting to students of accident and health insurance.

The third section surveys the amount of compensation paid for various contingencies. Some novelties with respect to basic wages are described in that section. The portion of the section on the form of compensation payment is a good illustration of the method followed in this work, four systems being discussed with appropriate illustrations from individual laws. This part goes

on to outline the provisions for death, incapacity, and medical aid, including a section on vocational rehabilitation.

Section IV comprehends the administration of insurance systems, the various types of insurance institutions, the financial operation of distribution and fixed premium systems, voluntary insurance with and without special security funds, compulsory insurance with optional carriers, with specified carriers, with trade associations and with special institutions. This section is chiefly valuable for the description of foreign premium and reserve systems. Section V deals with the settlement of claims by agreement and by litigation. Section VI discusses various methods of treating alien dependents and the question of residence.

This volume seems to fulfill its purpose admirably. It is not so meagre in detail as to leave doubts as to the essential nature of foreign legislation, nor so complex as to be useful only as a work of reference. Many of the sections are quite readable, which is unusual in a work of this character and size. It will undoubtedly prove useful to students of labor legislation and the social sciences in general, as well as to those interested in compensation and liability insurance.

ROBERT RIEGEL

Workmen's Compensation in the United States. Ralph H. Blanchard, International Labour Office, Series M, No. 5. Geneva, Switzerland, 1926. Pp. 103.

This is a report upon the status of workmen's compensation legislation in the United States and Territories, with some statistical notes on the scope of application of the acts, conforming in the main to the order of analysis and divisions of the subject found in the comparative analysis of world legislation by the same Office under the title "Compensation for Industrial Accidents—National Laws." The first section deals with the constitutionality, the second with the scope and application of the laws, the third with the benefits paid, the fourth with the security for compensation payments, the fifth with the methods of administration and the sixth with the present-day tendencies in legislation. The first five sections aim to give a brief analysis in 74 pages of the principal features of the laws as they now exist;

the latter section is an effort to discern what progress has been made in legislative enactments.

The section dealing with constitutionality is mainly a brief review of the grounds upon which cases have been brought in the state and federal courts and the conclusions of the courts. The value of this section for reference purposes is somewhat impaired by the absence of citations for some of the cases. The section on the scope and application of the laws describes the elective and compulsory laws, the employments and persons covered and the injuries compensated. There is very brief mention of the status of those engaged in interstate commerce and maritime work. A brief statement of the treatment of industrial diseases would have been useful here in view of the inadequate treatment of American conditions in the volume on national laws. In the third section the benefits paid are very satisfactorily described in a concise but fairly complete fashion and this is one of the best sections of the report. The statement that "insurance in state funds constitutes a relief from all liability under the Compensation Act" is likely to be misunderstood. Very little is said in section 4 with respect to the regulation by the state of various types of insurance carriers and of ratemaking other than by the National Council. Section 5 is a good brief statement of the methods of administration.

The most interesting and original section is that dealing with the tendencies in legislation, which gives a good summary of the directions in which workmen's compensation legislation appears to be progressing and furnishes some suggestions for the beneficial amendment of the acts in some jurisdictions. The appendix furnishes some tables showing the scope and application of the laws in 1920, provisions of 5 state laws respecting occupational diseases and a comparison of benefits in the various states on the basis of the American Accident Table.

This volume will be valuable to those in the insurance business as giving a fairly comprehensive survey of legislative enactments outside their own states, and might be suggested as a good foundation for study for sections 3 and 4 of Part I of the Fellowship examination of the Society.

It will also be useful to social workers and sociologists as a survey of social insurance legislation.

ROBERT RIEGEL

An Introduction to Mathematical Probability, J. L. Coolidge. Oxford, Clarendon Press, 1925. Pp. xii, 216.

During the past three or four years there have appeared a great many books on the theory of statistics, some of a mathematical nature, the greater number, however, avoiding the use of mathematical terms as much as possible that they might be intelligible to a much larger body of readers. The abundance of such texts has emphasized the dearth of text books, especially in English, on the closely related subject of mathematical probability. Several good texts on mathematical probability have appeared in French, German and Italian. Few have appeared in English in recent years except those of Keynes and Fisher, the former attempting to show, one might almost say, that the theory of probability did not lend itself to mathematical treatment, the latter splendid in its treatment of certain topics but omitting some of the more important phases of the subject.

The appearance of Professor Coolidge's splendid book is most timely, and most welcome. It is exceptionally well written: his arguments are clearly and concisely stated, the result, no doubt in part at least, of his experience in teaching. His touches of humor here and there are refreshing. The form of the material and the appearance of the text are a credit to Professor Coolidge and the publishers.

In the first chapter the author introduces us to several well-known definitions of probability, then by means of three broad empirical assumptions he defines it as the limit to a statistical ratio, and he adheres to this definition throughout. In the Preface he makes his attitude quite clear on this point, where he says, "It seems to me that, in the last analysis, probability is a statistical, that is to say, an experimental science, and the mathematical problem is to establish rules which yield correct and valuable results."

Chapters II-VI deal respectively with the elementary principles of probability, repeated trials, mean value and dispersion, geometrical probability, and probability of causes. The illustrative examples introduced are instructive and interesting. The problems inserted as exercises for the student are good, but if the book is to be placed in the hands of students more problems should perhaps have been inserted. The subject of "mean value" is of growing importance in recent years owing to the idea

of dispersion, and its application to statistical series. This the author has recognized, and has given it careful attention in Chapter IV,—one of the most interesting chapters in the text. Those who are interested in the theory of probability for its own sake will enjoy the author's brief treatment of geometrical probability in Chapter V.

In Chapters VII, VIII and IX the author treats the "adjustment of errors of observation." What appeals to the reader throughout the text, but more particularly perhaps in these chapters, is the explicit statement of the underlying assumptions made. He treats the important topic of correlation first from the "frequency surface" standpoint, later very briefly from the "regression equation" standpoint.

Not often does one find in a text book two such important yet widely different applications of the theory developed as we have in the last two chapters,—Chapter X dealing with the Statistical Theory of Gases, and Chapter XI with the Principles of Life Insurance. The author has thus added greatly to the number of those who will be interested in reading the book. Chapter XI is sufficient perhaps to give the pure mathematician a brief introduction to the theory of life insurance, but it is too brief to be of much value to the American actuarial student, who would find it awkward to use even as a reference owing to the fact that the author has used the old form British Commutation symbols, instead of the American. Even in Great Britain the use of the form introduced on page 196 is disappearing (See: "Life Contingencies" by E. F. Spurgeon, Chap. III, Sec. 11).

LLOYD A. H. WARREN

CURRENT NOTES

SYDNEY D. PINNEY, CURRENT NOTES EDITOR

NEW BLANKET FIDELITY BOND

The recent appearance of a new blanket fidelity bond which extends this type of coverage to the industrial and mercantile field marks another advance in corporate fidelity suretyship. The first blanket bond in America was issued about eleven years ago in response to an insistent demand from banks and other financial institutions for blanket coverage. Individual bonds which represented the only available form of coverage prior to that time proved unsatisfactory for it was possible for a bank to suffer a loss which could not be traced to any particular employee or an unusual embezzlement might occur in an amount greatly in excess of that for which the perpetrator was bonded.

The Bankers Blanket Bond as the original blanket contract was termed automatically covered all employees and indemnifies the bank for any loss of money or securities up to the face value of the bond, sustained by the bank by reason of the dishonesty of its employees, burglary, hold-up, etc. This form of coverage was later extended to brokerage houses but was withheld from industrial and commercial risks in spite of a large demand until the recent blanket fidelity bond was devised. The appearance of blanket coverage provided a remarkable stimulus to the fidelity business resulting in a tremendous increase in the premium volume of this line.

Feeling that blanket fidelity was urgently needed in the commercial field, the companies affiliated with the Surety Association of America decided to provide this coverage. Their attitude is well expressed by the manager of the fidelity department of one of the large surety companies who recently said:

“The new blanket bond of the surety companies is designed to meet changing conditions in the industrial and commercial fields, greatly to reduce the details incidental to the handling of such bonds, but above all to guard American business against under-insurance. One of its principal functions will be to take care of the catastrophe fidelity losses that are now more numerous than they were a generation ago by reason of the great expansion in our industrial and commercial fields, and the invention of the

blanket bond in place of a separate risk on each employee, makes this practicable. A very valuable feature is the application thereto of the principle of group insurance, thus eliminating the dangerous possibility of overlooking employees. The new bond will provide continuous instead of annual coverage, and there will be no need to watch renewals. Payment of annual premium will be sufficient. This is also a particularly desirable feature because even the most highly organized companies sometimes neglect such matters and find themselves confronted with losses not covered by bonds because of failure to renew".

Indemnity under the new blanket bond is limited to direct losses through larceny, theft, embezzlement, forgery, misappropriation, wrongful abstraction, wilful misapplication, or other fraudulent or dishonest acts committed by employees. The bonds may be written in favor of all employers in the industrial and commercial fields but they may not be written for those eligible for a banker's or broker's blanket bond, nor for building and loan associations. The new bond may be written as either a primary bond or an excess bond. The primary bond requires all of the employees to be separated into two groups: compulsory bondable employees and optional bondable employees. The bond may be written covering the compulsory group only, covering the compulsory group and optional group, or covering the compulsory group and a portion of the optional group. The compulsory group covers the officers and all employees in positions of responsibility, and others who have access to funds or accounts.

The excess blanket fidelity bond differs from the primary form in that it is always excess over straight fidelity bonds, whether on individual or schedule form, which must be maintained in their original or increased amounts, and it is not necessary that all employees be bonded. Additional underlying bonds are permissible. Premiums are computed on all of the employer's "compulsory bondable employees". They will follow the basic rates of the Towner Tables.

AUTOMOBILE INSURANCE ON MOTOR BUSES

The State Corporation Commission of Oklahoma recently filed an opinion ordering all motor busses in the State to carry automobile liability and property damage insurance. This order

provides that passenger busses carrying 12 passengers or less must have a minimum coverage of \$10,000; those with capacity of 13 to 20 passengers must have \$15,000; those carrying 20 to 30 passengers must have \$20,000; and \$25,000 insurance must be in force on all busses having greater capacity than 30 passengers. The sharp increase in motor bus transportation coupled with the alleged insolvency of many smaller bus lines, that would not permit of recovery for damages through personal injury or loss of life, have made imperative this action of the commission. It is expected that this action in Oklahoma will be followed by similar requirements in other states.

The opinion of the Oklahoma Corporation Commission runs in part as follows:

“Each and every liability insurance bond or policy of insurance filed with this commission shall be inviolable for the period for which it runs against any claims for payments of premium, and no liability insurance bond or contract or policy of insurance shall be filed with this commission or accepted for filing which contains any provision excusing liability for failure to pay premiums, and no liability insurance bond or policy of insurance shall contain any statement in words or in substance that delinquency in payment of premium is a ground for non-liability as to patrons of motor busses.

“No contract or policy of insurance or liability insurance bond shall be canceled without at least twenty days notice in writing to this commission. Indemnity insurance covering liability to patrons of motor carriers shall be continuous, and policies issued to licensees covering the period succeeding the current year shall be filed with this commission at least fifteen days prior to the expiration of the liability insurance bond or policy or contract of insurance on file with this commission.

“Each and every liability insurance bond, or policy or contract of insurance shall contain a provision for the adequate protection of personal property and baggage of patrons of motor carriers; except that a reasonable limitation may be placed upon the amount of liability for damage or loss of personal property. No liability insurance bond or contract of insurance, or policy, filed with this commission shall contain any provision or statement to the effect that liability to patrons of motor carriers may be avoided because of the culpability, the recklessness or the con-

dition of the driver, or any other restriction relating to the driving or operating of the motor bus on the part of the motor carrier; provided that this rule shall not be construed as requiring such policies to eliminate all reference to contingent liability of motor carriers on account of the culpability or the carelessness of the driver or operator of the motor vehicle. Each and every liability insurance bond shall show on its face that all patrons of the motor bus operator are protected in any and all motor vehicles operated by the licensee or insured, and that liability is not limited by the description of any particular motor vehicle or route which may be traveled by the motor vehicle in transporting passengers or property under the certificate of convenience and necessity”.

CROP INSURANCE

A new form of crop insurance is being written in the Middle West which, it is thought, will prove very popular with the farmers in that section. This form of coverage appears as crop insurance, but, in reality, it is insurance on investment, inasmuch as the company which issues the policy does not guarantee any particular yield but simply undertakes to protect the farmer against loss of labor, investment in seed and equipment, and interest or rental on his land. This coverage, of course, differs very considerably from ordinary crop insurance which is written on a yield basis. In writing this coverage the cost of production figures for the different crops as compiled by the government and state agricultural departments, are used as the basis for the protection of the farmer against any losses for his work and seed up to the time of harvest. The maximum is \$10 an acre and the cost of the production of the different crops varies between \$7 and \$10 per acre up to the harvest period. This form of insurance is written against drought, windstorm, hail, frost, winter-kill, insects and flood; in fact about everything that could damage a crop except fire. If the damage to the crop is complete, the farmer is paid the face of the policy. If, however, the damage is only partial and the yield is sufficient to meet the cost of plowing, seeding, seed, interest on the investment for land and equipment, the insurance company will not pay any loss. If one crop pays one half the cost of production, the company pays

the other half. The rate charged is 2% added to the hail rate for the various hail zones and undoubtedly this new coverage will be substituted for ordinary hail insurance in many states.

ANALYSIS OF DISABILITY CLAIMS

A prominent life insurance company has just completed an analysis of its disability claims, which would seem to indicate that the standard life risks are not necessarily standard disability risks. This analysis is very interesting in view of the uncertainty of actuaries as to the results to be expected from the rapid spread of disability clauses in the life insurance field.

This company's analysis of its disability claims shows that the largest single cause of disability is tuberculosis, which has accounted for more than one third of its disability claims. In view of the fact that this disease is markedly more prevalent among underweight persons than among those of normal weight, it would seem that applicants who are decidedly underweight, especially at the younger ages, should not be accepted as standard disability risks. The company's study has also shown that, in general, cases are not acceptable for disability unless the applicant is actually earning an income materially in excess of that provided in case of disability. It has been found further, although the experience is not conclusive on this point, that women as a class are not as desirable disability risks as men, even when they are self supporting. Finally, it has been concluded from the experience analysis that practically no risk substandard for life coverage by reason of physical impairment is a standard disability risk. In general, the company's experience indicates that more than two thirds as many cases insured at the age of thirty become disabled before the age of sixty as die before that age.

In connection with the study of disability, the company has tabulated its disability claims according to occupation which shows that 22.2% are clerks and clerical workers, 15.8% are farmers, 15.4% are mechanics (except building trade workers) and 13.6% are retail shop and store keepers. No other occupations contributed more than 10% of the disability claims. The causes of disability claims as tabulated by the company from its experience follows:

Kind of Disability	Per Cent
Tuberculosis of lungs.....	33.7%
Insanity.....	17.4%
Cancer and other tumors.....	7.2%
Accidents.....	6.0%
Nervous diseases.....	5.4%
Tuberculosis other than lungs.....	2.8%
Bright's disease.....	2.7%
Diseases of bones and organs of locomotion.....	2.5%
Paralysis.....	2.2%
Spinal diseases.....	2.1%
Appendicitis.....	1.9%
Heart Disease.....	1.6%
Rheumatism.....	1.1%
Anemia and dilorsis.....	.8%
All other causes.....	12.6%
All causes.....	100.0%

REVISION OF EMPLOYERS' LIABILITY RATES

A revision of employers' liability rates was completed recently to become effective December 1, 1927. This form of insurance is still written in the District of Columbia, Florida, Mississippi, North Carolina and South Carolina, where workmen's compensation laws have not as yet been adopted. Up to the present time, Missouri, of course, was the leading employers' liability state but following the referendum which was voted on favorably sometime ago, that state now has a workmen's compensation law. The revised employers' liability rates will therefore apply only in the four states enumerated above and the District of Columbia.

The rate revision was based upon classification experience for the various industrial classifications as submitted to the Bureau by member companies. This experience embraces policy years 1921, 1922, 1923 and 1924 and includes the total earned payroll of \$2,125,350,986 for the total experience period.

The last general revision of employers' liability rates involving adjustments based upon the relativity of hazard between individual classifications as disclosed by the experience was made by the Bureau in 1923. At that time, the experience used covered the four policy years 1917 to 1920 inclusive, which produced a total payroll exposure amounting to \$1,728,204,875.

The latest experience indicates a very definite upward trend in

loss cost in the states of North Carolina and South Carolina and this is reflected in an increase in the average rate level for these states. In North Carolina the rate increase amounted to approximately 20.5% whereas the increase in South Carolina amounted to 17%. In Arkansas, District of Columbia, Florida and Mississippi the experience indicated that the present level of rates was adequate and consequently no general increases in rate level were necessary. The net result of the revision for all states combined was an increase of 7.5% in the average rate level.

The rates for the individual classifications were changed in accordance with the classification experience. In many cases the classification rates within a state were considerably increased and in other cases there were decreases, these changes in many instances differing considerably from the average rate level change for the state as a whole. A general increase was also made in the level of minimum premiums inasmuch as the present minimum premiums were found to be inadequate.

A very important change was made with respect to the medical aid coverage under the new rates. Pre-existing rates did not provide coverage for medical aid but such coverage could be obtained by the payment of an additional premium. The new rates, however, provide automatically for full medical or surgical coverage, including hospital and ambulance charges. Furthermore, it is no longer permissible to write employers' liability policies to cover first aid only, but provision has been made for writing ex-medical or surgical policies. In connection with the revision, a number of important changes were made in the wording of classifications and in the underwriting rules, in order to make the underwriting of employers' liability insurance uniform with the underwriting of workmen's compensation, in so far as that is possible.

CASUALTY RESERVES FOR LOSSES INCURRED BUT NOT REPORTED

The question of the adequacy of reserves for losses incurred but not reported for the various casualty insurance lines is being investigated by several of the state insurance departments. This investigation has brought out the fact that the reserves set

aside for subsequent notices have been too low in many cases. This is particularly true regarding the subsequent fidelity and surety losses for in those lines there are always overhanging, unrevealed hidden losses for which companies may be held liable long after the premiums attaching to the bonds have been earned.

It is held that it is sometimes difficult to determine the date when certain surety losses have arisen, but the law provides that a reserve should be set aside when a notice is received by the company of any event which may result in a loss. In other words, when the danger signal is displayed the contingency of possible ultimate loss should immediately be provided for. Under the New York Insurance Law the Superintendent of Insurance at his discretion may require a company to maintain additional reserves whenever, in his judgment, loss reserves as determined above are inadequate. In a circular letter to the companies, Superintendent Beha of the New York Insurance Department said with respect to unreported losses:

"In connection with the audit of the annual statements of stock casualty and surety companies authorized to transact business in the State of New York, consideration has been given to the item designated, 'Incurred but not Reported Losses and Claims', appearing as a liability Column 3, Page 5 thereof. It has been noted that some companies have apparently made substantial provision for such losses while others have not.

"In order that the Department may ascertain to what extent by way of reserves the provision of Section 86 of the New York insurance law, requiring companies to report the estimated liability for all losses which have occurred but on which no notice has been received, may have been complied with, you are requested to prepare and submit to this department not later than December 31, 1926, a tabulation of your experience by lines of business written for the year ending December 31, 1925.

"We suggest that for the purpose indicated above the data be submitted in the following form: (1) lines of business (2) number of claims reported in 1926 to December 1 where liability was incurred on or before December 31, 1925 (3) estimated reserve carried December 31, 1925 for incurred but not reported losses per annual statement, Item 3, Page 5 (4) reserve that should have been carried based on actual developments to date on settled and still pending losses".

AUTOMOBILE FLEET INSURANCE

Lower automobile rates on fleet risks are prohibited by the anti-discrimination law in Wisconsin according to an opinion expressed by the Assistant Attorney General of that state. In accordance with this opinion, the Wisconsin Insurance Commissioner has directed automobile insurance companies to discontinue writing fleet policies at reduced rates. The opinion of the Assistant Attorney General regarding the anti-discriminatory character of this coverage is as follows:

"It is now the practice of some of the liability insurance companies to issue automobile liability policies at what is termed a fleet rate to owners operating a large number of automobiles or trucks. Under this practice a lower rate or a lesser premium is charged for a car than is charged to an insurer who owns only one car. The statutes relating to discrimination in rates or premiums for insurance originally only applied to life insurance, and this was then extended to fire insurance and later to liability and workmen's compensation.

"An examination of the different statutes prohibiting discrimination in insurance rates or premiums clearly indicates an intention on the part of the legislature to give no recognition to the quantity or the amount of the insurance in the making of the rate or the premium. It follows, therefore, that if any difference is to be made in the rate or premium where several automobiles are insured for the same owner from the rate given where only one automobile is insured for one owner the distinction must be made on the basis of some facts other than the number of cars so insured for the same owner".

EXCESS COMPENSATION INSURANCE

In general there are two forms of excess compensation insurance namely, (1) aggregate stop loss coverage, and (2) excess insurance on a single accident. The first of these forms of coverage guarantees the assured against a certain loss ratio which is determined on the basis of a comparison of losses to premium at manual rates. This form of excess coverage is favored by service organizations and the usual method is to guarantee against a loss ratio exceed-

ing 80%, 10% being charged for the insurance by the excess cover company and 10% additional by the service organization. Under this plan these charges remain constant regardless of the size or physical hazard of the risk.

Although as already stated the stop loss plan is popular with service organizations, there are several reasons why this form of excess coverage does not work out satisfactorily. A few of these reasons are as follows: (1) The self insured employer is primarily interested in securing protection against "shock" catastrophe losses and not against a multiplicity of minor losses. (2) Aggregate stop loss coverage affords an adverse selection of risks against the companies. Employers with a very poor experience record would be the ones chiefly interested in buying this insurance. (3) Any employer financially able to meet the requirements of the State Industrial Commission with respect to self-insurance would have the opportunity to purchase this insurance at a cost guaranteed not to exceed the premium at manual rates and in some cases less than manual rates depending upon his experience. Discrimination is therefore created in favor of the large employer and against the small employer who is obliged to pay the regularly established rates. (4) For this type of insurance, the insurable hazard would depend largely on the size and experience record of the individual risk.

Consequently, it would be exceedingly difficult, if not impossible, to determine equitable manual rates which would properly measure the hazard in the case of individual risks.

For the reasons stated above, the second form of excess coverage which applies to single accidents is issued more extensively to self insurers than the aggregate excess coverage based upon the total loss ratio. This second form of contract provides excess coverage against the losses over and above a certain amount, usually \$10,000 due to a single accident. There is very little experience on excess coverage which could be used for rate making purposes inasmuch as self insurers ordinarily have no standardized system for recording their experience. The minimum premium for an excess insurance policy is generally \$1,000. Excess cover companies are not required to pay losses until the actual cash paid out by the employer exceeds the limit provided by the policy. Companies do not pay losses on reserves and consequently the company's liability cannot be definitely as-

certained until the lapse of several years after the expiration of the contract. Large self insurers carrying excess coverage are equipped with departments that render inspections of physical conditions and also adjustments of claims, whereas employers of the minor type avail themselves of the services rendered by service organizations. The companies writing excess insurance also make payroll audits in the same manner as required under the manual rules for direct insurance.

PERSONAL NOTES

Edmund S. Cogswell formerly Secretary and Actuary of the Massachusetts Commission on Pensions is now Director of Research, Study of Old Age Dependency at the National Civic Federation in New York City.

Charles N. Young has left the United States Casualty Company to take a similar position as Manager of the Safety Engineering Department of the Constitution Indemnity Company of Philadelphia.

Louis H. Mueller is now Secretary and Treasurer of the Associated Industries Insurance Corporation in San Francisco.

Charles S. Forbes is now Treasurer of Smyth, Sanford and Gerard, Insurance Brokers, in New York City.

William A. Granville previously Educational Director of the U. S. National Life & Casualty Company is Director of Publications with the Washington Fidelity National Insurance Company in Chicago.

Arthur Hunter is now Third Vice-President as well as Chief Actuary of the New York Life Insurance Company in New York City.

A. L. Kirkpatrick is Secretary and Treasurer of the Casualty Information Clearing House in Chicago.

James D. Maddrill formerly Actuary of the Hartford Accident and Indemnity Company is Vice-President and General Manager of the Union Labor Life Insurance Company in Washington, D. C.

Franklin B. Mead has been elected Vice-President of the Lincoln National Life Insurance Company at Fort Wayne.

Samuel Milligan now holds the position of Third Vice-President with the Metropolitan Life Insurance Company in New York City.

William F. Roeber is now Actuary for the National Council on Compensation Insurance in New York City.

Charles H. Remington previously Vice-President of the Aetna Life Insurance Company is now an Insurance Counselor and Advisor in New York City.

John S. Thompson formerly Assistant Actuary of the Mutual Life Insurance Company is now Mathematician with the Mutual Benefit Life Insurance Company in Newark.

John L. Barter is Superintendent of the Casualty Department in the Pacific Department of The Hartford Accident and Indemnity Company at San Francisco.

W. Harold Bittel is with the Peoria Life Insurance Company in Peoria.

Harilaus E. Economidy now holds the office of Treasurer with the American Indemnity Company at Galveston.

L. Leroy Fitz previously with the Chamber of Commerce of the United States is now Assistant Actuary of the Acacia Mutual Life Association in Washington, D. C.

William D. Hall has left the National Bureau of Casualty and Surety Underwriters and accepted a position with the Western Automobile Insurance Company in Fort Scott, Kansas.

Edward S. Jensen is now Assistant Actuary of the Great Republic Life Insurance Company in Los Angeles.

Rosswell A. McIver formerly Actuary of the United States National Life and Casualty Company is now Actuary of the Washington Fidelity National Insurance Company in Chicago.

Donald M. Overholser has left the National Bureau of Casualty and Surety Underwriters and is with the Alfred M. Best Company in New York City.

Joseph Raywid is now President of the Underwriters' Statistical Bureau in New York City.

W. F. Somerville is with the Anchor Casualty Company in St. Paul.

E. S. Skillings is now Statistician of the Utilities Mutual Insurance Company in New York City.

Leland L. Waters is now Secretary-Treasurer of the National Accident Insurance Company at Lincoln, Nebraska.

Alexander C. Wellman has left the Royal Union Life Insurance Company to become Actuary of the Alabama National Life Insurance Company at Birmingham.

James M. Woolery has left the Protective Life Insurance Company and is Assistant Actuary of the Inter-Southern Life Insurance Company at Louisville.

Earl O. Dunlap, heretofore Assistant Secretary, is now Assistant Actuary of the Metropolitan Life Insurance Company at New York.

H. C. Miller is now Comptroller of the State Compensation Insurance Fund at San Francisco.

Roland V. Mothersill has left the Minnesota Compensation Insurance Board and is with the Anchor Casualty Company in St. Paul.

Gardner V. Fuller is now Assistant Secretary of the National Council on Compensation Insurance in New York City.

Julius J. Pallay formerly Secretary of the London Guarantee & Accident Company, Ltd., is now Special Agent for the Equitable Life Assurance Society in New York City.

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ABSTRACT FROM THE MINUTES OF THE THIRTEENTH
ANNUAL MEETING, NOVEMBER 19, 1926

The thirteenth annual (twenty-seventh regular) meeting of the Casualty Actuarial Society was held at the Hotel Biltmore, New York, on Friday, November 19, 1926.

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

FELLOWS

BARBER	GRAHAM, C. M.	MULLANEY
BREIBY	GRAHAM, T. B.	NICHOLAS
BUDLONG	GRAHAM, W. J.	PERKINS
COGSWELL	HAUGH	PINNEY
CRANE	HESS	RICHTER
DEUTSCHBERGER	HUNT	ROEBER
DORWEILER	LAWRENCE	RYAN
DUNLAP	MCMANUS	SENIOR
ELSTON	MADDRILL	SMITH, C. G.
FARRER	MATTHEWS	TARBELL
FLYNN	MAYCRINK	VAN TUYL
GINSBURGH	MELTZER	WOODWARD
GLOVER	MICHELBACHER	YOUNG, C. N.
GOULD	MOORE, G. D.	

ASSOCIATES

AULT	JACKSON, H. H.	SPENCER
BLACK, N. C.	MALMUTH	STELLWAGEN
BROWN, F. S.	MARSHALL	THOMPSON, A. E.
COMSTOCK	SAWYER	UHL
FLEMING	SKELDING	VOOGT
HALL, H. L.	SMITH, A. G.	WARREN, C. S.

President Michelbacher read his presidential address.

The minutes of the meeting held May 21, 1926 were approved as printed in the *Proceedings*.

The Secretary-Treasurer read the report of the Council and upon motion, it was adopted by the Society. Diplomas had been sent to H. G. Crane, C. M. Graham, C. J. Haugh, Jr., A. N. Matthews,

O. C. Richter and W. H. Kelton, who had been admitted as Fellows under the 1926 examinations.

The Council selected the following and recommended to the Society that they be admitted as Fellows without examination under the terms of Article III of the Constitution:

- CHARLES E. HODGES, President,
American Mutual Liability Insurance Company, Boston, Mass.
- WILLIAM L. MOONEY, Vice President,
Aetna Life Insurance Company, Hartford, Conn.
- BERTRAND A. PAGE, Vice President,
The Travelers Insurance Company, Hartford, Conn.
- JESSE S. PHILLIPS, President,
Great American Indemnity Company, New York, N. Y.
- ROY A. WHEELER, Vice President and Actuary,
Liberty Mutual Insurance Company, Boston, Mass.

After ballot these nominees were declared duly elected Fellows.

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

H. C. CRANE	W. H. KELTON
C. M. GRAHAM	A. N. MATTHEWS
C. J. HAUGH, JR.	O. C. RICHTER

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

E. R. BATHO	R. M. MARSHALL
F. S. BROWN	N. E. MASTERTON
E. A. DAVIES	J. L. MILNE
C. V. FULLER	D. M. OVERHOLSER
GRACE G. HALL	E. S. SKILLINGS
H. H. JACKSON	W. F. SOMERVILLE
MARK KORMES	G. P. WELCH

The reports of the Secretary-Treasurer (Richard Fondiller) and of the Librarian (William Breiby) were read and accepted. The annual report of finances follows:

ANNUAL REPORT OF FINANCES

Cash receipts and disbursements from November 1, 1925 to October 31, 1926.

INCOME

On deposit on Nov. 1, 1925 in Fidelity Trust Company.....		\$ 293.49
Members' Dues.....	\$2,030.00	
Sales of Proceedings.....	1,479.55	
Examination Fees.....	275.00	
Luncheons.....	204.00	
Liberty Loan Coupons.....	85.00	4,073.55
Total.....		<u>\$4,367.04</u>

DISBURSEMENTS

Printing and Stationery.....	\$2,534.34
Postage, Telegrams and Express.....	155.00
Secretarial Work.....	360.00
Luncheons.....	298.70
Examination Expense.....	471.66
Books for Hartford Library.....	30.80
Books for New York Library.....	14.46
Miscellaneous.....	25.77
	<u>\$3,890.73</u>

On deposit on Oct. 31, 1926 in Fidelity Trust Company.....		476.31
		<u>\$4,367.04</u>
Income.....	\$4,073.55	
Disbursements.....	<u>3,890.73</u>	
Surplus.....	182.82	
1925 Bank Balance.....	293.49	
1926 Bank Balance.....	<u>\$ 476.31</u>	
Plus check 26 not yet cleared.....	30.00	
Balance as per Fidelity Trust Company.....		<u>\$ 506.31</u>

ASSETS

Cash in Bank.....	\$ 476.31
Liberty Loan Bonds.....	1,000.00
Total.....	<u>\$1,476.31</u>

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

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

1926 EXAMINATIONS—SUCCESSFUL CANDIDATES

The following is a list of those who passed the examinations held by the Society on May 5th and 6th, 1926:

ASSOCIATESHIP—PART I

BATHO, E. R.	MILNE, J. L.
KORMES, M.	SHAPIRO, I.
MARSHALL, R. M.	VALERIUS, N. M.
MASTERTON, N. E.	WELCH, G. P.

ASSOCIATESHIP—PART II

BATHO, E. R.	MILNE, J. L.
HALL, G. G. (Miss)	OVERHOLSER, D. M.
KORMES, M.	SKILLINGS, E. S.
MARSHALL, R. M.	WELCH, G. P.

FELLOWSHIP—PART I

BROWN, F. S.	HAUGH, C. J., JR.
CRANE, H. G.	JACKSON, H. H.
DAVIES, E. A.	MATTHEWS, A. N.
FULLER, G. V.	SOMERVILLE, W. F.
GRAHAM, C. M.	

FELLOWSHIP—PART II

CRANE, H. G.	HALL, W. D.
DAVIS, E. M. (Miss)	HAUGH, C. J., JR.
FREDERICKSON, C. H.	KELTON, W. H.
GRAHAM, C. M.	RICHTER, O. C.

The Committee on Papers (Leon S. Senior, Chairman) reported that it was not feasible to follow Dr. Rubinow's suggestion as to devoting each meeting largely to one topic.

The Council's re-election of Robert J. McManus as Editor and William Breiby as Librarian, subject to confirmation by the Society, was announced.

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

President..... SANFORD B. PERKINS
Vice President..... GEORGE D. MOORE
Vice President..... THOMAS F. TARBELL
Secretary-Treasurer..... RICHARD FONDILLER
Editor..... ROBERT J. McMANUS
Librarian..... WILLIAM BREIBY

Members of Council (terms expire in 1929)

HENRY FARRER MARCUS MELTZER SYDNEY D. PINNEY

Member of Council (term expires in 1928)

BENEDICT D. FLYNN

The President stated that the Council had decided to hold the Woodward Prize competition for the best paper over for another year and that the new Council would be requested to consult with Mr. Woodward as to revising the terms of the competition.

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

The papers printed in this Number were read or presented.

Recess was taken until 2:00 P. M.

By invitation of the Committee on Program the three following papers were presented:

“Selection and Training of Men for Casualty and Surety Field Positions”—C. G. Hallowell, Secretary, Accident and Liability Department, Aetna Life Insurance Company.

“Installment Purchase Accident and Health Insurance”—R. O. Davidson, Superintendent, Accident and Health Department, Royal Indemnity Company.

“The Interest of the Actuary in Stable Money”—Norman Lombard, Executive Director, Stable Money Association.

The compulsory automobile insurance law in Massachusetts was the topic of discussion in the “question box”.

Upon motion, the meeting adjourned at 4:45 P. M.

PROCEEDINGS

MAY 13, 1927

A MESSAGE TO AND CONCERNING THE CASUALTY
ACTUARIAL SOCIETY

PRESIDENTIAL ADDRESS, SANFORD B. PERKINS

If the presidential address this morning seems to depart in its character from what has become traditional and customary, and if to the speakers who participate in today's program is left the opportunity and honor of laying before you the various important and interesting problems which enter into our business, it is because I am actuated by two motives. First, that under this modified procedure the presentation of those subjects which comprise the major and material portion of our program will be handled more entertainingly and convincingly is probable; that their treatment will be more masterful and authentic is positive. Second, I should like to avail myself of this, my only opportunity of getting before you all some thoughts which have been uppermost in my mind for the past few years in connection with the well being and very existence of our Society.

In the fall of 1914 the Casualty Actuarial Society came into existence as the Casualty Actuarial and Statistical Society of America and we may accept as historically true the statement of our first President and Founder, Dr. I. M. Rubinow, which is contained in his address to the Society on the origin of the Casualty Actuarial Society, presented at the Decennial Meeting in 1924, that "The organization of the Society was forced by the Compensation Legislation of 1911, 1912, 1913 and particularly 1914, and the pressure of problems that were arising almost daily, particularly in connection with the administration of the New York Compensation Act of 1914."

From the Constitution of the Society we learn from Article II that, "The object of the Society shall be the promotion of actuarial and statistical science as applied to the problem of casualty and social insurance. . . ."

Both of these references force upon us a realization that the fundamental purpose of the organization of our Society was to deal with problems of applied science. To ascertain how well these obligations were originally fulfilled, it is only necessary to glance through the first few volumes of the *Proceedings*. There may be found paper after paper dealing with the methods of rate calculation, systems of schedule and experience rate modification, various methods of setting up claim reserves, cost accounting difficulties and, in fact, containing references to all of the technical phases of the administration of workmen's compensation insurance.

After the first two or three years the activities of the Society were extended to other forms of casualty insurance until eventually practically every casualty line was included.

As time passed and as the Society developed and prospered, it was, perhaps, but natural that its policy formed itself rather than was formed by any definite and directed effort on the part of its successive administrators. The Founders comprised a group of men with a common interest—that of developing casualty lines of insurance. The Casualty Actuarial Society to them represented a medium through which their views on the subject could be expressed and compared and tried. Their meetings supplied that very necessary contact with others who were struggling with the same general problems. In the *Proceedings* there existed a vault into which for permanent reference could be carried records of creative thoughts of pioneering minds as they, step by step, developed their theories, tested them and converted them into practices which ultimately became the foundation upon which the tremendous structure of casualty insurance took form until it has expanded today to dimensions probably undreamed of when the Casualty Actuarial Society came into existence. Sound, healthy and normal youth is a prerequisite to extensive, active and productive life in any organism. I do not attribute to the Society the credit for the development of the casualty business. That would be absurd but I do maintain that the Casualty Actuarial Society represented the first concerted and serious gesture toward controlling its growth and directed it along safe and conservative lines.

Twenty years ago the automotive industry produced automobiles. They were neither a source of inspiration to the eye nor did they offer particular comfort to the body and we admit that if produced in the light of all subsequently acquired knowledge, today, they would not reflect much credit to the profession of automotive engineering. But they served their purpose until now we have automobiles which are freely admitted by various manufacturers to be the most beautiful, the most powerful and the most mechanically perfect vehicles which will ever be designed. What we actually have are millions of cars which represent marvelous strides of advance in the automotive industry and which, while meeting our present needs, will probably in time prove to be entirely insufficient. Twenty years from today there will undoubtedly be a new generation of cars which will then be proclaimed the most beautiful and the most virtuous in every conceivable way.

In just this way has our Society contributed magnificently in the development of the casualty business. Workmen's compensation insurance represents the line which has occupied the most prominent position in the field of activity of the Society. There are many who freely condemn the effects of the entrance of the actuarial mind into the development of the compensation business. That I pity them for their lack of ability to focus more truly upon the actual weaknesses which have found their way into that vastly important field need not be emphasized. But who can deny that the group business, whether it be group life or group accident, has profited to no slight extent from the experimentations arising out of the injection of the actuarial viewpoint into the administration of the workmen's compensation business.

The Casualty Actuarial Society was a successful venture. It satisfied the needs which actually existed at the time of its organization. Its membership has increased quite satisfactorily and it has been fortunate in the character and qualifications of its ever increasing numbers. There is not one of us who is not proud of being associated with an organization which has earned through its accomplishments recognition in various ways that has been accorded ours. But what of the future? The present of today is the past of tomorrow and a record of our activities this year becomes history of next and what will our record show?

It can do no harm once in a while to become introspective and to search ourselves, as a Society, for the purpose of ascertaining

whether or not we have been constant to our purpose and possibly without that preconceived notion that all is as it should be. Let us ask ourselves questions such as these: How many times in the past decade have Insurance Departments come to us for advice or for the solution of vexing problems? How often have any Boards or Bureaus solicited our aid? When and how frequently have members associated with individual companies, feeling the need of assistance and recognizing that from the professed purpose of our being we should be the instrument through which they could obtain the necessary counsel, brought their problems to us—problems which were impossible of solution through the ordinary channels available to an individual company but which would submit easily to treatment through the accumulated effort of all of the Society members and the material which is at their disposal? How many times has the Society, itself, sensed, through the close contact of its individual members with current problems, that it could serve the business of insurance to advantage by anticipating its needs which must grow out of the steady expansion of the business or out of anticipated legislation then in its formative stage? How often has it initiated action which has resulted in furnishing those actively administering the business with more adequate tools with which to work or data or other information which has subsequently simplified some of their problems?

It is not for me to answer these questions but it can do no harm for all of us to give them serious consideration. If by any chance one finds in attempting a reply that the answers are not all they should be nor entirely satisfactory from the viewpoint of the Society, criticism should not be directed against the Society without a full realization that it is but a collection of individuals. Such individual member should ask himself what he has contributed that the answers to these questions might indicate that the Society is functioning as originally intended.

Let me say here that during the remainder of my term of office I shall do my utmost to further the best interests of the Society. I shall look to you for an intimation of the course you wish me to pursue, either by action from the Society as a whole or by individual suggestion which seems to reflect the attitude of a substantial number of members. To this end I solicit your counsel and your suggestion, and the question I now ask of you is, "How can the Society best serve its members?"

As I have intimated heretofore, the policy of the Casualty Actuarial Society—as contrasted with its professed purpose—has gradually established itself. What else could have been expected? Our Founders—a group of men—some of them, at least, then in the process of “arriving,” contributed to the success of the Society by discussing their particular current problems. As time passed, their interests changed with their ever new duties. Subsequent activities and participation in the program reflected altered viewpoints. New members were admitted to the Society. Did the subjects discussed at our meetings bear directly upon their problems? Probably not. Did the problems of these newer men seem to be in the same category with those which apparently monopolized the entire attention of the Society? Unquestionably, no. Who, then, can blame them for refraining from bringing before the Society matters which would have, no doubt, met with very sympathetic and enthusiastic acceptance by many other members?

I believe that in our development we have grown up and not out. We have grown as do men who progress along their business career, reaching forward to new attainments, leaving behind the interests of yesterday to someone else. Such is the ideal course for man. But for a Society with a professed purpose, is that the kind of development which is conducive to its ultimate success? Should its progress be comparable with man's or with, let us say, that of industry? An industry thrives and expands but it never loses sight of its main purpose. If it starts to manufacture needles, it strives to produce more and better needles until it may control the production of the world's supply, but it still sticks to needles. Possibly side lines are developed in the process—possibly it adds piston rings or vacuum cleaners or motorcycles to its line—but withal the needles are not overlooked. Have we with the same persistence stuck to our original purpose or have we in our intense desire to keep abreast of the interests of the few, accomplished that end at the expense of losing the interest of and not rendering assistance to many of the members of more recent election? We should make a distinct effort to give ample opportunity for the free and full discussions of present day problems. We should set up machinery by which these problems can be solved—and solved in time to be useful in the every-day conduct of our business.

Consider the terrific handicap under which we must labor to crystalize our intent to apply scientific treatment to casualty problems into action when the problems are arising daily and we meet semi-annually. Under our present system of operation it is impossible of accomplishment. But it can be done if we set ourselves to the task. There is no valid reason why various sections could not be formed—each dealing with some definite subdivision of activity and under the supervision of a standing committee. Such sections could meet as frequently as might be necessary and semi-annual reports rendered to the Society which would in themselves be most valuable additions to the contents of the *Proceedings*. True, the *Proceedings* contain today probably the best and most authentic papers on casualty subjects in existence. That is as it should be but is it not equally true that in the main they represent records of what has been accomplished and information that has been gleaned from other sources? Do they to any appreciable extent represent a record of achievements of the Casualty Actuarial Society? There should be no fewer papers of the character already found in the *Proceedings* but in addition there should be many of the type that are not contained therein today.

Upon authorization of your Council, I have already appointed a Committee to investigate and report on ways and means by which the activities of the Society may be extended to deal advantageously with current problems and from its report, hope to have a definite recommendation to submit to you at our next meeting.

As Ex-President James D. Craig said in his recent paper to the Society, "Apparently a very definite need has been met. Those interested in casualty lines have found a common medium for the discussion of their general problems. The number of papers submitted and discussed show that these problems have been continuous."

The annual earnings of casualty companies in this country today are probably five times what they were when the Society was organized. Out of a growth in volume as substantial as this, together with the incidental extensions into new fields as must have accompanied such expansion, should we expect the related technical problems to be less than continuous? Indeed, they should have been presented with such frequency that the capacity of the Society's ability to solve them should have been taxed to the limit.

I can but agree with Mr. Craig when he says, "Those interested in casualty lines have found a common medium for the discussion of their general problems." Yes, but that medium is not the Casualty Actuarial Society and the Casualty Actuarial Society is not today completely performing those very functions for which it was organized. That is the message I want to carry to you all, today. If we as a Society do not fulfill our obligation to the world of insurance as may reasonably be expected of us, someone or some other organization must of necessity show the way of doing those things which we will be leaving undone.

OBSERVATIONS ON MAKING RATES FOR EXCESS
COMPENSATION INSURANCE

BY

PAUL DORWEILER

Workmen's compensation is based on the concept that losses due to industrial accidents, in an economic sense, should be regarded in the same way as losses resulting from depreciation or breakage of machinery and considered as a part of the cost of production. Under the Compensation laws the employer directly assumes the industrial accident losses and transmits them to the consumer through an increase in the price of the employer's products.

This situation leaves the employer in a state of uncertainty, for he may have no accidents and thus obtain a greater gain from the increased price of his products, he may have accidents so costly as to bring on insolvency, or he may have accidents of some intermediate status. In addition to his uncertainty as to the cost of accidents, the employer may be in need of special legal counsel, the aid of experienced adjusters, the advice of medical specialists, the cooperation of safety engineers to reduce the accidents to a minimum, or the service of a statistical department for issuing payments to the injured, keeping records, compiling reports and administering the necessary funds to assure payments for disabilities.

FUNCTION OF COMPENSATION INSURANCE CARRIERS

It is the function of compensation insurance carriers to relieve the employer of the uncertainty as to the cost of accidents by assuming his legal responsibility for all accidents covered by the compensation law, and to furnish the employer the services that may be required to administer the law on the most efficient economic basis.

Employers are qualified in different degrees to assume the financial obligations placed directly upon them by the compensation acts and to provide the services necessary for administering the act most efficiently. Most employers desire and need to be fully protected against all liabilities incurred. Relatively few may desire protection only against accidents covered by

certain types of benefits, and still fewer desire protection only against extreme fluctuations in the annual losses. In the efforts of the carriers to supply the desires and needs of the employers in the several states different forms of coverage have been developed.

CLASSIFICATION OF COVERAGES

For purposes of classification, with respect to the inclusiveness of compensation accidents, these coverages may be divided as follows:

I. *Full Coverage.* Under this coverage all obligations to the injured employees which the compensation law imposes upon the employer are assumed by the carrier.

II. *Partial Coverage.* The employer may chose to retain some of the obligations and to insure the others. For such employers these general forms of partial coverage are available.

1. *Coverage for a Fixed Percentage of Each Loss.* Under this form of coverage the assured retains a definitely fixed percentage of every loss and insures the rest. This form of coverage is known as *Co-Insurance*, and is mentioned merely for completeness of classification as it is of no real importance in compensation insurance.

2. *Coverage for Certain Types of Benefits.* The assured under this form of coverage retains the obligations for certain types of benefits and insures the obligations for the other types. The most common form of coverage under this division is *Ex-Medical Insurance* in which the assured assumes the medical losses and insures the indemnity losses.

3. *Coverage for Losses in Excess of a Fixed Limit per Accident.* This form of insurance is commonly known as *Excess Insurance* or *Deductible Average Insurance*. The assured under this coverage retains his obligations up to a fixed amount for each accident and insures all losses in excess of this fixed amount. If this fixed limit is high, *e. g.*, \$5,000 or more, this is known as *Excess Insurance*. If the limit is low, *e. g.*, \$500 or less, it is called *Deductible Average Insurance*. This form of insurance will be referred to hereafter as *Excess Insurance per Accident*.

4. *Coverage for Losses in Excess of a Fixed Percent of the Risk Premium.* Under this form of coverage the assured retains his obligations for all losses up to a fixed percentage of his premium at manual rates or merit-rated rates, and

insures all losses in excess of this fixed percentage. This form of excess insurance is rare and has not yet acquired a generally accepted name. It has been referred to as *Aggregate Stop Loss Ratio Insurance* and *Excess Loss Ratio Insurance*. In this discussion this form of excess insurance will be designated as *Excess Insurance per Loss Ratio*.

III. *No Coverage*. The assured may retain for himself all of his obligations to the injured employees. This case in which there is no coverage extended by a carrier is generally known as *Self-Insurance*. It is not included in the general topic of discussion and is mentioned for the sake of completeness of classification.

GRAPHICAL ILLUSTRATION

The types of coverage just classified may be illustrated by graphic forms. In Fig. 1 the accidents of a typical risk of larger size are represented. Each rectangular column represents a loss due to an accident of the type of benefit specified. The horizontal lines denote the fixed amounts indicated at the left. The larger rectangle at the right denotes the risk premium and the shaded portion of the rectangle denotes the aggregate risk losses. The numbers at the right of the rectangle indicate the loss ratio scale.

Under insurance for *Full Coverage* all of the losses represented by the individual rectangular columns are assumed by the carrier and under *No Coverage* or *Self-Insurance* the employer retains all the losses. In forms of insurance which extend partial coverage the losses are shared by the assured and the carrier. Under *Co-Insurance* each loss is split vertically and the same fixed percentage of every loss is retained by the assured, and the rest is assumed by the carrier. If *Ex-Medical* Insurance or any coverage by kind of injury is used the losses of specified types of benefits are retained by the assured and the losses of the other types of benefits are assumed by the carrier. If coverage is given for *Excess Insurance per Accident* the larger losses are split by the horizontal lines representing the fixed limit per accident. The portion above the line is assumed by the carrier and the lower portion and all small losses are retained by the assured.

The form of coverage designated as *Excess Insurance per Loss Ratio* may be represented by the large rectangle at the right of

the figure. Losses above the horizontal line representing the specific loss ratio used in the insurance contract are assumed by the carrier and those below the line are retained by the assured.

If the meaning of the rectangular columns is extended to denote the total loss due to the accident rather than the part covered by the compensation act then the graphic illustration of accidents—Fig. 1—may be used to indicate the share of the industrial hazard assumed by the employee. The risk of the employee involves the loss of his total wages from the date of accident until recovery and the cost of medical treatments. If his employment was not covered by the act, and he insured his industrial risk by taking out a policy similar to the compensation policy he would have *Co-Insurance*, for only 50% to 66⅔% of his wages are generally covered by compensation insurance. He would also have *Deductible Average Insurance* because he would bear his loss of wage during the waiting period. Generally he would carry his own *Excess Insurance per Accident* because the period during which he receives benefits or the total amount of benefits are usually limited in compensation acts. He would in some cases also have coverage by type of injury for in some of the states he is obliged to assume his own medical costs and is not covered for losses on account of death or industrial disease.

PURE PREMIUM RELATIONSHIPS

It will be assumed in this discussion that for *Full Coverage* insurance the present rate making procedure, inclusive of the application of the merit rating plans, produces rates for the manual classifications and the individual risks which are substantially correct, not only as a whole but for each of the component parts. Under this assumption the classification pure premium for any one of the types of partial coverage enumerated may be considered to be fully determined when its relation to the full coverage pure premium has been definitely established. This ratio of the pure premium under partial coverage to the pure premium under full coverage will be known as the *Pure Premium Ratio*. As there are at present no adequate available data developed under partial coverage, it is necessary to determine the pure premiums for partial coverage from experience developed under full coverage. In this procedure there is a further tacit

assumption that experience developed under partial coverage is approximately the same as the analogous part of the experience developed under full coverage.

It is obvious that under *Co-Insurance* the pure premium for the portion insured by the carrier bears the same ratio to the full coverage pure premium that the portion of insured losses bears to the total losses. It is also evident that under a form of insurance covering certain types of benefits only, *e. g., Ex-Medical Insurance*, the pure premiums for the partial coverage may be determined from the relativity of the pure premiums of the component parts entering into the full coverage rates.

EXCESS INSURANCE PER ACCIDENT .

The Actuarial Committee of the National Bureau of Casualty and Surety Underwriters in 1920 had referred to it the problem of providing state rates for insuring compensation losses in excess of a specified limit per accident. At that time compensation experience for policy years 1916 and 1917 was the latest available. Carriers generally had not yet started keeping separate records of losses due to catastrophes. Rates based on data of compensation catastrophes were definitely out of consideration.

The Committee decided to build a frequency distribution of catastrophes based on reports of the United States Bureau of Mines for Pennsylvania anthracite coal mining. These reports give the total deaths and the deaths in every catastrophe involving five or more cases. The number of accidents involving 2, 3 or 4 deaths were supplied on a pro rata basis from Pennsylvania compensation reports. The data for the period 1880-1919 were tabulated for a catastrophe frequency distribution. In graduating this distribution the number of catastrophes and the number of fatal cases involved were preserved.

It was decided to establish excess rates for all classifications, except those which had a specific loading in the pure premiums for an inherent catastrophe hazard, on the basis of the relativity of the catastrophe deaths and the normal deaths in anthracite coal mining. It was assumed that the permanent total and fatal cases had the same relativity in catastrophes as in normal accidents. To provide for the cost of injuries other than death

and permanent total cases the variable loading factor given in column 5, Table I was added.

The classifications were divided, by schedules, into five groups on the basis of the ratio of the D & P T D partial pure premium to the total pure premium. This ratio which is designated by a was determined for each group of classifications in each state. There also was determined for each group, if possible, otherwise for the state as a whole, the average of the D & P T D losses per fatal case which is represented by the symbol A , and the ratio of the excess cost of individual injuries to the total D & P T D cost which is designated by b .

The pure premium ratios were determined for all limits in one tabular calculation for each of the five groups into which the industries of the states had been divided. The method for an individual case of the most general form is shown in the example following:

Let

$$a = \frac{\text{D \& PTD Losses}}{\text{Total Losses}}, \text{ for each classification group.}$$

$$A = \frac{\text{D \& PTD Losses}}{\text{No. of Fatals}}, \text{ for each group, or for state if group experience is not available or inadequate.}$$

$$l_1 = \text{the excess limit over which the losses are covered.}$$

$$b_{i_1} = \frac{\text{Losses on Individual Cases in excess of Limit } l_1}{\text{Total D \& PTD Losses}}, \text{ for whole state.}$$

$$R_{i_1} = \text{Pure Premium Ratio for Limit } l_1, \text{ for classification group.}$$

$$e = \text{Expected Loss Factor.}$$

$$f = \text{Portion of Manual rate, used as flat loading.}$$

$$g = \text{Portion of Excess rate, used as pro rata loading.}$$

Find n so that

$$(n - 1) A \leq l_1 < n \cdot A$$

Use this value of n to find N_n , T_n and T'_n in Table I.

Substitute in the formula

$$R_{i_1} = a \cdot b_{i_1} \cdot \frac{T_n}{18976} + \left(\overset{1.0210}{x} - \frac{T'_n \cdot A + N_n \cdot l_1}{18976 A} \right) a$$

$$= a \left(\overset{1.0210}{x} + b_{i_1} \frac{T_n}{18976} - \frac{T'_n \cdot A + N_n \cdot l_1}{18976 A} \right)$$

$$\text{Percentage Rate} = 100 (e R_{i_1} + f) \div (1 - g)$$

NEW YORK EXCESS RATES—1926

In 1926 the Actuarial Committee of the New York Compensation Inspection Rating Board and the Actuarial Committee of the National Council were asked to prepare rates for excess insurance. It was decided to divide the classifications of industries into groups on the basis of the catastrophe hazard and to make use of the catastrophe experience developed under compensation acts as far as possible. The Engineering Committee of the National Council prepared a grouping of the industrial classifications according to the inherent catastrophe hazard. On the basis of engineering judgment the classifications were assigned to these four groups.

- Group I —Serious inherent catastrophe hazard.
- Group II —Moderate inherent catastrophe hazard.
- Group III —Slight inherent catastrophe hazard.
- Group IV —No inherent catastrophe hazard.

The Committee had available an exhibit showing a compilation of a country-wide experience of accidents involving two or more serious cases for policy years 1922 and 1923. This exhibit gave, by classifications, the number of serious cases in excess of 1, 2, and 3 for any single accident, and for the classifications developing catastrophes, the total number of serious cases exclusive of catastrophes. The summary of this exhibit follows:

Catastrophe Group	Serious Cases Exclusive of Catastrophe	Total Number of Cases in Excess of x on any single accident		
		$x = 1$	$x = 2$	$x = 3$
(1)	(2)	(3)	(4)	(5)
I	993	100	74	59
II and III	3,987	72	25	17
IV	3,213	58	23	6
Total	8,193	230	122	82

These data are admittedly too limited to have their indications accepted without modification by judgment. The Actuarial Committee of the New York Compensation Inspection Rating Board, on the basis of these data, supplemented by judgment, proceeded to determine a rate for covering losses in excess of \$10,000 per accident in New York. The judgment interjected represents the composite opinion of the Committee. It is prob-

able that no member agrees with every item of judgment entering into the calculation.

It was decided to reduce the number of catastrophe groups from four to three by combining Group II and Group III. The determination of the excess rate for a \$10,000 limit is shown somewhat in detail in Table II. Items of the service and expense loading factor were split on a judgment basis into a flat loading or fixed percentage of the manual rate, which represents the part proportional to the number of risks, and a pro rata loading which represents the part proportional to the excess rate, as follows:

Flat Loading	Pro Rata Loading
Inspection.....2.5%	Acquisition.....17.5%
Audit.....2.0	Taxes.....2.5
Administration.....3.75	Administration.....3.75
	Claims.....8.00
<u>8.25%</u>	<u>31.75%</u>

To obtain rates for losses in excess of \$25,000 per accident the Committee used the data of the anthracite coal mine catastrophe distribution. These data when subjected to the procedure followed in Table II indicated, for the three groups combined, an average rate of 14% for the \$25,000 limit. It was the belief that the adverse selection factor of 1.20—line 4, Table II,—was not needed for this high limit and that there should be a reduction in expense factors. The committee adopted an average rate of 10% for the combined groups. Judgment differential rates of 11%, 10% and 9% were assigned to the respective groups. The rates for excess limits of \$15,000 and \$20,000 per accident were then interpolated.

The percentages adopted for the \$10,000 excess limit in Table II are averages based on the experience of the whole group. It was the Committee's decision that the actual classification ratio of the serious pure premium to the total pure premium should be used in calculating the \$10,000 excess limit rates for each individual classification, instead of the group average shown in line 5, Table II. The rates for the higher excess limits were then obtained for each classification, by maintaining the relativity of the average group rates. In the final exhibit of rates recommended, each classification is given an excess rate which is expressed as a percentage of the full coverage manual rate.

WISCONSIN EXCESS RATES—1926

The National Council Staff and Committees cooperated with the Wisconsin Compensation Rating and Inspection Bureau in developing rates and rules for excess insurance in Wisconsin. The maximum amount of compensation possible for a single injury under the Wisconsin act is limited so that single injury accidents could have no effect on excess cost over a \$20,000 limit per accident. The cost of a single injury in Wisconsin also is practically negligible on excess costs for limits of \$15,000 and \$10,000 per accident. This condition simplified the calculation of excess rates in Wisconsin.

The National Council using compensation catastrophe data and following the general procedure shown in Table II, but eliminating the effect of single injuries and using a different expense loading, determined these average rates for all classifications combined.

Excess Limit per Accident	Percentage Rate
\$10,000	10.0%
15,000	8.5
20,000	7.5

The items of the service and expense loading used for Wisconsin were divided as follows:

	Flat % of Manual Rate	Pro Rata % of Excess Rate
Inspection.....	1.0%	1.0%
Payroll Audit.....	1.0	1.0
Home Office.....	1.5	4.5
Claim.....	..	7.0
Taxes.....	..	3.5
Acquisition.....	..	17.5
	<u>3.5%</u>	<u>34.5%</u>

The classifications were divided, on the basis of engineering and underwriting judgment, into five groups according to catastrophe hazard. Judgment differentials for the five groups were established and minimum group rates for the \$10,000 limit were determined so that when applied to all classifications, except clerical office, premiums equal to 10% of the manual premium were produced. The minimum group rates for the \$15,000 limit and the \$20,000 limit were then determined by taking

respectively 85% and 75% of the minimum group rates for the \$10,000 limit. A flat rate of 2c. was selected for classifications covering clerical office force. The Wisconsin minimum rates which are expressed in monetary units and which are applied directly to the payroll are:

	Excess Rate for Limits of		
	\$10,000	\$15,000	\$20,000
Group 1.....	\$1.00	\$.85	\$.75
Group 2.....	.78	.66	.59
Group 3.....	.56	.48	.42
Group 4.....	.34	.29	.26
Group 5.....	.12	.10	.09

It is proposed to add to these minimum rates certain charges for unusual catastrophe hazards. These charges are to be added to the minimum rates irrespective of the classification grouping. The charges which necessarily are based on judgment are:

	Flat Charges for Excess Limits of		
	\$10,00	\$15,000	\$20,000
First Unusual Hazard.....	\$.20	\$.16	\$.12
Second " ".....	.10	.08	.06
Third " ".....	.03	.02	.01
Fourth " ".....	.03	.02	.01
Fifth " ".....	.03	.02	.01
Sixth " ".....	.03	.02	.01

EXCESS INSURANCE PER LOSS RATIO

This type of Excess Insurance has had a very limited usage. Under this coverage the carrier agrees to assume all losses sustained on a risk in excess of a definite percentage of the premium based on either manual rates or rates adjusted for the particular risk by the application of merit rating. This form of excess coverage which insures the stability of the loss ratio resulting from the aggregate risk losses introduces the size of the risk as a new factor to be considered in the determination of pure premium ratios. It is evident that in the very small risks there will be most likely a clear experience. If there happen to be any losses the loss ratio will probably be high, e. g., 100% or more. At the other extreme, for large risks, there will be few, if any, risks with-

out losses and few, if any, with loss ratios exceeding 100%. From purely theoretical considerations it may be demonstrated that there will be definite changes in the frequency distribution of risk loss ratios when these are grouped according to the size of the risk premium.

In Table III a tabulation of the distribution of loss ratios of risks by premium groups has been made for 24,838 compensation risks for New York state, for policy years 1924 and 1925. This tabulation excludes minimum premium risks and risks whose governing classifications have a per capita premium basis. The figures in the body of Table III denote the number of risks belonging to the premium group indicated in the left hand column and to the loss ratio group indicated by the column heading.

CONTOUR MAP

Consider a rectangular field whose ordinates are divided on a percentage scale and whose abscissas are divided into premium groups on a scale proportional to the total losses within the group. From the data in Table III, for a given loss ratio, plot points on the median line of each group so as to divide the line in the ratio that the number of risks having loss ratios equal to or less than the given loss ratio bears to the total number of risks in the group. Plot similar points for several such arbitrarily selected loss ratios. If curves are fitted freely to the points of the different premium groups representing equal loss ratios there will result a plat such as is roughly sketched in Fig. 2.

The sketch in Fig. 2 may be considered a sort of limiting form approached by lines joining the plotted points, when the number of premium groups is indefinitely increased and the volume of experience is indefinitely large. The sketch is really a contour map of risks arranged first into ascending premium groups from left to right, and then arrayed according to size of loss ratio within each group.

THREE-DIMENSIONAL MODEL

To visualize a three-dimensional model constructed from this contour map imagine the part above each curve in the map as extended perpendicularly to the plane of the map on a scale of

one inch for each 100% of loss ratio. This process would form a model with sharp ridges. To overcome this defect suppose the number of contour lines on the map were indefinitely increased then there would result a model with a smooth curved surface somewhat as sketched in Fig. 3.

A model formed as just described would be constructed according to scale and from it many of the pure premium relations could be visualized and roughly determined. The part of its volume above the horizontal plane a inches above the base would represent to scale the losses in excess of a loss ratio of 100 a %. The ratio of the volume above the plane to the total volume of the model would represent the pure premium ratio. From the model it can be visually ascertained that the losses in excess of the larger loss ratios are due entirely to the small premium group risks. To obtain relations which are representative of a whole group of risks it is necessary to divide the model by planes parallel to the $Y O Z$ -plane. Within each of these sections of the model which now represent the premium group of risks the ratio of the volume above the horizontal plane to the volume of the whole section would represent the pure premium ratio of the group for the particular loss ratio corresponding to the horizontal plane.

CALCULATION OF PURE PREMIUM RATIOS

In determining the *Pure Premium Ratio* which will be defined as the ratio of the risk losses in excess of a specified loss ratio to the total risk losses, it will be necessary to make certain assumptions. It will be assumed that the ratio of the aggregate of the risks of a premium group approximately represents the ratio for the risks of average premium within the group, or with a lesser degree of accuracy it may be assumed that the ratio for the group represents the ratio for each risk within the group.

The pure premium ratios for *Excess Insurance per Loss Ratio* for each of any number of specified loss ratios may be determined in one tabular calculation for each premium group by the procedure followed in Table IV. The data in columns 1 and 2 of this table are taken from Table III. The rest of the process with the aid of the column headings is believed to be self-explanatory.

A general test as to accuracy may be applied to the calculation

in Table V. The sum of the individual loss ratios in column 3 may be applied to the average risk premium of the group. The product should equal approximately the total losses of the group. The close agreement found in this particular case is not to be expected generally. In passing judgment on the adequacy of these data it should be noted that while there are 2202 risks in the group, 1649 of these have no losses whatever and the losses of the last seven risks listed in the table account for one-third of the total. The very high loss ratio of the last risk group is larger than is to be expected in this volume of experience, and in part accounts for the lack of greater uniformity in the trend of the pure premium ratios in Table V.

If similar calculations of pure premium ratios are made for each of the other premium groups and if the ratios of column 10 of Table IV and the corresponding ratios of other groups are tabulated according to the premium group and the selected risk loss ratio there will result the tabulation which has been designated Table V.

From the different proportions in which the various types of injuries, each of which has probably a definite accident frequency distribution, enter into the classifications it would seem natural to infer that the different classifications or industries would produce different pure premium ratios for *Excess Insurance per Loss Ratio*. To test the validity of such an inference the risks for the Manufacturing Industry (schedule 5-25), the Contracting Industry (schedules 26-27), the Commercial Industry (schedule 34), and the Care, Custody and Maintenance of Buildings (schedule 36) were segregated. Pure premium ratios for each of these industries were then calculated. Only the lower premium groups were used as the data when divided by industries are entirely too limited for the upper groups. The results of these calculations are shown in Table V-a.

One would expect to derive less stable loss ratios and correspondingly higher pure premium ratios from the individual risk experience of those industries in which the serious accidents are relatively more frequent. In connection with the different parts of Table V-a it is interesting to consider the percentage distribution of losses within the different industries as shown in the following table which has been compiled from the country-wide

experience of policy years 1918-1922 brought to the basis of the 1925 New York Law.

Kind of Loss	Percentage Distribution of Losses by Industries				
	Manu- facturing	Contract- ing	Com- mercial	Care and Custody	All
Serious	34%	44%	34%	38%	38%
Non-Serious	41	37	40	38	39
Medical	25	19	26	24	23
Total	100%	100%	100%	100%	100%

The parts of Table V-a do not have the same degree of smoothness that is found in Table V, particularly among the higher selected loss ratios. Considering the limited volume of experience this is to be expected. A similarity appears when comparing the level and trend of the pure premium ratios for the manufacturing industry with the commercial, and those for the contracting industry with the care, custody and maintenance of buildings. It would be premature to derive from these limited data the definite conclusion that the indicated differences in the pure premium ratios in Table V-a are due to causes inherent in the industry.

SERVICE AND EXPENSE LOADING

The loading factor to be applied to this form of insurance depends largely on the service the assured desires or needs and on the limits specified in the policies. If the assured desires full claim, legal and safety engineering service there should be the same service and expense loading as provided under the full coverage. Generally the assured desires excess insurance because of his belief in the inherent merit of his risk and in the efficiency of his organization in rendering the necessary services. For its own protection against adverse selection of risks it is necessary that the carrier render some service the extent of which would depend on the nature of the risk and the size of the excess limits.

There is general agreement on the principle that a part of some of these loading items should be charged flat and the rest of the same items should be charged on a pro rata basis. There is no general agreement however, as yet, as to how much of the split items should be charged on the flat and how much on the pro

rata basis. Actual instances of a division of these items for *Excess Insurance per Accident* occur in the recommendations of the Actuarial Committees and are shown in the New York rates in Table II and in the Wisconsin excess rates. The question also arises, particularly in *Excess Insurance per Loss Ratio*, whether there should be any variation in the expense loading with different excess limits. No general agreement has yet been reached on this question.

There is also the broader question as to the effect of excess insurance on the general expense loading for full coverage. There is a certain overhead cost which is in part fixed and which is now spread over the relatively large premiums derived from full coverage rates. It is conceivable that the writing of excess insurance might reduce the total premium volume to such an extent that it would be necessary to increase the present percentage loading for full coverage in order to provide for this fixed overhead.

TEST OF CORRECT RELATIVITY OF EXCESS INSURANCE RATES

The generally accepted aim of rate making is to produce such rates for individual risks that all risks become equally desirable when judged solely on the basis of realizing the expected loss ratio. The fact that underwriters when considering only the loss experience prefer one risk or set of risks over others would indicate that in their judgment the proper rate had not yet been determined for the individual risks. It is the problem of the rate makers to determine such rates for excess insurance that when considered entirely with reference to realizing the expected loss ratio there can be no adverse selection of risks on account of differences in any of these conditions:

1. The excess limit used in the policies
2. The industry to which the risk belongs
3. The loss experience of the individual risk
4. The size of the risk.

EXCESS INSURANCE IN COMPENSATION AND LIABILITY LINES

The problem of rate making for excess insurance under compensation coverage is simpler than the rate making problem for excess insurance of other liability lines involving personal injury.

The cost of compensation for specific injuries within a state has become practically standardized through the compensation law. Compensation laws have no restrictions on the total amount an accident may cost aside from the prescribed cost for individual injuries. The variable necessary to consider in *Excess Insurance per Accident* is the accident cost frequency distribution and the variable necessary to consider in *Excess Insurance per Loss Ratio* is the loss ratio frequency distribution.

In Liability insurance involving personal injury there is little, if any, standardization of cost for specific accidents for a state. Verdicts secured for specific accidents which are almost identical in character and which occurred under very similar conditions will show wide variations in cost. Under these conditions the costs of accidents in liability insurance have a much larger spread. This results in frequency distributions of greater standard deviations for both the individual accidents which are used in *Excess Insurance per Accident* and for the aggregate accidents of a risk which are used in *Excess Insurance per Loss Ratio*. This characteristic of the frequency distribution indicates definitely that the pure premium ratios of either type of excess insurance, for limits which have the same relativity to the average cost, are greater under liability insurance than under compensation insurance.

TABLE I
SHOWING DISTRIBUTION OF FATAL CASES FOR
PENNSYLVANIA ANTHRACITE FOR YEARS 1880-1919, AND
AUXILIARY COLUMNS FOR DETERMINING PURE
PREMIUM RATIOS

FATALS per Accident n	No. of Accidents		Total FATALS	Factor for P. P. & T. T.	Cost (4) \times (5)	Σ (3) up N_n	Σ (4) down T_n	Σ (6) down T'_n
	Actual	Revised						
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1			16,445	1.00	16,445			
2	(600)	600	1,200	1.20	1,440	836	16,445	16,445
3	(120)	120	360	1.18	425	236	17,645	17,885
4	(40)	40	160	1.16	186	116	18,005	18,310
5	19	20	100	1.14	114	76	18,165	18,496
6	15	15	90	1.12	101	56	18,265	18,610
7	12	11	77	1.10	85	41	18,355	18,711
8	3	7	56	1.09	61	30	18,432	18,796
9	6	5	45	1.08	49	23	18,488	18,857
10	8	4	40	1.07	43	18	18,533	18,906
11	..	3	33	1.06	35	14	18,573	18,949
12	3	2	24	1.05	25	11	18,606	18,984
13	4	1	13	1.05	14	9	18,630	19,009
15	1	1	15	1.05	16	8	18,643	19,023
17	..	1	17	1.05	18	7	18,658	19,039
19	1	..	..	..	..	6	18,675	19,057
20	..	1	20	1.05	21	6	18,675	19,057
25	..	1	25	1.05	26	5	18,695	19,078
28	2	..	..	..	..	4	18,720	19,104
34	..	1	34	1.05	36	4	18,720	19,104
58	1	1	58	1.05	61	3	18,754	19,140
72	1	1	72	1.05	76	2	18,812	19,201
92	1	1	92	1.05	97	1	18,884	19,277
Total	836	836	18,976				18,976	19,374

TABLE II
SHOWING DETERMINATION OF EXCESS RATES FOR LOSSES
IN EXCESS OF \$10,000 PER ACCIDENT

Line	Item	Classification Hazard Group		
		I Serious	II Moderate	III All Other
(1)	(2)	(3)	(4)	(5)
1.	Ratio Excess Cost on Single Injuries to Cost of Serious Injuries.....	.150	.153	.108
2.	Ratio Excess Cost on Catastrophes to cost of Serious Injuries	.085	.062	.005
3.	Ratio Excess Cost to Cost of Serious Injuries. Lines (1) + (2).....	.235	.184	.111
4.	Loading for Adverse Selection and Lack of Control. $1.20 \times (3)$.....	.282	.221	.133
5.	Ratio Serious Pure Premium to Total Pure Premium.....	.459	.379	.342
6.	Ratio Excess Cost to Total Pure Premium. $(4) \times (5)$.....	.129	.084	.045
7.	Ratio Excess Cost to Manual Rate. $.60 \times (6)$.....	.078	.050	.027
8.	Add Flat Expense Loading of .0825 $(7) + .0825$.....	.1605	.1325	.1095
9.	Loading for Pro Rata Expense $(8) \div (1 - .3175)$.....	.235	.194	.160
10.	Per Cent of New York Manual Rate selected as average rate for excess of \$10,000 per accident.....	24%	19%	16%
11.	Percentage Rate selected for \$15,000 Excess Limit.....	17	15	13
12.	Percentage Rate selected for \$20,000 Excess Limit.....	13	12	11
13.	Percentage Rate selected for \$25,000 Excess Limit.....	11	10	9

TABLE V
 PURE PREMIUM RATIOS FOR EXCESS INSURANCE PER LOSS RATIO.
 Table showing the Pure Premium Ratio—Ratio of Excess Cost to Total Cost—for Selected Risk Loss Ratios, by Premium Groups, for All Industries Combined.

Lower Limit Premium Group*	Number of Risks	Selected Risk Loss Ratios												
		00%	30%	50%	60%	70%	80%	100%	200%	500%	1000%	2000%	5000%	10000%
\$10	3,682	1.000	.978	.963	.957	.951	.945	.934	.890	.797	.709	.610	.471	.354
25	5,999	1.000	.947	.919	.907	.895	.884	.863	.779	.625	.482	.329	.144	.025
50	3,490	1.000	.919	.881	.864	.849	.834	.807	.698	.505	.353	.191	.037	
75	2,202	1.000	.929	.895	.880	.866	.852	.828	.737	.587	.451	.302	.184	.079
100	2,672	1.000	.911	.870	.851	.836	.821	.794	.698	.529	.377	.222	.073	
150	1,471	1.000	.874	.820	.797	.775	.756	.722	.598	.387	.234	.097	.012	
200	1,657	1.000	.842	.779	.752	.727	.704	.664	.529	.317	.158	.042		
300	940	1.000	.852	.790	.765	.742	.720	.682	.544	.321	.145	.051		
400	539	1.000	.861	.805	.783	.762	.752	.705	.572	.370	.220	.101		
500	629	1.000	.804	.732	.703	.677	.652	.608	.459	.252	.108	.016		
700	479	1.000	.734	.637	.600	.568	.541	.495	.341	.111	.026			
1,000	348	1.000	.705	.643	.605	.570	.540	.492	.341	.161	.036			
1,500	313	1.000	.667	.550	.506	.469	.436	.376	.196	.053	.003			
2,500	180	1.000	.666	.538	.490	.450	.414	.356	.200	.013				
4,000	141	1.000	.556	.386	.319	.266	.223	.163	.045					
8,000	61	1.000	.510	.318	.248	.204	.169	.132	.030					
16,000 and over	35	1.000	.460	.215	.137	.066	.028							

*Each group extends from the given limit to the next.

TABLE IV
SHOWING CALCULATION OF PURE PREMIUM RATIOS FOR PREMIUM GROUP \$75—\$99.
ALL INDUSTRIES COMBINED, NEW YORK DATA FOR POLICY YEARS 1924 AND 1925, AS IN TABLE III

Average L. R. of Group	No. Risks in Group	Total Group L. R. (1) X (2)	Cost Σ (3) down	Excess Cases Σ (2) up	Excess L. R.	Cost Excess Cases (5) X (6)	Cost to Assureds (4) + (7)	(8) \div (3a)	Pure Premium Ratio 1.00 - (9)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
90%	1,649	00	00	553	00	000	000	.0000	1.0000
05	100	500	500	453	10	4,530	50,03	.0282	.9718
15	75	1,125	1,625	378	20	7,560	9,185	.0514	.9486
25	50	1,250	2,875	328	30	9,840	12,715	.0712	.9288
35	26	910	3,785	302	40	12,080	15,865	.0888	.9112
45	26	1,170	4,955	276	50	13,800	18,755	.1050	.8950
55	20	1,100	6,055	256	60	15,360	21,415	.1199	.8801
65	12	780	6,835	244	70	17,080	23,915	.1339	.8661
75	12	900	7,735	232	80	18,560	26,295	.1472	.8528
85	13	1,105	8,840	219	90	19,710	28,550	.1598	.8402
95	11	1,045	9,885	208	100	20,800	30,685	.1718	.8282
105	14	1,470	11,355	194	110	21,340	32,695	.1830	.8170
115	10	1,150	12,505	184	120	22,080	34,585	.1936	.8064
125	6	750	13,255	178	130	23,140	36,395	.2037	.7963
135	13	1,755	15,010	165	140	23,100	38,110	.2133	.7867
145	6	870	15,880	159	150	23,850	39,730	.2224	.7776
160	14	2,240	18,120	145	175	25,375	43,495	.2435	.7565
185	9	1,665	19,785	136	200	27,200	46,985	.2630	.7370
250	44	11,000	30,785	92	300	27,600	58,385	.3268	.6732
350	15	5,250	36,035	77	400	30,800	66,835	.3741	.6259

TABLE IV—Continued

Average L. R. of Group	No. Risks in Group	Total Group L. R. (1) × (2)	Cost Σ (3) down	Excess Cases Σ (2) up	Excess L. R.	Cost Excess Cases (5) × (6)	Cost to Assureds (4) + (7)	(8) ÷ (3a)	Pure Premium Ratio 1.00 - (9)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
450	16	7,200	43,235	61	500	30,500	73,735	.4127	.5873
550	6	3,300	46,535	55	600	33,000	79,535	.4452	.5548
650	4	2,600	49,135	51	700	35,700	84,835	.4749	.5251
750	5	3,750	52,885	46	800	36,800	89,685	.5020	.4980
850	5	4,250	57,135	41	900	36,900	94,035	.5264	.4736
950	2	1,900	59,035	39	1,000	39,000	98,035	.5488	.4512
1,120	8	8,960	67,995	31	1,300	40,300	108,295	.6062	.3938
1,390	4	5,560	73,555	27	1,500	40,500	114,055	.6384	.3616
1,760	12	21,120	94,675	15	2,000	30,000	124,675	.6979	.3021
2,350	8	18,800	113,475	7	3,000	21,000	134,475	.7527	.2473
3,620	2	7,240	120,715	5	5,000	25,000	145,715	.8157	.1843
5,690	1	5,690	126,405	4	6,000	24,000	150,405	.8419	.1581
9,080	2	18,160	144,565	2	10,000	20,000	164,565	.9212	.0788
17,040	2	34,080	178,645				178,645	1.0000	.0000
Total	2,202	(a) 178,645	1,453,810	..	..	776,505	2,230,315	..	..

Check— { Average Risk Premium = \$86.10
 Total Losses of Group = \$153,748
 Test—1,786.45 × 86.10 = 153,813

TABLE V-a
 PURE PREMIUM RATIOS FOR EXCESS INSURANCE PER LOSS RATIO.
 Table showing the Pure Premium Ratio—Ratio of Excess Cost to Total Cost—for Selected Loss Ratios, by Premium Group
 and by Industries.

Industry	Prem. Group*	No. of Risks	Selected Risk Loss Ratios											
			30%	50%	60%	70%	80%	100%	200%	500%	1000%	2000%	5000%	10000%
Manufacturing	\$10	1,045	.9511	.9204	.9061	.8929	.8803	.8567	.7588	.5558	.3707	.1997	.0034	.0157
	25	1,357	.9213	.8811	.8635	.8471	.8315	.8027	.6959	.5003	.3354	.1942	.1034	
	50	648	.9108	.8700	.8532	.8383	.8246	.7987	.6915	.4940	.3317	.1510		
	75	414	.8783	.8221	.7981	.7757	.7547	.7174	.5936	.3766	.1660	.0340		
	100	512	.8756	.8225	.8006	.7818	.7647	.7331	.6150	.4326	.2679	.0797		
	150	240	.8883	.8382	.8169	.7971	.7779	.7437	.6374	.4480	.2501	.0607		
	200	356	.7840	.6962	.6594	.6261	.5957	.5433	.3794	.1969	.0753			
	300	223	.8540	.7951	.7711	.7505	.7313	.6969	.5845	.3852	.2459	.1201		
	400	142	.7590	.6267	.5907	.5571	.5261	.4720	.3168	.1491	.0062			
	500	196	.8110	.7348	.7033	.6754	.6495	.6026	.4538	.2189	.0671			
	700	138	.5943	.4682	.4228	.3824	.3471	.2876	.1514	.0202				
1,000	..	..	..	..	..	..	..	..	..
Contracting	\$10	424	.9908	.9852	.9826	.9799	.9772	.9719	.9514	.9056	.8694	.8185	.6940	.5667
	25	1,468	.9631	.9418	.9323	.9232	.9144	.8973	.8265	.6817	.5341	.3724	.1723	.0276
	50	1,028	.9352	.9022	.8880	.8747	.8618	.8369	.7331	.5707	.4522	.3085	.1166	
	75	675	.9400	.9105	.8974	.8853	.8736	.8513	.7625	.6214	.4833	.3012	.1785	.1034
	100	772	.9341	.9013	.8868	.8738	.8620	.8412	.7644	.6219	.4845	.3105	.1185	
	150	535	.8935	.8476	.8289	.8123	.7977	.7723	.6841	.5183	.3639	.2196	.0572	
	200	579	.8604	.7996	.7729	.7479	.7245	.6818	.5370	.2793	.1153	.0266		
	300	358	.8948	.8492	.8294	.8111	.7940	.7621	.6293	.3804	.1554	.0495		
	400	203	.9168	.8789	.8645	.8515	.8395	.8175	.7255	.5625	.3888	.1931		
	500	223	.7882	.7132	.6820	.6527	.6260	.5786	.4110	.2304	.0994			
	700	182	.7855	.6985	.6649	.6356	.6114	.5742	.4489	.2129	.0661			
1,000	..	..	..	..	..	..	..	..	..

*Each group extends from the given limit to the next.

TABLE V-a—Continued

Industry	Prem. Group*	No. of Risks	Selected Risk Loss Ratios											
			30%	50%	60%	70%	80%	100%	200%	500%	1000%	2000%	5000%	10000%
Commercial	\$10	996	.9685	.9507	.9426	.9349	.9280	.9153	.8648	.7566	.6612	.5483	.3967	.2273
	25	1412	.9456	.9174	.9049	.8931	.8819	.8613	.7808	.6473	.5360	.4097	.2231	.0557
	50	769	.8959	.8476	.8261	.8065	.7886	.7554	.6340	.4080	.2629	.1345	.0140	
	75	495	.9371	.9077	.8945	.8821	.8703	.8488	.7672	.6011	.4598	.3089	.1760	
	100	599	.8904	.8409	.8193	.7998	.7817	.7474	.6328	.4619	.3341	.2212	.1149	
	150	296	.7686	.6826	.6454	.6122	.5825	.5302	.3571	.1358	.0151			
	200	309	.7818	.7080	.6782	.6523	.6291	.5859	.4498	.2535	.0965			
	300	157	.6575	.5310	.4799	.4347	.3953	.3308	.1173					
	400	80	.8008	.7290	.7007	.6723	.6449	.5921	.3966	.1039				
	500	79	.6063	.5213	.4899	.4586	.4273	.3669	.1790					
	700	59	.6029	.5048	.4761	.4569	.4402	.4115	.2871	.0239				
1,000	..	..	..	..	..	..	..	..	..	..
Care, Custody	\$10	515	.9856	.9775	.9737	.9700	.9664	.9592	.9317	.8664	.8066	.7415	.6130	.4680
	25	738	.9402	.9076	.8931	.8793	.8663	.8421	.7431	.5624	.3797	.2038	.0395	
	50	433	.9127	.8709	.8520	.8341	.8176	.7879	.6763	.4675	.3024	.1074		
	75	261	.9033	.8557	.8352	.8160	.7980	.7655	.6534	.5036	.3831	.2528	.0450	
	100	264	.8972	.8495	.8294	.8103	.7922	.7595	.6389	.3926	.2016	.0543		
	150	143	.8284	.7591	.7277	.6997	.6757	.6328	.4703	.2970	.1980	.0330		
	200	164	.8135	.7438	.7158	.6910	.6701	.6405	.5476	.3715	.2034	.0272		
	300	73	.7801	.7113	.6826	.6558	.6291	.5832	.4474	.2753	.0841			
	400	51	.8512	.7934	.7645	.7355	.7066	.6517	.4480	.0867				
	500	45	.8311	.7554	.7257	.7014	.6797	.6405	.5378	.3622	.1595			
	700	36	.7371	.6341	.5908	.5528	.5149	.4472	.1897					
1,000	..	..	..	..	..	..	..	..	..	..

*Each group extends from the given limit to the next.

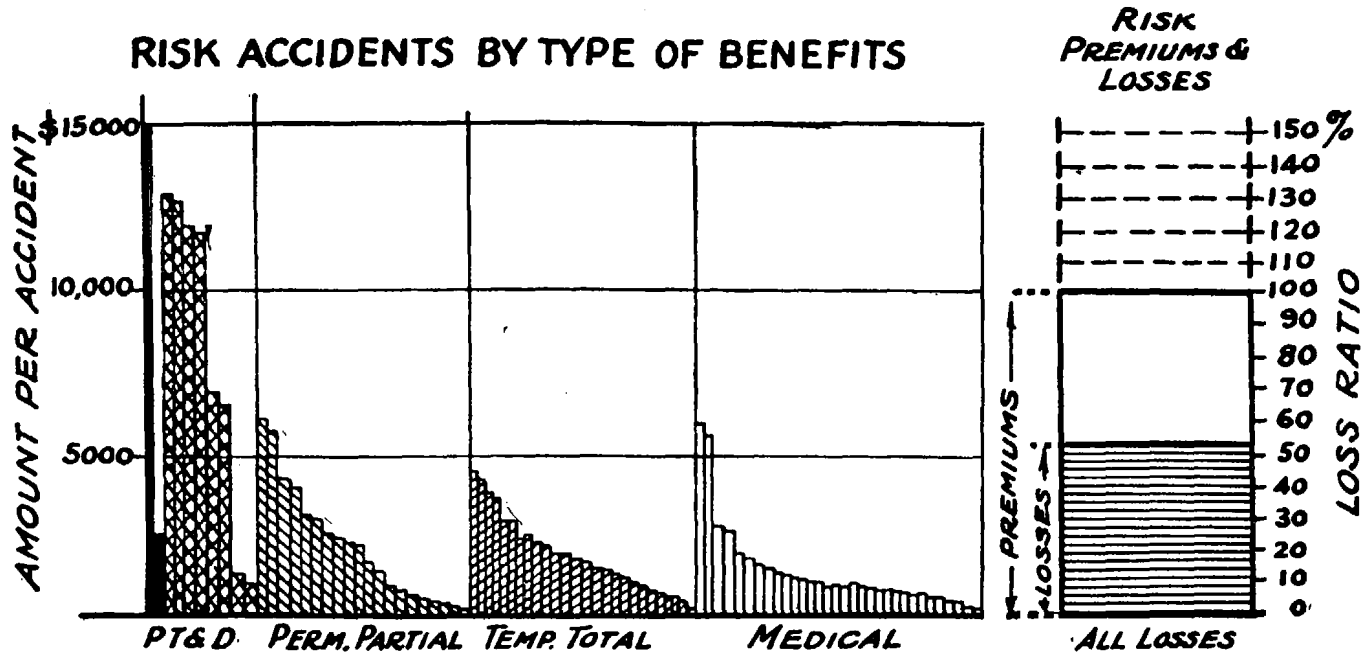


FIG. 1

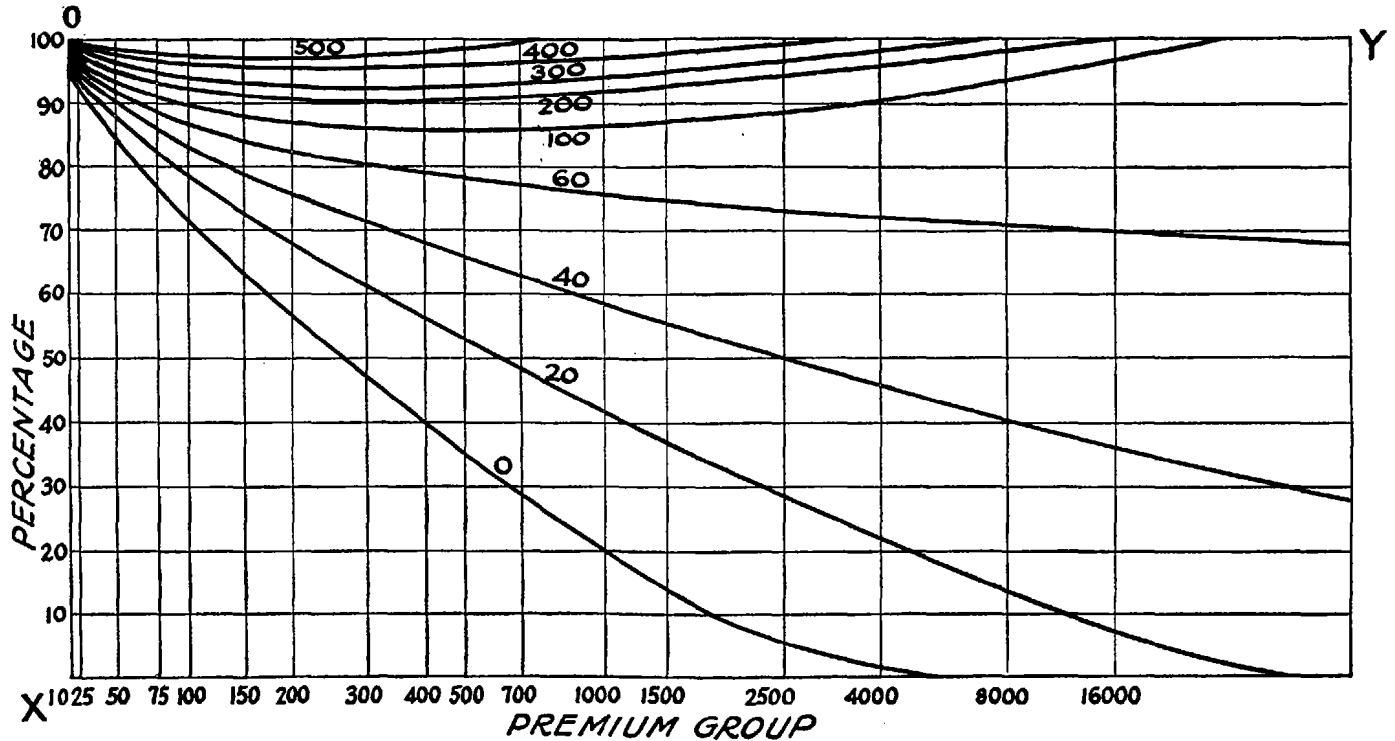
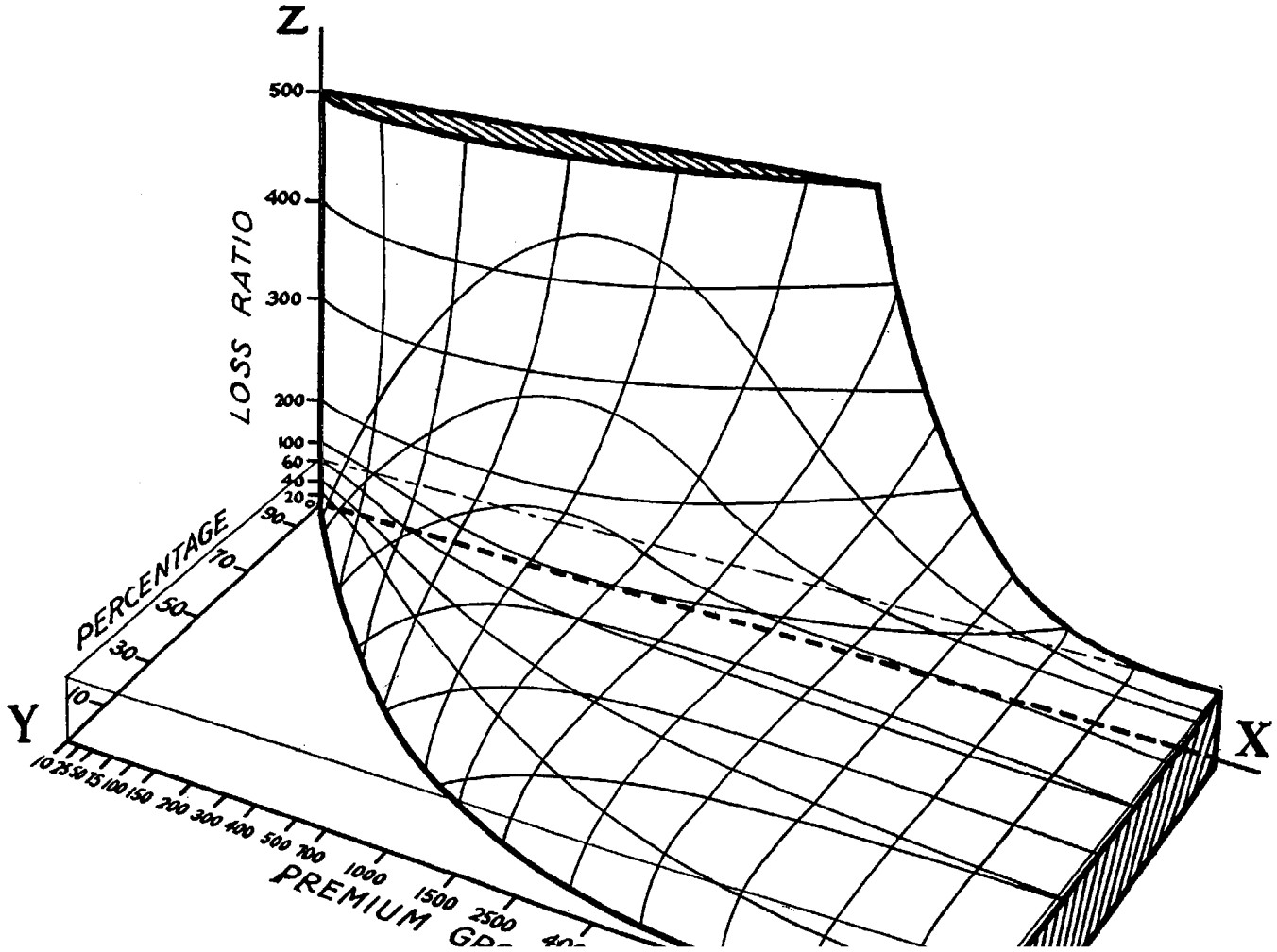


FIG. 2



HEALTH INSURANCE HAZARDS REFLECTED IN OCCUPATIONAL HEALTH LOSS RATIOS

BY

ARMAND SOMMER

Health insurance has been universally unprofitable to the commercial accident and health companies and we should take advantage of every opportunity to study and analyze the factors which enter into the high loss ratios. The Committee of Five on Statistics of the Bureau of Personal Accident and Health Underwriters has published an exhaustive report on the combined health experience of 24 of the largest companies for the years of 1921, 1922 and 1923. The report is based upon sufficient data to give an excellent indication of actual conditions, and as the underwriting theory and practice and policy provisions of all companies are essentially the same we may safely use this report as a basis for an inquiry into the make-up of severe health losses.

The report verifies the long recognized principle that health hazards increase with advanced age although there are some downward swings of the health curve around middle age. The larger weekly indemnity policies have been shown to be more disastrous which has been realized and countered by the companies restricting and scrutinizing the larger risks. The most interesting schedule is the one which gives the loss ratios by occupations and we are surprised at the great variance which clearly indicates that there are some fundamental underlying causes for the vast differences; further the variations are difficult to explain at first thought, from our preconceived ideas about health underwriting. However, before making an analysis or drawing any conclusions we must be certain that our data are homogeneous. Seven policy forms are included in the report as follows:

1. 52 weeks' limit, total disability only; full weekly indemnity irrespective of house confinement.
2. 52 weeks' limit, total disability with full weekly indemnity, irrespective of house confinement, and partial disability.
3. 52 weeks' limit, total disability only, full weekly indemnity while confined to house and reduced payment while not confined.
4. Life indemnity, total disability only, full weekly indemnity irrespective of house confinement.
5. Life indemnity, total disability with full weekly indemnity irrespective of house confinement, and partial disability.

6. Policies on which the first seven days of total disability are eliminated.

7. Policies on which the first fourteen days are eliminated.

We are not using forms 6 and 7 as the waiting period policies will reflect a selection favorable to the companies in that only the better risks will accept a waiting period unless there is undue company and resulting agency pressure. The elimination period is at the present time a panacea for the unsatisfactory health insurance condition and companies are insisting or demanding one or two weeks' "coinsurance," but in the years 1921, 1922 and 1923 the waiting period policy was merely an additional form of coverage offered by the companies and taken mostly by those risks who were physically and financially preparing protection against only the unforeseen and improbable lengthy disability. Forms 4 and 5 are not used as a few cases of prolonged disabilities would distort the experience. If sufficient exposure were obtained it would be preferable to take only one policy form but when our premiums are subdivided into occupations the exposure for many groups would be too small for dependability. We have therefore combined forms 1, 2, and 3 which, even though form 3 calls for house confinement, follow the same general trend.

The following table shows the combined loss ratios by occupations in descending order together with the exposure in thousands of earned premium for each occupation.

OCCUPATIONAL LOSS RATIOS

<i>Occupation</i>	<i>Earned Premium—</i>	
	<i>Thousands of Dollars</i>	<i>Loss Ratio</i>
Manufacturers, Miscellaneous.....	43	.790
Restaurant Proprietors.....	99	.768
Barbers.....	75	.744
Tailors.....	111	.731
Merchant Clerks, Confectionery.....	54	.722
Auto Dealers and Salesmen.....	277	.715
Clothing Manufacturers.....	115	.712
Clergymen.....	116	.690
Commission Merchants.....	97	.639
Merchant Clerks, Tobacco.....	68	.633
Merchant Clerks, Groceries.....	297	.625
Buyers.....	74	.624
Merchant Clerks, Light Goods.....	674	.622
Corporation Officers N. O. C.....	937	.621
Auto Garage Proprietors.....	66	.620
Physicians and Surgeons.....	1,042	.612
Real Estate Salesmen.....	395	.606
Merchant Clerks, Dry Goods.....	242	.601
Stationary Engineers.....	22	.591

OCCUPATIONAL LOSS RATIOS—Continued

Occupation	Earned Premium—	
	Thousands of Dollars	Loss Ratio
Postal Employees.....	39	.589
Traveling Salesmen.....	847	.587
Dentists.....	442	.583
Merchants, Wholesale.....	155	.580
Bakers, Manufacturers.....	57	.578
Merchant Clerks, Drugs.....	239	.577
Oil Wells, P. S. & F.....	56	.572
Sales Managers.....	143	.572
Drivers and Teamsters.....	98	.572
Brokers.....	287	.564
Merchant Clerks, Heavy Goods.....	135	.555
Farmers.....	140	.543
City and State Officials.....	30	.534
Actors, Movie.....	15	.533
Butchers and Fish Dealers.....	109	.531
Hotel Proprietors and Managers.....	68	.530
Auto Accessories, Manufacturers and Merchants	87	.529
Textile Manufacturers, Light.....	70	.528
Auto Garage Employees.....	38	.526
Plumbing, P. S. & F.....	79	.520
Office Clerks.....	1,852	.515
Musicians.....	78	.515
Mechanical Engineers.....	37	.514
Merchant Clerks, Furniture.....	97	.505
Newspaper Publishers.....	97	.504
Insurance Agents and Brokers.....	626	.504
Jewelers.....	125	.504
Miscellaneous Office.....	59	.491
Theater Proprietors and Managers.....	43	.487
Claim Agents.....	42	.475
Shipping Clerks.....	55	.474
Machine Shop, P. S. & F.....	65	.461
Printing.....	118	.457
Undertakers and Embalmers.....	57	.456
City Salesmen.....	33	.453
Lumber Yard Dealers.....	98	.450
Carpenter, Contractor.....	169	.449
Merchant Clerks, Hardware.....	83	.445
Merchant Clerks, Country Store.....	41	.439
Teachers.....	153	.431
Bankers.....	415	.429
Civil Engineers.....	120	.425
Iron and Steel Manufacturers.....	40	.425
Lawyers.....	669	.423
Actors, Not Movie.....	29	.414
Insurance Officers and Clerks.....	97	.413
Artists and Designers.....	49	.408
Opticians.....	36	.390
Electrical Employees, Inside.....	54	.370
Mining.....	38	.368
Architects.....	73	.343
Total Classified.....	*13,483	.554
Remaining Unclassified.....	2,470	.565
Grand Total.....	15,953	.566

P. S. & F. refers to Proprietors, Superintendents and Foremen.

*The total of our occupational exposure adds to 13,486 but the correct figure from the original data is 13,483, the difference being due to our taking the nearest \$1,000.00 instead of the nearest \$1.00. This has no effect on the ratios.

We are immediately impressed by the inconsistency of the loss ratios and we are convinced that there is some underwriting or physical foundation for these differences. If we can prove by experimentation that these variations follow a logical sequence as explained by our theories of underwriting, or if we can find that there is a sensible explanation for them, we shall feel less discouraged over the ultimate future of health insurance.

The factors which enter into morbidity rates by occupations could be considered from two angles, (1) the objective or physical health hazard presented by the duties of the occupation, and (2) the subjective or the characteristics of the individuals of the occupation combined with the influences which might have a bearing on the moral hazard of the individual. We might sub-divide according to the following outlines:

Objective

- Occupations which cause illness by exposure to disease.
- Occupations which prolong disease by exposure after returning to work.
- Occupations which prolong disability by inability to return to work.

Subjective

- Physical or racial characteristics of individuals making up the occupational group, which constitute a moral or physical hazard.
- Uncertain income or employment which consciously or unconsciously develops the moral hazard in times of low income or slack employment.

If we attempt to classify all occupations into these subdivisions, we must resolve the choice into little more than guesswork as most occupations are not capable of such refinement except in a negative way. However, there are some occupations which are materially affected by these factors and others which undoubtedly and emphatically are not influenced by these criteria. If we do not attempt to choose the occupations according to the degree of hazard, but merely divide them into negative, possible, or positive; that is

1. Those that are not affected by the hazard factors,
2. Those that may be affected by the hazard factors,
3. Those that are affected by the hazard factors,

we should empirically prove or disprove the correctness of our hazard theory. The following table shows division into these three groups under both the objective and subjective captions:

DIVISION OF OCCUPATIONS BY OBJECTIVE HAZARD		
Occupation	Earned Premiums (thousands of dollars)	Loss Ratios
<i>Group 1—</i>		
Office Clerks.....	1,852	.515
Miscellaneous Office.....	—	.491
Architects.....	—	.343
Artists and Designers.....	—	.408
Bankers.....	415	—
Insurance Agents.....	626	—
Insurance Officers.....	97	—
Lawyers.....	669	.423
Corporation Officers.....	937	.621
Teachers.....	153	.431
Real Estate Salesmen.....	395	.606
Totals.....	5,325	.511
<i>Group 2—</i>		
All Occupations not included in Groups 1 or 3.....	6,674	.576
<i>Group 3—</i>		
Dentists.....	442	.583
Physicians and Surgeons.....	1,042	.612
Totals.....	1,484	.603

DIVISION OF OCCUPATIONS BY SUBJECTIVE HAZARD		
Occupation	Earned Premiums (thousands of dollars)	Loss Ratios
<i>Group 1—</i>		
Corporation Officers.....	937	.621
Office Clerks.....	1,852	.515
Mechanical Engineers.....	37	.514
Miscellaneous Office.....	59	.491
Teachers.....	153	.431
Bankers.....	415	.429
Civil Engineers.....	120	.425
Insurance Officers.....	669	.423
Real Estate Salesmen.....	97	.413
Architects.....	73	.343
Totals.....	4,412	.504
<i>Group 2—</i>		
All Occupations not included in Groups 1 or 3.....	7,551	.560
<i>Group 3—</i>		
<i>a</i> Restaurant Proprietors.....	99	.768
<i>a</i> Barbers.....	75	.744
<i>a</i> Clothing Manufacturers.....	115	.712
<i>a</i> Merchant Clerks, Groceries.....	297	.625
<i>a</i> Merchant Clerks, Confectionery.....	54	.722
<i>a</i> Commission Merchants.....	97	.639
<i>a</i> Tailors.....	111	.731
<i>b</i> Real Estate Salesmen.....	395	.606
<i>b</i> Auto Dealers and Salesmen.....	277	.715
Totals.....	1,520	.671

a Racial or Physical. *b* Income or Employment.

The loss ratios by occupation have been oriented from a chaotic divergence to three groups whose ratios rise in order according to predetermined hazards as follows:

	<i>Objective</i>		<i>Subjective</i>	
	Earned Premium Exposure (thousands of dollars)	Loss Ratio	Earned Premium Exposure (thousands of dollars)	Loss Ratio
Group 1	5,325	.511	4,412	.504
Group 2	6,674	.576	7,551	.560
Group 3	1,484	.603	1,520	.671

We have arranged the data according to the two methods of testing the health risk of an employment and the results of each follow in approximately the same proportion. If we should combine the two methods, and if we had a greater spread and could accurately group the occupations, we could approach a smooth curve. We do not recommend that we participate a rating of health risks by occupation but we believe that the data has a trend toward showing that certain broad aspects of a particular occupation are a function of the health hazard of the employment. The attainment of uniformity in occupational loss ratios can better be brought about by the selection of the individual risks with the hazard factors strongly in mind rather than to attempt to re-rate an entire occupation; although some occupations should bear future analysis of complete statistics with the possibility of higher rating as a group.

The grouping in the table is of necessity arbitrarily made and solely the result of applying individual judgment to the factors involving the choice. There is no definite line of demarcation between any of the groups, especially between 1 and 2, and we have been further handicapped by the lack of finely divided and completely described occupations. If we had a truer picture of the duties and personnel of each we could more accurately allocate our occupations into groups. Also, there is the disadvantage of picking the subdivisions from an underwriter's point of view, for although we have tried conscientiously to choose with regard to the attributes of the occupations and individuals with the abstract ideas in mind, we have possibly exercised an unconscious selection toward

the desired result. However, we believe that the grouping has been essentially in accordance with the outline and that the results are at least an indication that the experience by occupations has followed a well defined course which does agree with the basic ideas of profitable selection of risks. Conversely we realize that if we very carefully apply the factors that enter into the high ratios of group three we may be successful in greatly reducing the total health losses. We are especially encouraged by the satisfactorily low rates of many occupations, nearly all of which are lacking entirely in the qualities which make up the higher losses of the more unprofitable occupations.

COMPULSORY AUTOMOBILE INSURANCE

BY

WILLIAM J. CONSTABLE

For his presidential address to the Casualty Actuarial Society at its meeting in May, 1926, President Michelbacher chose as his subject "Some Insurance Problems Incidental to Compulsory Automobile Insurance." This address was delivered before any of the problems had been faced and naturally enough he took a pessimistic view of the future. The Massachusetts law is now in effect and this paper has been written with the thought in mind that our members should know the work that has been accomplished. The paper is not technical but has been written to outline the requirements under the law, the work already done to meet these requirements and the preparations being made for the future.

The Massachusetts Legislature in 1925 passed the so-called Massachusetts Compulsory Motor Vehicle Insurance Law and the law was signed by the Governor on May 1, 1925. The law became applicable with the registration of motor vehicles or trailers for the year 1927 and requires that the owner of a motor vehicle or trailer, required to be registered in the Commonwealth of Massachusetts during 1927, must provide security for his liability to pay damages to others for bodily injuries including death at any time resulting therefrom in the amount of at least \$5,000 on account of injury to or death of any one person and, subject to such limit as respects injury to or death of one person, of at least \$10,000 on account of any one accident resulting in injury to or death of more than one person.

This security may be provided in any of the following ways:

1. By an insurance policy issued by an authorized company.
2. By a surety bond issued by an authorized company.
3. By depositing security with the Division of Highways in the amount of five thousand dollars.

The law places upon the Registry of Motor Vehicles the responsibility of seeing to it that the security is provided before registration plates are issued. No registration plates can be issued by the Registry unless the registration application is accompanied by "a certificate." This certificate is defined in the law as the certificate of an insurance company authorized to transact automobile public

liability insurance, stating that it has issued, to the applicant for registration of a motor vehicle or trailer, a motor vehicle liability policy which covers such motor vehicle or trailer as provided by law and runs for a period at least coterminous with that of such registration or has issued a binder pending the issue of a policy; or the certificate of a surety company that it has issued a bond or binder covering the requirements of the law; or the certificate of the Division of Highways stating that cash or security has been deposited with the Division as provided by law.

The certificate of an insurance company or of a surety company must be in a form prescribed by the Commissioner of Insurance and must state the rate at which and classification under which the motor vehicle liability policy or bond referred to thereon was written and must contain a certification by the company issuing the policy or acting as surety on the bond that the premium charged thereon is at the rate approved by the Commissioner of Insurance for that particular class of risk. A duplicate of this certificate must be filed with the Registry of Motor Vehicles by the company issuing the certificate within five (5) days thereafter.

These requirements pertain to the motor vehicle owner but I would point out that there are requirements in the law not only for the motor vehicle owner but also for the insurance company intending to write this line of insurance.

The law is a compulsory law. The motor vehicle owner is compelled by the law to provide security but on the other hand the insurance or bonding company is compelled to grant that security unless it can show satisfactory reason for not granting it. The law creates a Board of Appeal, consisting of the Commissioner of Insurance, the Registrar of Motor Vehicles and the Attorney-General of the Commonwealth or their representatives to whom appeal can be made. If a company declines to grant the required security or gives notice of intent to cancel, the motor vehicle owner may demand a hearing before this Board of Appeal and the company must show cause for its refusal to grant or its intent to cancel the security.

The law further provides that fifteen (15) days' notice of intent to cancel security must be given instead of the usual five (5) days' notice provided in the so-called Standard Policy. This provision was, of course, placed in the law to give an assured time to replace his security or have a hearing before the Board of Appeal.

In the fall of 1925 the Commissioner of Insurance suggested to the insurance companies that they voluntarily form an organization to assist him in carrying out the provisions of the Compulsory Law and in January, 1926, the companies organized "The Massachusetts Automobile Rating and Accident Prevention Bureau" whose jurisdiction is limited by its constitution to the "coverages defined in Chapter 346 of the Laws of 1925 of the Commonwealth of Massachusetts, and all acts amendatory thereof and supplementary thereto." Chapter 346 of the Laws of 1925 is the so-called "Motor Vehicle Liability Security Law."

The object of the Bureau as set forth in its constitution are as follows:

- (1) To cooperate with the Commissioner of Insurance of Massachusetts in carrying out the provisions of said Chapter 346 and of Chapter 345 of said laws, and all acts amendatory thereof and supplementary thereto.
- (2) To deal with the following activities:
 - (a) The collection and analysis of such statistical data as may be necessary for the purposes of the Automobile Bureau.
 - (b) The formulation of provisions for Motor Vehicle Liability policies and bonds and other forms required by law.
 - (c) The classification according to hazard of motor vehicles and trailers which are subject to the provisions of Chapters 345 and 346 of the Laws of 1925 and all acts amendatory thereof and supplementary thereto; the establishment of rules governing the writing of Public Liability insurance and the execution of bonds upon such motor vehicles and trailers.
 - (d) The determination, upon the basis of the combined experience of all carriers, of pure premiums for the various classes of such motor vehicles and trailers.
 - (e) The determination, upon the basis of the combined experience of stock companies, of expense loadings which shall be used for the purpose of converting the pure premiums for the several classes of motor vehicles and trailers into gross rates; it being understood that the stock company members shall determine the said amounts of expense loadings and that such expense loadings with all data pertaining thereto shall be furnished to the Governing Committee.

- (f) The development of a merit rating plan by means of which rates may be equitably adjusted to the hazard of individual risks.
- (g) The furnishing of merit rates to the Members of the Bureau.
- (h) The explanation, to every owner of a motor vehicle or trailer who may apply, of the rate for his risk including the method of its computation.
- (i) The encouragement of owners and operators of motor vehicles and trailers to reduce the number and severity of automobile accidents.
- (j) The stamping, if correct, of such documents as the Governing Committee may require Members to file with the Automobile Bureau on risks which are subject to merit rating.

Here then was the first Compulsory Automobile Insurance Law effective January 1, 1927, and a Bureau organized to deal with its problems. A Governing Committee was elected and at once selected sub-committees to begin the task of analyzing the requirements of the law and perfecting the necessary details for the insurance companies.

One committee attacked the problem of drawing up the certificate of the insurance or bonding company, the form of which was to be prescribed by the Commissioner of Insurance. The problem was not simple, for not only was it advisable to draw up the certificate so as to make as little work as possible for the insurance companies and their agents but also to make little trouble for the Registry of Motor Vehicles. There was also the problem of the duplicate certificate and, since each company would want a copy for their own records, provision had to be made for a triplicate. The problem was finally worked out with the cooperation of the Registry of Motor Vehicles by making the original certificate of insurance a part of the registration application. A copy of each side of the registration application is shown in Exhibit "A".

Next came the problem of policy form. The new law required a far different coverage than that granted by the so-called Standard Policy. The law required this security only for the operation, maintenance, control or use of the motor vehicle or trailer upon the "ways" of the Commonwealth. It did not require security while off the "ways" of the Commonwealth such as private grounds, inside garages or outside the limits of the Commonwealth. It

required that the policy grant security not only for the liability of the owner of the motor vehicles but also for any person responsible for the operation of the motor vehicle with his express or implied consent. This last provision practically made the policy grant security to anyone driving the motor vehicle unless the car had been stolen.

It was first proposed to prepare an endorsement to be attached to the standard policy, making the policy subject to the provisions of the Massachusetts law. This procedure is similar to the procedure under compensation laws where a standard policy plus a state endorsement constitutes the compensation policy for that particular state. Since the form of policy had to be approved by the Commissioner of Insurance, he was asked whether or not an endorsement to a standard policy would be satisfactory. The Commissioner of Insurance submitted the question to the Attorney-General who ruled that this procedure was not proper and that the Commissioner of Insurance could not legally approve such endorsement. This ruling forced the committee to draft a new policy form in its entirety which was finally approved for use by the companies. This policy is known as the "Massachusetts Statutory Policy." A copy of this form is attached in Exhibit "B".

The ruling of the Attorney-General that the basic policy must be a policy granting only Statutory coverage made it necessary to draft an endorsement for use when the assured desired coverage similar to that granted by the standard policy. Of course, the open coverage required in Massachusetts could not be given on the extra-territorial coverage so the restrictions of the standard policy had to be put back on the extra-territorial endorsement. A copy of this endorsement is shown in Exhibit "C".

Other endorsement forms were prepared such as Garage forms and Taxicab forms but these are not shown in the exhibits as the policy form and extra-territorial forms are far more important.

The new law made necessary not only new policy and endorsement forms but also required a new manual. A vast majority of the rules in the countrywide automobile manual could not be used at all and those that could be used had to be rewritten to conform to the requirements of the law. Under voluntary insurance the policy could be limited to certain conditions but no limitations are permissible under the compulsory law. For

example, under voluntary insurance a policy could be issued to an individual engaged in moving furniture and the coverage limited to the time he was so engaged. If he had an accident while engaged in a more hazardous business the company could deny liability. Under the compulsory law, however, such a limited form of policy is not permissible. The security must be available at all times and regardless of the classification on the policy the insurance company would be liable under its contract.

The law prescribes that the rates for any year must be available by September 1 of the preceding year. No rates could be made available until the manual with its rules and classifications was ready, so the first work after the policy form was completed was the preparation of the manual. This was completed in July and in August attention was given to the rates.

The duty of establishing rates for the first year of the law was placed upon the Commissioner of Insurance. In subsequent years he will be called upon to approve rates for each carrier but for the first year the law requires him to establish rates. Early in 1926 the insurance department, therefore, called for the experience of the insurance companies for policy years 1924 and 1925. This experience was made available to the Automobile Bureau and was reviewed by them and suggested rates furnished the Commissioner of Insurance.

The experience of policy year 1925 was incomplete and, of course, before it could be used had to be modified by a judgment factor. This modification was finally decided upon but the committee in reviewing the experience decided to use the 1924 pure premium indications as a base. These indications were those of the latest complete policy year available and it was felt advisable to rely on 1924 experience rather than to bring in the judgment factor necessary in modifying 1925 experience. The Massachusetts experience for Private Passenger and Commercial cars is shown in Exhibit "D" for Policy Years 1923, 1924 and 1925.

But the experience of policy year 1924 was the experience on cars voluntarily insured. Losses occurring off the "ways" of Massachusetts had been eliminated but the experience was not experience under a compulsory law. How should it be modified? That was the question for which an answer must be found. The experience for 1923, 1924 and 1925 showed an upward trend on private passenger cars but not so much of a trend on commercial cars. Should

this trend be recognized or not? Would the new law be more costly, assuming that the experience on the voluntarily insured cars was a correct sample of the entire group? If it would be more costly, how much so? Of course, these questions involved the use of judgment almost wholly and the Governing Committee of the Bureau spent many days in discussing these questions.

Finally, the Governing Committee after a careful analysis of the experience decided that their recommendation to the Commissioner of Insurance should be to modify the 1924 experience as follows:

PRIVATE PASSENGER CARS

1. To adopt the 1924 indications of \$16.75 and to add thereto 5% to recognize the upward trend.
2. To add to the selected pure premiums an amount of 15% for the effect of the new law.

COMMERCIAL CARS

1. To adopt the 1924 indications of \$27.57 with no increase for trend.
2. To add to the selected pure premiums an amount of 15% for the effect of the new law.

GARAGES

1. To adopt the 1924 indications of \$.63 with an increase of 5% to recognize the upward trend.
2. To add to the selected pure premiums an amount of 15% for the effect of the new law.

OTHER CLASSES

1. To adopt the pure premiums underlying the then existing rates.
2. To add to the selected pure premiums an amount of 15% for the effect of the new law.

The determination of differentials for the three classes of Private Passenger cars (W-X-Y) was a different problem. No modification of 1924 experience was needed to provide for the effect of the new law.

The differentials used in establishing the W, X and Y rates in the Manual prior to the compulsory law were as follows:

$$W - .852 \quad X - 1.053 \quad Y - 1.337$$

The differentials on the basis of various combinations of Massachusetts experience were:

Policy Years 1923-1924	W—.763	X—1.131	Y—1.360
1923-1924-1925	W—.775	X—1.115	Y—1.385
1923	W—.778	X—1.100	Y—1.359
1924	W—.774	X—1.150	Y—1.362
Frequency only	W—.851	X—1.061	Y—1.207

It was felt by the Governing Committee that since, in all probability, one of the reasons why W cars in the past showed a lower pure premium than Y cars was because the claimant realized that the W owner did not have the financial responsibility that the Y owner had, and the claimant was, therefore, willing to accept a smaller amount in settlement for his claim from the owner of a cheap car than he would from the owner of a more expensive car. This condition will not, in all probability, exist under the Massachusetts law, where it will be known that everyone carries insurance, to the same extent that it exists where insurance is voluntary. For this reason it was felt that the W, X and Y factors should be brought closer together than they have been in the past.

It was, therefore, voted to adopt the following differentials for Private Passenger cars.

W — .90 X — 1.05 Y — 1.20

On commercial cars effect of the financial responsibility of the owner was not so prominent as in the case of Private Passenger cars and the differentials indicated by the combined Massachusetts commercial car experience were adopted for Class 4. These were as follows:

CLASS 4 COMMERCIALS

Heavy 1.54 Medium 1.23 Light .83

These could further be justified because the differentials used in the rates prior to the compulsory law were:

Heavy 1.52 Medium 1.22 Light .80

The differentials for Class 3 and Class 2 commercials were continued as in the past because the experience in Massachusetts was too limited to warrant any change. These differentials are as follows:

CLASS 3 COMMERCIALS

Heavy 2.18 Medium 1.62 Light 1.23

CLASS 2 COMMERCIALS

Heavy 3.05 Medium 2.79 Light 2.28

Then came the problem of establishing territories and territorial differentials. Prior to the compulsory law there had been eight territories but the Governing Committee felt that this was entirely too many under a compulsory law and proposed that there be only three.

- (1) Boston as a metropolitan center.
- (2) Middle-sized cities.
- (3) Remainder of the commonwealth.

The proposed territorial differentials were the indicated differentials of the Massachusetts 1924 experience as follows:

PRIVATE PASSENGER CARS		
Terr. I — 1.289	Terr. II — .982	Terr. III — .712
COMMERCIAL CARS		
Terr. I — 1.687	Terr. II — .820	Terr. III — .473
OTHER CARS (SAME AS COMMERCIAL)		
Terr. I — 1.687	Terr. II — .820	Terr. III — .473

The constitution of the Bureau provides that the expense loading be determined by the stock companies based on their combined experience. The stock companies reported as agreed upon a total expense excluding acquisition of 23.5% for Private Passenger Commercial and Public Automobiles and 26.4% for Garages. These totals were divided up as follows:

EXPENSE LOADING (excluding acquisition)

	Private Passenger Commercial Public	Garages	Basis
1. Claim Expense.....	9.5%	9.5%	1925 N. Y. Casualty Exhibit. 1925 N. Y. Casualty Exhibit. Estimated N. Y. Casualty Exhibit shows .7 for Bureau and inspection.
2. General Administration	7.9	7.9	
3. Bureau.....	.1	.1	
4. (a) Inspection.....	1.0	Mass. only 2% on net premiums plus agents, fees, etc.
(b) Inspection and audit	....	3.9
5. Taxes.....	2.5	2.5	
6. Profit.....	2.5	2.5	
Total (excluding acquisition).....	23.5	26.4	

As stated above, the initial rates for compulsory automobile liability insurance by law had to be established by the Commissioner of Insurance and these rates were not filed for approval but were submitted to him for his consideration.

On September 1, 1927, the Commissioner of Insurance established the manual and rates as required.

The manual was established as submitted but the rates were modified from those submitted as follows:

PRIVATE PASSENGER CARS

1. 1924 indication—no allowance for trend.
2. Insurance department reduction of 5% from 1924 indication.
3. No provision for effect of law except in loading.

COMMERCIAL CARS

1. 1924 indication x .94*.
2. Insurance department reduction of 5% from 1924 indication.
3. No provision for effect of law except in loading.

TAXICABS

Judgment rate established by Insurance Department.

On the other miscellaneous classes reduction was made from the rates proposed by the Bureau but I will not go into the details on these unimportant classes.

The Private Passenger Car Class Differentials were modified as follows:

W — .85 X — 1.00 Y — 1.30

The Commercial Class Differentials and the Territorial Differentials as submitted were used by the department.

In arriving at gross rates the department used a total expense loading of 40.2 for all classes. This loading was divided as follows:

Claim Expense.....	10.4%
Administration.....	8.7
Bureau.....	.1
Inspection.....	1.0
Taxes.....	2.5
Profit.....	2.5
Acquisition.....	15.0
	<hr/>
	40.2%

Instead of allowing the 15% increase for the effect of the new law as proposed by the Governing Committee, the Commissioner

*Ratio 1923 Countrywide experience Class 4 Commercial Cars to 1923 countrywide experience all commercial cars.

of Insurance increased by 10% the amounts proposed as an expense loading for Claim Expense and General Administration.

By this time the details had all been settled so that the carriers could proceed to write the business, the policy form and endorsement forms had been sent to the companies for printing, the manual and rates established and the registration applications with the required certificates available. It was now time to prepare for the future so the Actuarial Committee began work on a Statistical Plan.

Since the law required that rates for any year must be available by September 1 of the preceding year the situation was made doubly hard, for it forced the companies to file their data in such form as to provide for the determination of the earned premium in the middle of the year. We could not wait for a completed year but must have something ready for September 1, 1927. After considerable work the Massachusetts Automobile Liability Statistical Plan was established by the Commissioner of Insurance and provided for the reporting of experience to the Bureau on punch cards. Sample of the premium and loss cards are shown in Exhibit "E". In addition to filing punch cards showing premium and loss experience to be used as a basis of rates, the plan also requires a hand written report of each claim to be used as a basis of accident prevention work. A copy of this card is shown in Exhibit "F". I will not go into the details of this Plan at this time for my intention is simply to show the problems which have been met and the plans that have been laid for the future.

I have roughly outlined up to this point the problems of getting started and preparing for the future. I have not attempted to go into great detail, for the obvious reason that a paper could be written on a dozen different points and the purpose of this paper is not to discuss any particular point but to give a general outline of the course pursued.

When Mr. Michelbacher presented his address he pointed out several dangers which lay ahead as he saw them and criticised the law in many respects. As I pointed out in the opening paragraph, his criticism was made before the problems had been faced. But some criticisms have been made since the problems have been faced.

The first and most general criticism is that the law has no "teeth". The claim is made that an automobile owner can pur-

chase an insurance policy and there is no penalty for accidents. But there is. The "teeth" in the law are in the records which the insurance companies will keep. If the automobile owner has a bad record the company can refuse to insure the car for the following year and can produce the accident record before the Board of Appeal.

But the Board of Appeal has been criticised by some insurance companies and I believe unjustly. Up to April 1 there had been 31 cases before the Board and of these only 2 had been decided in favor of the insurance company. Before passing judgment on the Board's action, let us analyze the situation. The Commissioner of Insurance refused to allow experience rating under the Compulsory law. His ground for this refusal was that experience under a voluntary law was not comparable to experience under a compulsory law. His argument was that experience would change when an automobile owner knew that a sword, in the form of the possibility of not being able to purchase insurance, was constantly hanging over his head. Now whether or not such a premise is correct at least the Commissioner of Insurance has been consistent in his refusal to allow an accident record under voluntary insurance which was considered bad by an insurance company, to be used as the only excuse for declining to write a risk under the compulsory law.

In addition a great many of the cases presented before the Board of Appeal should never have been presented. The insurance companies may not like the Compulsory law but it is a law and the companies must modify their views to meet its conditions. Some companies have gone before the Board because of their refusal to write taxicab risks. They have argued before the Board that in all the period of their existence they have never written a taxicab risk, that they consider them very bad risks and, therefore, do not want to write them. Who can blame the Board of Appeal for refusing to allow the company to decline the risk? Perhaps in the life of the company no taxicab had ever been written but for that matter neither had there ever been a compulsory law before.

The Board of Appeal are honest. They are trying their best to do a difficult job to the satisfaction of all and it cannot be done. But they are giving their best thought and judgment in each case and if an insurance company can present a satisfactory cause for refusing to grant security the company will be upheld. As experi-

ence records under the Compulsory law become available they can be used to advantage and the Board will admit them a full value but will discount experience records under voluntary insurance.

Some criticism arose among the people of Massachusetts on the question of territorial divisions. This question naturally divides itself into two questions: (1) the principle of territorial divisions and (2) the assignment of division lines. No one questioned or argued against the principle. The argument came on whether or not one town should be in Territory I or Territory II. An amendment to the law was introduced in the Legislature this year which would have prohibited the Commissioner of Insurance from establishing territorial divisions but was defeated overwhelmingly.

A great many changes were proposed before the Legislature but only one amendment passed. This changed the provision in the law which required the filing of a duplicate certificate with the Registry of Motor Vehicles within five days after the signing of the original. This provision was inserted in the original law as a check against forgery. The Registry required that these duplicates be forwarded in a special blue envelope and it was hoped that they could be checked against the originals. The checking proved impossible because of the number of duplicates filed for which no original was ever presented. Some insurance companies in their effort to retain the business already on their books sent signed certificates to all their policy holders prior to January 1 and in accordance with the law sent the duplicate to the Registry within five days. A great many of these automobile owners decided not to register their cars on January 1 or else decided to change companies so that the Registry had thousands of duplicates for which no original was filed. The change in the law provides that the Registry shall notify the insurance company when registration plates are issued on a certificate signed by them. This will be much more satisfactory and will more certainly prevent forgery. Each company will know when registration plates are issued on which it is providing security and will also know the registration plate number which will be of material assistance if cancellation is subsequently made.

Compulsory automobile insurance is in its first stages. Problems are springing up every day. No one can foretell the end. Laws similar to the Massachusetts law were introduced in many states during 1927 and in most cases were defeated with the avowed

intention of watching Massachusetts. It is too early to quote figures or draw conclusions from the experience under the law in Massachusetts. But this much can be said—all interested parties in Massachusetts are working together to make the law work. The insurance companies have given and received the utmost cooperation from the Commissioner of Insurance and the Registry of Motor Vehicles and little trouble has been encountered in working out the details required by the law.

Whether or not accidents will decrease remains to be seen. I have more faith in human nature than those who claim that accidents will increase because of the compulsory law. The primary purpose of the Massachusetts law was to compel the owner of a motor vehicle to provide security for claims due to the ownership of the motor vehicle. This purpose has been accomplished. The secondary purpose, of course, was to prevent accidents. Up to date, in all probability, this has not been accomplished but with the development of records by the companies I feel that we can reduce the appalling economic loss caused by automobiles by driving off the highways of Massachusetts the reckless and incompetent operator.

EXHIBIT "A"

REGISTRY OF MOTOR VEHICLES
Commonwealth of Massachusetts

To the Registrar of Motor Vehicles, Commonwealth of Massachusetts
State House, Room 100, 100 State Street, Boston, Massachusetts 02133

Name _____
Address _____
City _____
State _____
Zip _____

Make _____
Model _____
Year _____
Color _____
Type _____

Serial No. _____
Plate No. _____

By _____
Auditorial Representative

REGISTRY OF MOTOR VEHICLES
Commonwealth of Massachusetts

To the Registrar of Motor Vehicles, Commonwealth of Massachusetts
State House, Room 100, 100 State Street, Boston, Massachusetts 02133

Name _____
Address _____
City _____
State _____
Zip _____

Make _____
Model _____
Year _____
Color _____
Type _____

Serial No. _____
Plate No. _____

REGISTRATION APPLICATION

1. Make _____
2. Type _____
3. Motor Number _____
4. Year of Model _____
5. If Automobile: Number of Cylinders _____, Bore or Diameter _____, Stroke _____, Weight _____, Total weight _____
6. From whom did you purchase the vehicle?
7. Was vehicle registered by you last year? _____
8. Have you number plates available for assignment to the motor vehicle described in this application as a result of the sale or transfer of ownership of a motor vehicle? _____

REGISTRATION APPLICATION

1. Make _____
2. Type _____
3. Motor Number _____
4. Year of Model _____
5. If Automobile: Number of Cylinders _____, Bore or Diameter _____, Stroke _____, Weight _____, Total weight _____
6. From whom did you purchase the vehicle?
7. Was vehicle registered by you last year? _____
8. Have you number plates available for assignment to the motor vehicle described in this application as a result of the sale or transfer of ownership of a motor vehicle? _____

REGISTRY OF MOTOR VEHICLES
Commonwealth of Massachusetts

To the Registrar of Motor Vehicles, Commonwealth of Massachusetts
State House, Room 100, 100 State Street, Boston, Massachusetts 02133

Name _____
Address _____
City _____
State _____
Zip _____

Make _____
Model _____
Year _____
Color _____
Type _____

Serial No. _____
Plate No. _____

REGISTRATION APPLICATION

1. Make _____
2. Type _____
3. Motor Number _____
4. Year of Model _____
5. If Automobile: Number of Cylinders _____, Bore or Diameter _____, Stroke _____, Weight _____, Total weight _____
6. From whom did you purchase the vehicle?
7. Was vehicle registered by you last year? _____
8. Have you number plates available for assignment to the motor vehicle described in this application as a result of the sale or transfer of ownership of a motor vehicle? _____

TRIPPLICATE CERTIFICATE
To be retained by Insurance Company

Name _____
Address _____
City _____
State _____
Zip _____

Make _____
Model _____
Year _____
Color _____
Type _____

Serial No. _____
Plate No. _____

By _____
Auditorial Representative

DUPLICATE CERTIFICATE
To be filed by Insurance Company with Registrar

Name _____
Address _____
City _____
State _____
Zip _____

Make _____
Model _____
Year _____
Color _____
Type _____

Serial No. _____
Plate No. _____

By _____
Auditorial Representative

CERTIFICATE OF INSURANCE
To be filed up by Insurance Company

Name _____
Address _____
City _____
State _____
Zip _____

Make _____
Model _____
Year _____
Color _____
Type _____

Serial No. _____
Plate No. _____

By _____
Auditorial Representative

9. Is this vehicle owned by you individually? (Answer Yes or No.) _____
10. Or is it owned jointly or by a Co-partnership, Association or Corporation? _____
11. If owned jointly or by a concern write the name and address: _____
12. Massachusetts residential address. (If non-resident, give legal address.) _____
13. Mail address in full: _____
14. If a motor vehicle is to be registered in the name of a concern, the name of the concern should be signed on the application, and below it should be written the word "By" and the signature of the person filing the application. If a motor vehicle is owned by two individuals, each should write his signature at the end of the application.
15. Check or affirmation is hereby required in the month of all statements submitted in this application.
I, the undersigned, the owner of the motor vehicle herein described, hereby apply for registration of said vehicle, and affirm that the statements herein are true to the best of my knowledge and belief subject to the penalties of perjury.

Sign your name in full _____
Print last name _____

APPLICANT MUST WRITE NAME AND MAIL ADDRESS LEGIBLY:

OWNER'S NAME AND ADDRESS

Name _____
Address _____
City _____
State _____
Zip _____

EXHIBIT "B"

MASSACHUSETTS MOTOR VEHICLE LIABILITY POLICY

The.....Company
 (Hereinafter called the Company)

INSURING CLAUSE

In accordance with the provisions of Chapter 346 of the Acts of 1925 of the Commonwealth of Massachusetts, and all acts amendatory thereof and supplementary thereto, in consideration of the premium set forth herein, hereby agrees to indemnify the Assured named in the declarations hereby made a part hereof and any person responsible for the operation of the named Assured's motor vehicle or trailer described herein with his express or implied consent against loss by reason of the liability to pay damages to others for bodily injuries, including death at any time resulting therefrom, sustained during the term of this policy by any person other than employees of the Assured or of such other person responsible as aforesaid who are entitled to payments or benefits under the provisions of Chapter 152 of the General Laws of said Commonwealth and arising out of the ownership, operation, maintenance, control or use upon the ways of said Commonwealth of such motor vehicle or trailer to the amount or limit of five thousand dollars (\$5,000) on account of injury to or death of any one person, and, subject to such limit as respects injury to or death of one person, of ten thousand dollars (\$10,000) on account of any one accident resulting in injury to or death of more than one person.

STATUTORY PROVISIONS

I. LEGAL REFERENCE

(a) This policy is subject to the provisions of Sections 112 and 113 of Chapter 175 of the General Laws of the Commonwealth of Massachusetts as respects both the owner of a motor vehicle or trailer insured hereunder and any person responsible for its operation with the express or implied consent of such owner.

(b) This policy, the written application therefor, if any, and any rider or endorsement, which shall not conflict with the provisions of Chapter 346 of the Acts of 1925, and all acts amendatory thereof and supplementary thereto, and/or Section 34A of Chapter 90 of the General Laws constitutes the entire contract between the Company and the Assured as respects the motor vehicle or trailer herein described.

(c) No statement made by the Assured or on his behalf and no violation of the terms of this policy shall operate to defeat or avoid this policy so as to bar recovery within the limit provided in this policy by a judgment creditor proceeding under the provisions of Section 113 of Chapter 175 and clause 10 of Section 3 of Chapter 214 of the General Laws.

2. INSOLVENCY OR DEATH

If the death, insolvency or bankruptcy of the Assured shall occur within the policy period, the policy during the unexpired portion of such period shall cover the legal representatives of the Assured.

3. CANCELATION

This policy may be canceled by the company or by the named Assured by written notice stating the date and hour thereafter when such cancelation shall be effective; such notice shall be given by the party proposing cancelation to the other party at least fifteen (15) days prior to the intended effective date thereof and, except when said effective date is the date of expiration of the period of registration of the motor vehicle or trailer covered by this policy, to the Registrar of Motor Vehicles of said Commonwealth, in such form as the Division of Highways of said Commonwealth may prescribe, at least fifteen (15) days prior to said effective date and in the event of a cancelation by the named Assured he shall be entitled to receive a return premium after deducting the customary monthly short rates for the time this policy shall have been in force, in accordance with the Table printed hereon, or, in the event of cancelation by the company, shall be entitled to receive a return premium pro rata.

If after such cancelation by the Company, a finding that such cancelation is not proper and reasonable, is made under General Laws, Chapter 157, Section 113 D, either by the Board of Appeal from which finding the Company takes no appeal, or by the Superior Court, the Company will in the first case within ten (10) days and in the second case within five (5) days, comply with said finding and reinstate the policy.

Notice of cancelation sent by registered mail to, or delivered at, the address of the named Assured as given in the Declarations shall be a sufficient notice. The check of the Company, or its duly authorized representative, mailed to, or delivered at such address shall be a sufficient tender of any unearned premium, when determined, but no tender shall be required, if the premium has not been paid.

AGREEMENTS

I. EXPENSES INCURRED

The Company agrees to pay all expenses incurred by the Company for investigation, negotiation for settlement, and/or defense of any claims for such injuries and of suits or legal proceedings arising therefrom; the expense incurred by the Assured for such immediate medical or surgical relief as shall be imperative at the time any such injuries are sustained; all premiums on attachment and/or appeal bonds required in any such proceedings; all costs taxed against the Assured in any such proceedings; and all interest accruing before or after entry of judgment and up to the

date of payment, tender or deposit in Court by the Company of its share of any judgment.

II. DEFENSE

The Company agrees to defend as in this Policy provided, or at the option of the Company to settle, in the name and on behalf of the Assured any claims, suits or other legal proceedings alleging such injuries and demanding damages on account thereof, although such claims, suits, legal proceedings, allegations and demands are wholly groundless, false or fraudulent.

III. PERSONS COVERED

The unqualified term "Assured" whenever used in this Policy shall include in each instance not only the named Assured but also any other person, firm or corporation entitled to protection under the Agreements, Conditions and Declarations of this Policy, and under the provisions of Chapter 346 of the Acts of 1925 of the Commonwealth of Massachusetts and all Acts amendatory thereof and supplementary thereto, but the qualified term "named Assured" or "Assured named in the Declarations" shall apply only to the Assured named and described as such in the Declarations.

IV. EXCLUSIONS

This Policy shall *NOT* cover:

- (a) Injuries or death arising out of the ownership, operation, maintenance, control or use of the motor vehicle or trailer described herein, elsewhere than upon the ways of the Commonwealth of Massachusetts.
- (b) Injuries or death to any employee of the Assured who is entitled to payments or benefits under the provisions of Chapter 152 of the General Laws of the Commonwealth of Massachusetts.

GENERAL CONDITIONS

The foregoing Agreements are subject to the following conditions:

A. PREMIUM

The premium for this Policy is as expressed in the Declarations.

B. NOTICE TO THE COMPANY

Upon the occurrence of death or personal injuries or any accident covered by this Policy, the Assured shall as soon as practicable after learning thereof, give written notice with full particulars to the Company or its duly authorized Agent. The Assured shall give like notice of any claim made on account of any such occurrence. If any suit or other legal proceeding mentioned in Agreement II is instituted against the Assured on account of any such occur-

rence, the Assured shall immediately forward to the Company or its duly authorized Agent every notice, summons, or other process served upon the Assured.

C. CO-OPERATION

The Assured, when requested by the Company, shall aid in effecting settlements, in securing evidence and the attendance of witnesses, in defending suits, and in prosecuting appeals, and shall at all times render to the Company all co-operation and assistance in the Assured's power. The Assured shall not voluntarily assume any liability, settle any claim or incur any expense, except at the Assured's own cost, or interfere in any negotiation for settlement or legal proceeding, without the consent of the Company previously given in writing, but the Assured may provide, at the expense of the Company, such immediate medical or surgical relief as shall be imperative at the time any such injuries are sustained.

D. SUBROGATION

The Company shall be subrogated in case of any payment under this Policy, to the extent of such payment, to all rights of recovery therefor of the Assured and/or of any other person claiming hereunder, against persons, corporations, associations or estates, and the Assured and/or any other person claiming hereunder shall execute all papers required and shall co-operate with the Company to secure its rights.

E. OTHER INSURANCE

If the Assured has any other liability insurance applicable to a claim covered by this policy and issued by a company authorized to transact casualty insurance in the Commonwealth of Massachusetts, the Company shall not be obliged to indemnify the Assured or pay to a judgment creditor or claimant a larger proportion of or on account of any such claim than the limit of the Company's liability under this Policy, applicable to such claim, bears to the total corresponding limits of the whole amount of such valid and collectible insurance.

F. RIGHT OF RECOVERY

No recovery against the Company by the Assured shall be had hereunder until the amount of loss or expense shall have been finally determined either by judgment against the Assured after actual trial or by written agreement of the Assured, the Claimant and the Company, nor in any event unless suit is instituted within two years thereafter.

G. CHANGES IN POLICY

No Agreement or Condition of this Policy shall be waived or altered except by an endorsement attached hereto, signed by

(proper company official) nor shall notice to any Agent, nor shall knowledge possessed by any Agent, or by any other person, be held to effect the waiver of, or a change in any part of this Policy. Changes in the written portions of the Declarations made a part hereof may be made by an endorsement attached hereto, countersigned by the authorized representative countersigning this Policy. Endorsements, when so countersigned and attached hereto, shall be construed as a part of this Policy.

H. RATE CHANGES

This Policy is issued by the Company and accepted by the named Assured with the agreement that the classifications and rates of premium expressed in the Policy or any endorsement attached thereto, are subject to modification to the extent that they are approved and required by the Commissioner of Insurance in accordance with the law, and become applicable from and after the date required by said Commissioner.

I. REIMBURSEMENT

The named Assured by the acceptance of this Policy declares the several statements in the Declarations hereby made a part hereof to be true; agrees to the several provisions and conditions hereof; in consideration of the several agreements of the Company, agrees to reimburse the Company for any losses or payments the Company suffers or makes by reason of the provisions of said Policy provided any statements made in the Declarations are to the named Assured known to be false, or any terms or conditions of the Policy are violated by the Assured.

J. INSPECTION

The Company shall be permitted to inspect any motor vehicle or trailer described herein if it so desires, but the company assumes no responsibility by reason of any such inspection or the omission thereof.

IN WITNESS WHEREOF, the Company has caused this Policy to be executed by its (proper company official) but this policy shall not be binding upon the Company unless countersigned by a duly authorized representative of the Company.

(COMPANY SIGNATURE)
by.....

Countersigned at.....
this day of 192
.....
Authorized Representative

DECLARATIONS

- ITEM 1. Named Assured
- ITEM 2. Address.....
 No. Street City or Town County State
- ITEM 3. The named Assured is
 State whether individual, copartnership,
 corporation, receiver or trustee
- ITEM 4. Named Assured's occupation or business is.....
- ITEM 5. The Policy period shall be from 12.01 o'clock A.M.
 , 19....., to 12.01 o'clock A.M.,
 , 19....., Standard time.
- ITEM 6. The motor vehicles and/or trailers covered hereby are
 principally garaged in the city or town of.....
- ITEM 7. The motor vehicles and/or trailers covered by this
 Policy and the Premium charges therefor are as follows:

Trade Name, Type of Body, and Num- ber of Cylinders	Model and Year	Engine Number	Serial Number	Load Capacity (if Truck)	Seating Capacity (if Bus)	Premium	
						Total Premium \$	

- ITEM 8. The purposes for which the above described motor
 vehicles and/or trailers are to be used are:
- ITEM 9. None of the motor vehicles and/or trailers herein described
 is or will be rented to others or used to carry passengers
 for a consideration during the period of this Policy,
 except as follows:
- ITEM 10. No Company has declined to issue or has canceled motor
 vehicle liability insurance for the Named Assured during
 the past three years, except as follows:

SHORT RATE TABLE

If Policy was written for ONE year and has been in force any
 number of days or months indicated in the left hand column

of the table the Company may retain from the annual premium the percentage thereof indicated in the right hand column:

Number of days or months	Percentage
15 days.....	14
16 days.....	14
17 days.....	15
18 days.....	16
19 days.....	16
20 days.....	17
21 to 25 days.....	19
26 to 30 days or 1 month.....	20
31 to 35 days.....	23
36 to 40 days.....	26
41 to 45 days.....	27
46 to 50 days.....	28
51 to 55 days.....	29
56 to 60 days or 2 months.....	30
61 to 65 days.....	33
66 to 70 days.....	36
71 to 75 days.....	37
76 to 80 days.....	38
81 to 85 days.....	39
86 to 90 days or 3 months.....	40
91 to 105 days.....	45
106 to 120 days or 4 months.....	50
121 to 135 days.....	55
136 to 150 days or 5 months.....	60
151 to 165 days.....	65
166 to 180 days or 6 months.....	70
181 to 195 days.....	73
196 to 210 days or 7 months.....	75
211 to 225 days.....	78
226 to 240 days or 8 months.....	80
241 to 255 days.....	83
256 to 270 days or 9 months.....	85
271 to 285 days.....	88
286 to 300 days or 10 months.....	90
301 to 315 days.....	93
316 to 330 days or 11 months.....	95
331 to 360 days or 12 months.....	100

EXHIBIT "C"

Form.....
 Company

EXTRA-TERRITORIAL COVERAGE ENDORSEMENT

It is hereby understood and agreed, in consideration of the additional premium stated below that the policy to which this endorsement is attached is extended to indemnify the named

Assured against loss by reason of his legal liability to pay damages to others for bodily injuries, including death at any time resulting therefrom, accidentally sustained during the term of this policy by any person or persons not hereinafter excluded, arising out of the ownership, operation, maintenance, control or use of the motor vehicle or trailer described in the policy within the limits of the Continental United States of America and the Dominion of Canada elsewhere than upon the ways of the Commonwealth of Massachusetts.

It is a condition of this endorsement as respects the coverage provided herein that Statutory Provisions, Section I (Legal Reference Clauses) 1a, 1b and 1c and Agreements III (Persons Covered) and IV (Exclusions) and General Condition I (Reimbursement) shall be null and void.

OMNIBUS COVERAGE

The terms and conditions of this endorsement are so extended as to be available, in the same manner and under the same conditions as they are available to the named Assured, to any person or persons while riding in or legally operating any of the motor vehicles or trailers described in the declarations, and to any person, firm or corporation legally responsible for the operation thereof, provided such use or operation is with the permission of the named Assured or, if the named Assured is an individual, with the permission of an adult member of the named Assured's household other than a chauffeur or a domestic servant; except that the terms and conditions of this paragraph shall not be available to any public automobile, garage, repair shop, sales agency, service station, or the agents and employees thereof.

CANCELATION

This endorsement may be canceled at any time by either the named Assured or by the Company upon fifteen (15) days' written notice to the other party and the effective date of such cancellation shall then become the end of the period for the coverage provided by this endorsement. If such cancellation is at the request of the named Assured the Company shall be entitled to an earned premium adjusted according to the short rate table shown on the policy. If such cancellation is at the Company's request the earned premium shall be computed and adjusted on the pro rata basis. Notice of cancellation mailed to or delivered at the address of the named Assured as given in the declaration on the policy shall be a sufficient notice. The check of the company mailed to, or delivered at such address shall be a sufficient tender of any unearned premium when determined but no tender shall be required if the premium has not been paid.

SPECIAL STATUTES

If any of the Agreements, Conditions or Declarations of this endorsement are at variance with any specific statutory provisions in force in any State, Territory, District or Province within which coverage is granted, such specific statutory provisions shall supersede any such Agreement, Condition or Declaration of this endorsement inconsistent therewith.

EXCLUSIONS

This endorsement shall not cover:

- (a) when any of the said motor vehicles or trailers are being
 - (1) operated by any person contrary to law as to age, or any person under the age of sixteen (16) years in any event; or
 - (2) used in any race or speed contest; or
 - (3) used in towing or propelling any trailer, or other vehicle used as a trailer, unless such privilege is endorsed on this policy and a proper premium charged therefor, or such trailer is also insured by the Company; or
 - (4) used for renting or livery use or the carrying of passengers for a consideration; or
- (b) personal injuries or death to any employee under any Workmen's Compensation Agreement, Plan or Law or while engaged in any business or occupation of the Assured or in the operation, maintenance or repair of any automobile described in this policy.

ADDITIONAL PREMIUM \$

This endorsement is effective from 12.01 A.M.,, 192, to the date of expiration as expressed in this policy.

Nothing herein contained shall waive, vary, alter or extend any provision or condition of the policy other than as above stated.

Attached to and forming part of Policy No.
issued by the Company, of
to of

Dated at this day of 192

(Company (Company
Official) Official)

Countersigned
Authorized Representative

EXHIBIT "D"

Massachusetts Automobile Public Liability Experience
PRIVATE PASSENGER AUTOMOBILE—BY CLASSIFICATIONS

Aug. 3, 1926

Class	No. of Cars Earned			Claim Frequency			Average Claim Cost			Pure Premium			
	1923	1924	1925	1923	1924	1925	1923	1924	1925	1923	1924	1925	
W	66,224.0	73,490.0	46,416.0	5.4	5.4	6.0	233	230	238	12.65	12.45	14.34	.....
X	51,338.0	62,911.0	44,710.0	6.4	6.6	7.7	277	290	253	17.78	19.26	19.57	.....
Y	19,530.0	21,708.0	14,606.0	7.5	7.7	9.3	300	316	282	22.34	24.18	26.30	.....
Z	4,512.0	4,286.0	2,082.0	6.6	4.9	6.6	296	321	404	19.64	15.89	26.57	.....
Y-Z	24,042.0	25,994.0	16,688.0	7.3	7.2	9.0	299	316	293	21.84	22.81	26.34	.....
Total	141,603.0	162,395.0	107,814.0	6.1	6.2	7.2	263	271	255	16.07	16.75	18.37	.....

PRIVATE PASSENGER AUTOMOBILES—TERRITORIES

New Terr.	Old Terr.													
I	4	38,236.0	42,739.0	27,295.0	9.3	9.6	11.3	259	244	229	23.96	23.41	25.81	23.60
							8.8			10.0			245		229	21.60
II	5	.....	11,448.0	7,078.0	...	5.8	6.6	...	254	229	.....	14.82	15.07	.....
							7.0			245			273		267	15.68	16.46	18.73
III	10	34,341.0	54,311.0	35,891.0	6.4	6.0	7.0	245	273	267	15.68	16.46	18.73	.....
	11	23,300.0	20,902.0	13,616.0	4.3	4.1	5.6	274	304	285	11.79	12.53	15.84	.....
	19	27,067.0	32,974.0	23,868.0	3.8	3.4	3.9	295	347	299	11.19	11.94	11.77	.....
	21	.....	19.0	65.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
	24	.....	1.0	1.0	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Total	*1923	122,944.0	162,394.0	107,814.0	6.3	6.2	7.2	261	271	255	16.53	16.75	18.37	.....

Terr. 10 includes Lowell (23)—Worcester (50)—Fall River (53)—New Bedford (54)—Springfield (55)—Lawrence (64)—Lynn (65) and 91 (Surrounding cities—100,000).

Terr. 11 includes Bristol County (82) and 81 (Boston Suburban).

EXHIBIT "D"—(Continued)

Massachusetts Automobile Public Liability Experience

August 3, 1926

COMMERCIAL

Territories—All classes and load capacities combined

Includes all 1600 and 1800 classes except Code No. 1891—Hired Cars.

New Terr.	Old Terr.	No. of Cars Earned			Claim Frequency			Average Claim Cost			Pure Premium			Selected P. P.
		1923	1924	1925	1923	1924	1925	1923	1924	1925	1923	1924	1925	
I	4	8,334.6	8,697.0	5,428.2	18.1	20.8	22.5	270	252	229	48.86	52.31	51.73	.....
	5	.....	2,290.7	1,201.0	...	7.7	7.6	...	319	228	.....	24.54	17.25	.....
II	10	8,856.7	12,066.7	7,172.7	9.0	8.7	8.6	272	259	214	24.54	22.61	18.43	.....
	11	3,981.1	3,853.7	2,418.0	5.6	5.2	6.7	284	315	279	15.98	16.33	18.78	.....
III	19	6,020.3	7,131.7	5,108.0	4.5	4.5	5.8	245	289	408	11.08	13.03	23.58	.....
	21	.....	50.3	14.3	...	...	...	...	...	...	.....	.....	.....	.....
	24	.....	.....	.....	...	...	...	...	...	...	.....	.....	.....	.....
	Total	27,192.7	34,090.1	21,342.2	10.3	10.4	11.2	269	264	251	27.76	27.57	28.09	.....

COMMERCIAL

Load Capacities—All Territories and Classes Combined.

Includes all 1600 Classes.

Load Capacity	*													
Light	.....	16,707.6	10,514.6	...	8.2	9.5	...	271	231	.....	22.32	22.00	.....	.....
Medium	.....	8,213.8	5,062.6	...	11.6	12.2	...	285	254	.....	33.15	31.14	.....	.....
Heavy	.....	1,857.7	929.9	...	17.3	19.0	...	241	326	.....	41.63	62.01	.....	.....
Total	26,607.4	26,779.1	16,507.1	9.7	9.9	10.9	255	273	248	24.86	26.98	27.06	.....	.....

* 1923 not split.

EXHIBIT "E"

REPORTING COMPANY	12	27 28	1 2 3 4 5 6	Analysis of Loss	PREMIUM TOWN AND TERRITORY	CLASS	ACCIDENT TOWN AND TERRITORY	12	12	LOSSES PAID						CREDIT PAYMENT					
	Policy Issue	DATE Year	ENTERED Month					Date of Accident	Month of Report	Amount						Amount					
	11	29 30	7 8 9 10 11 12					11	11	Kind of Payt						Kind of Payt					
Mo. Yr.	Identification No.						Mo. Yr.	Kind of Payt	Amount						Amount						
0 0	10 30	0 0	0 0 0	0 0 0	0 0 0 0 0	0 0 0 0	0 0 0 0	10 30	10	0 0 0 0 0	0 0	0 0 0 0 0	0 0	0 0 0 0 0	0 0	0 0 0 0					
1 1	1 31	1 1	1 1 1	1 1 1	1 1 1 1 1	1 1 1 1	1 1 1 1	1 31	1	1 1 1 1 1	1 1	1 1 1 1 1	1 1	1 1 1 1 1	1 1	1 1 1 1					
2 2	2 32	2 2	2 2 2	2 2 2	2 2 2 2 2	2 2 2 2	2 2 2 2	2 32	2	2 2 2 2 2	2 2	2 2 2 2 2	2 2	2 2 2 2 2	2 2	2 2 2 2					
3 3	3 33	3 3	3 3 3	3 3 3	3 3 3 3 3	3 3 3 3	3 3 3 3	3 33	3	3 3 3 3 3	3 3	3 3 3 3 3	3 3	3 3 3 3 3	3 3	3 3 3 3					
4 4	4 34	4 4	4 4 4	4 4 4	4 4 4 4 4	4 4 4 4	4 4 4 4	4 34	4	4 4 4 4 4	4 4	4 4 4 4 4	4 4	4 4 4 4 4	4 4	4 4 4 4					
5 5	5 35	5 5	5 5 5	5 5 5	5 5 5 5 5	5 5 5 5	5 5 5 5	5 35	5	5 5 5 5 5	5 5	5 5 5 5 5	5 5	5 5 5 5 5	5 5	5 5 5 5					
6 6	6 26	6 6	6 6 6	6 6 6	6 6 6 6 6	6 6 6 6	6 6 6 6	6 26	6	6 6 6 6 6	6 6	6 6 6 6 6	6 6	6 6 6 6 6	6 6	6 6 6 6					
7 7	7 27	7 7	7 7 7	7 7 7	7 7 7 7 7	7 7 7 7	7 7 7 7	7 27	7	7 7 7 7 7	7 7	7 7 7 7 7	7 7	7 7 7 7 7	7 7	7 7 7 7					
8 8	8 28	8 8	8 8 8	8 8 8	8 8 8 8 8	8 8 8 8	8 8 8 8	8 28	8	8 8 8 8 8	8 8	8 8 8 8 8	8 8	8 8 8 8 8	8 8	8 8 8 8					
9 9	9 29	9 9	9 9 9	9 9 9	9 9 9 9 9	9 9 9 9	9 9 9 9	9 29	9	9 9 9 9 9	9 9	9 9 9 9 9	9 9	9 9 9 9 9	9 9	9 9 9 9					

HOLLERITH 503850

MASSACHUSETTS AUTOMOBILE PLAN - LOSSES

COMPULSORY AUTOMOBILE INSURANCE

STATE *vs.* FEDERAL COMPENSATION
FOR LONGSHOREMEN

BY

LEON S. SENIOR

What are the rights of a longshoreman under the workmen's compensation system? During the past ten or fifteen years it has been well-nigh impossible to give a clear or definite answer to this question. The exact legal status of claims for injuries on the seacoast has remained uncertain during the entire period while the States of the Union were gradually, one after another, adopting compensation systems for the benefit of workers within their respective borders. This uncertain and indefinite status was due in the main to the conflict between State and National sovereignty. In the early days of compensation it was assumed, although not without considerable doubt, that the laws of the individual States embraced within their scope men engaged in loading or unloading of freight on board vessels or in the repair of ships lying alongside piers and docks. This assumption, however, was rudely shattered by the decision of the United States Supreme Court handed down on May 21, 1917, in the case of *Southern Pacific Company v. Jensen* (244 U.S. 205).

The Jensen case involved a claim under the New York Act for death resulting from injuries sustained while the deceased was on board and engaged in loading freight on a vessel. In holding that the claim did not come within the purview of the New York Act, the court expressed the view that the work of a stevedore is maritime in nature, that the employment is in connection with a maritime contract, that the injuries received were likewise maritime and the rights and obligations of the parties in connection therewith were matters clearly within admiralty jurisdiction.

It is not my purpose to treat at length the legal reasoning employed by the court in the Jensen and subsequent cases, but it may be well to review briefly the effect of this decision and its consequences insofar as the rights of longshoremen for compensation are concerned. No less an authority than Justice Holmes has expressed the view that the reasoning of the court in the Jensen case and the cases following it has never satisfied him. And Justice Brandeis of the same court has stated that the far-reaching and unfortunate results of the rule declared in that case could not

have been foreseen when the decision was rendered. A brief recital of the legislative and judicial events following that decision may not be out of place. As a reminder to the student of casualty insurance who is not familiar with the nice distinctions created by the Constitution and its interpreters as between Federal and State jurisdiction, let me point out that the admiralty jurisdiction of the Federal Courts extends over navigable waters, including vessels designed for and capable of the navigation of such waters in the execution of maritime contracts. By the term "navigable" are described waters which form a continuous highway for interstate or international commerce. For example, in the State of New York, the Hudson, St. Lawrence and Niagara Rivers, Lakes Erie and Ontario, and the streams and lakes within the State that are commercially tributary to them, including the canals, come within the definition of navigable waters.

Insofar as industrial accidents are concerned, it appears to be well settled that the Federal law takes cognizance of claims relating to maritime contracts in cases where the accident occurs on board a vessel operating on navigable waters, while the laws of the individual States are permitted to recognize only accidents that occur on land or any extension thereof. According to the rule laid down by the Federal Courts, maritime jurisdiction will not extend to accidents incurred in the construction of new vessels which have not been put in commission, nor will the Federal Courts assume jurisdiction in cases involving injuries to longshoremen or other harbor workers engaged in work on maritime contracts when the accident takes place on the dock or on the pier, docks and piers being regarded as extensions of the land and therefore subject to State jurisdiction. Under this rule, the place of accident is the important point in deciding the question of jurisdiction. To illustrate: A longshoreman who is pushing a hand truck loaded with freight from a dock or pier to a vessel lying alongside such dock or pier, may sustain an injury while he is on the dock or on the gangplank or after reaching the boat. If injured on the dock, the claim comes within the State Compensation Law. Should the accident occur while on the gangplank, the claim might come within State or Federal jurisdiction, depending on the facts and circumstances of the case. If the injury is sustained on board the vessel, the claim comes within the provisions of the Federal Law. The Federal Law will prevail if he should fall off the dock and meet

with an injury in the water. And similar situations may arise with respect to ship carpenters or other mechanics engaged in ship repair work.

In declaring certain torts as maritime in nature and bringing them within the scope of the Federal authority, the courts have been prompted by the belief that this was the best way of securing uniformity as respects maritime rights and obligations of the kind contemplated by the Constitution, relieving maritime commerce from restrictions which may be incident to control exercised by individual States. It is difficult, however, to see how such uniformity can prevail if employees of independent contractors, such as stevedores, who do not stand in direct relation with the owner of the ship are subjected to different systems of compensation depending upon the place of the accident. This very point is argued by Mr. Justice Brandeis in his dissenting opinion rendered in "The State of Washington v. Dawson" (264 U. S. 219).

With the desire to meet and overcome the objections presented by the Supreme Court in the Jensen case, an appeal made to Congress for relief resulted in an amendment to the Judicial Code which was adopted on October 6, 1917, and provided that in all civil cases of admiralty and maritime jurisdiction the claimants should have not only the right of a common law remedy, where the common law is competent to give it, but in addition thereto the rights and remedies provided under the workmen's compensation laws of the particular State where the accident occurred.

The question as to the constitutionality of this Act came up before the Supreme Court in the case of Knickerbocker Ice Co. v Stewart (253 U. S. 149). The decision was handed down on May 17, 1920. The Knickerbocker case involved a claim under the New York law on account of the death of a bargeman who was drowned in the Hudson River. The court held that Congress had no authority to legislate that the workmen's compensation laws of individual States could be made applicable to injuries arising out of maritime torts. Emphasis was given to the point that since the beginning of our Constitution, Federal Courts recognized and applied rules and principles of maritime law somewhat distinct from the law of the several States, that the Constitution referred to a system of law operating uniformly in the whole country and that it was not the intention of the Constitution to place the rules of the maritime law under the disposal and regulation

of the several States since that would defeat the purpose of uniformity and consistency which was aimed at on all subjects of a commercial character affecting the intercourse of the States with each other or with foreign States.

Following the defeat of this amendment, another effort was made in 1922 when Congress was prevailed upon to legislate again on the subject. Another amendment to the Judicial Code known as the Johnson-Mills amendment was then enacted, having the same object of bringing harbor workers under the compensation laws of the several States. This amendment was so framed as to deprive the district courts of their jurisdiction in maritime torts. It was quite logical that this second amendment should have met with the same fate as the preceding legislation. The power of Congress in enacting it was first challenged in the United States Court for the Southern District of Alabama, and the challenge was upheld by the Supreme Court on February 25, 1924, in the cases of "State of Washington v. Dawson" and "The Industrial Commission of California v. Rolph." Both cases involving the same point were heard together and were decided by one opinion. The Dawson case raised the question as to whether an employer engaged in the business of stevedoring, whose employees work only on board ships in the navigable waters of Puget Sound, could be compelled to contribute to the accident fund provided for by the Workmen's Compensation Act of Washington. In the Rolph case, the Industrial Accident Commission of California made an award of compensation on the death of a workman killed while actually engaged in maritime work under a maritime contract upon a vessel moored at her dock in San Francisco Bay and discharging her cargo. The majority of the court held that the States of Washington and California had no jurisdiction in the cases at bar and that the Act of June 10, 1922 (the Johnson-Mills Amendment), was unconstitutional and beyond the power of Congress. These decisions handed down on February 25, 1924, embodying as they did the nullification of the Congressional Act, ended apparently for all time the efforts to bring longshoremen within the purview of State Compensation Acts. The obligations of the employer and the rights of the employee were again to be determined under the admiralty rule unless the accident occurred on land or any extension thereof.

A modification of the rule to some extent was introduced in the

decision handed down on October 18, 1926, in the case of International Stevedoring Company v. Haverty (269 U. S. 549). If anything, this decision served to intensify the difficulty of determining rights and obligations under the admiralty rule. Here a claim was prosecuted by a longshoreman who was injured while stowing freight in a vessel's hold in a harbor in Seattle. The opinion written by Mr. Justice Holmes is to the effect that the common law fellow-servant doctrine is not available to the employer as a defense, the claimant being entitled to the benefits of the Merchant Marine Act of 1920. In effect the longshoreman in this case is declared by the court to be a seaman on the ground that work of this nature was a maritime service formerly rendered by the ship's crew.

The search for some legislative remedy to bring the longshoremen under a compensation system has finally resulted in the enactment of a special measure. I refer, of course, to the Federal Act recently adopted by Congress for the benefit of harbor workers, entitled "Longshoremen's and Harbor Workers' Compensation Act" approved on March 4th to become effective on July 1, 1927. This Act appears to be modeled very closely after the New York Statute. A synopsis of its provisions covering the essential points may be of some service: It provides for a system of compulsory compensation for maritime workers in cases of disability or death occurring upon the navigable waters of the United States, including any dry dock, except the master and members of the crew of any vessel, persons engaged by the master to load, unload or repair any small vessel under eighteen tons, officers or employees of the United States or any State or foreign government. Insurance of the employer's obligation is compulsory, but self-insurance is permitted upon proof of financial ability. Occupational diseases or infections arising naturally out of the employment or unavoidably resulting from accidental injury are covered under the Act. The schedule of compensation is based on 66 2/3% of average weekly wages, with a maximum of \$25 and a minimum of \$8 per week, and is subject to a maximum limit of \$7,500. Compensation to the wife continues during widowhood with an allowance upon remarriage as provided in the New York law; the other provision as to distribution of awards among dependents is also similar to that provided in New York. The average wage in death cases is subject to an upper limit of \$37.50 and a lower of \$12 per week.

Provision is made for a seven-day waiting period unless the disability lasts more than forty-nine days. The employer must furnish medical treatment as the nature of the injury or process of recovery may require. The administration of the Act is under the authority of the United States Employees' Compensation Commission. Deputy Commissioners must order hearings upon application of either party, and the Federal district courts are given the power to suspend compensation orders and to set aside proceedings by injunction. In case of accident due to the negligency of a third party, the injured has the option to take compensation or to sue the third party for damages, and the acceptance of compensation operates as an assignment of the claim for damages to the party liable for the compensation. The Act contains the usual provisions respecting posting of notices, reports to be filed by the employer, regulation of attorneys' and physicians' fees, and also imposes on the Commission an obligation to study conditions and to make recommendations to Congress for accident prevention.

The frequent changes in the statute law and its interpretation by the courts have been followed very closely by the insurance companies with the object of safeguarding the employers, by means of their policy contracts, against loss because of the peculiar and conflicting nature of the obligations imposed by State and Federal authority. At first the regular standard form of workmen's compensation and employers' liability policy was regarded as sufficient to provide the necessary cover on the assumption that the principal obligation of the employer was under the State Compensation Act with only incidental liability for negligence.

About September 15, 1920, two forms of cover were established for the stevedoring classifications, Cover I providing unlimited compensation and limited liability for damages at common law to an amount not exceeding \$5,000 per person, and \$10,000 per accident involving two or more persons. Higher limits were made available at increased rates, the highest limits providing \$50,000 per person and \$100,000 per accident, at an additional cost of 10%. Cover II provided insurance without limits both as to compensation and liability at a higher cost. These forms of cover with several fluctuations in rates remained in force until August 19, 1922.

Following the enactment of the Johnson-Mills amendment to the Judicial Code, the single form of unlimited compensation

and liability cover was restored in the belief that this amendment definitely fixed the compensation status for longshoremen. Soon after the Supreme Court declared the Johnson-Mills Act unconstitutional, the companies again erected two forms of cover. This time Cover I was so constructed as to provide compensation for accidents coming under the State acts with a limit for liability against negligence of \$5,000 per person, and placing no limit on the number of cases resulting from a single accident. Cover II, with rates about 30% higher than those for Cover I, was constructed to provide so-called voluntary compensation and unlimited liability under the negligence provision of the policy. By voluntary compensation it was intended that a carrier should offer to each injured employee a settlement on the basis of the State Compensation Law, even though the accident may have been subject to Federal jurisdiction. The employee was of course free to accept or reject the offer, and in case of rejection had the right to maintain an action at common law or at admiralty.

Subject to several fluctuations in rates, these forms of cover continued in force until the fall of 1926 when the Supreme Court announced its decision in the Haverty case. This disturbing decision caused another change, and on January 1, 1927, steps were taken to modify the liability feature of Cover II, limiting it in the same manner as provided under Cover I and the rates were increased to the extent of 30% for Cover I and 10% for Cover II.

The enactment of the Longshoremen's and Harbor Workers' Compensation Act presents a new problem both as to cover and rates. The subject is still under discussion and therefore nothing definite can be expressed at the present time. It appears, however, that a solution will be reached by giving the employer protection under a special endorsement to be attached to the standard policy which will insure him against the obligations imposed by the Federal Act, while under the standard policy he will be protected against any losses incurred under the State Compensation Act or on account of any incidental claims which may arise under the negligence provisions of the policy. The latter possibility, however, seems remote since the enactment of the Federal statute will bar recovery on the theory of negligence.

The problem of rates will be determined ultimately along State lines, not along National lines, as many employers seem to think. Due cognizance will be given to the proportionate number of

accidents occurring on water as compared with the number occurring on land or any extensions thereof. A National schedule of rates under the Federal Act does not seem possible because of the inherent difficulties involved in segregating payroll as between workers on land and workers on ships. Employees engaged in loading freight or in ship repair work interchangeably on ship and on shore, and the same men may be subject to accidents on land in the morning and to maritime injuries in the afternoon. The exposure of a given risk under two separate jurisdictions requires a single system of rates reflecting average conditions. The division of accidents as to place of occurrence must remain for some time a matter of judgment since no conclusive data are available, but in the course of time and with the accumulation of combined experience under State and Federal authority, proper and dependable average rates will automatically develop.

THE EARLY HISTORY OF THE ANNUITY

BY

EDWIN W. KOPF

The present paper, dealing with the fascinating and compelling story of the annuity, is offered in line with the purpose of the Council and of the Educational Committees of the Society to have papers presented on the fundamental aspects of insurance. Students who follow the usual references in Section 8 of our syllabus are likely to consider chiefly the superficial mechanics of annuity computation, and to overlook some very important historic, legal, economic and underwriting aspects of this type of insurance. It will be possible to present the landmarks in the history of the annuity, bringing the record to that point in the nineteenth century when the transaction of annuity business passed almost entirely into the hands of insurance corporations. The real history of the annuity remains, however, to be written. Let us consider at the outset certain organic definitions.

DEFINITIONS

We have before us the definition given by Sir Edward Coke (born 1552; died 1633). During his incumbency as Lord Chief Justice of the King's Bench, 1613-1620, he defined an annuity as "a yearly payment of a certain sum of money granted to another in fee, for life or years, charging the person of the grantor only." There are scores of definitions by our American courts which hark back to the one given by Coke. In some of our American decisions, a definition is given which virtually includes the so-called "rent charge." In the case of *Routt v. Newmann*, (97 N. E. 208, 209; 253, Ill., 185), Coke's definition is given, and the following words are added: "or in a broader sense, a fixed sum payable periodically, chargeable on real property as well as on a person." The weight of the decisions available is that a clear distinction must be made between an annuity as defined by Coke, and a "rent charge," which is sometimes confused with an annuity. In the case of *Lynch v. Houston* (138 Mo. App. 167), there appears this definition: "a *rent charge* is a charge against land in the hands of the purchaser, and arises out of the land itself, while an

"annuity" is a yearly payment of a certain sum of money granted to one for life, years, or in fee, chargeable upon the person of the grantor." In this case, it was pointed out, however, that a deed of land in consideration of the payment to the grantor of an annual sum until the grantor's death, and retaining a lien to secure said payments, imposed merely a personal obligation to make the payments and created an annuity and not a land charge, the provision securing the payments by a lien not affecting the personal character of the obligation. The fact that the grantor rented the land, and applied the rent on the annual payments with the grantor's acquiescence, did not affect the character of the instrument. None of the American decisions available at this writing mentions specifically those pseudo-annuities which are chargeable against rights and personal property. These types of annuities were sold in the late Middle Ages and apparently have become obsolete.

ANNUITIES AND OTHER PERIODICAL INCOMES DISTINGUISHED

While the distinction between an annuity and a rent charge is clear, yet there has been much confusion because of the occasional crossing of the definitions. The annuity as defined by Coke, has sometimes been called a personal fee, because though strictly personal estate, it partakes of the general nature of real estate, being transmissible as an estate of inheritance, and not passing to the executor upon the death of the annuitant. Although the annuity contract has been consistently considered to be a personal contract, and so a technical *chose in action*, that is to say, a mere right to recover a debt or to redress a wrong by a suit at law, yet the rigorous document of the common law against the assignment of such choses in action, seems to have been relaxed at a very early date with respect to annuities, probably on account of their frequency, and because of the necessity for permitting free alienation.

A *writ of annuity* in the early common law was a writ to enforce the payment of an annuity. This has long since become obsolete in practice.

It may be well to mention some of the various types of income which have been confused with annuities. We have defined a "rent charge." It has been stated in the case of *Brown's Estate*,

143 Cal. 450, that a gift of an income from a certain fund is not an "annuity." It is not "income" or "profits," or indeterminate in amount, varying according to income or profit, though a certain sum may be provided out of which it is to be payable (Poe v. Raleigh and A. Air Line Co., 141 N. C. 525). Hence when a testator gives a beneficiary the interest upon a certain sum payable annually, it is not an annuity, but merely an ordinary legacy. The income or interest on a certain fund (bequest) is not an annuity but simply profit to be earned, and although directed to be paid annually, that relates only to the mode of payment and does not change the character of the bequest.

COMMON, FORMAL TYPES OF ANNUITIES

Limiting ourselves to Coke's definition, the various types of annuities may be divided into two main classes, *annuities certain* and *contingent annuities*.

The first, or *annuity certain*, is a series of payments made at equal intervals over a fixed period of years. All term annuities come under this classification. The whole class may be divided, according to time of first payment, into *immediate annuities* in which the first payment is made at the end of the first period; or *annuities due*, in which the first payment is made at the beginning of the first period; or *deferred annuities*, in which the first payment is made after a lapse of a given number of years.

These annuity payments may be made annually, semi-annually, quarterly, etc. The *continuous annuity* is one in which the payments are assumed to be made payable momentarily by infinitely small installments. This form is purely theoretical, but one which is approximated by the income of firms receiving many small accounts daily. When payments are to continue forever, the transactions are called *perpetual annuities* or *perpetuities*. While the payments of most annuities are constant in size, they may vary in an ordered fashion either increasing or decreasing by arithmetical or geometrical progression. In some few cases, the successive payments from a series in which the r th term is a rational integral function of " r ". When the successive payments of an *annuity certain* are not taken as they fall due, but are left to accumulate at compound interest, the annuity is said to be *forborne*.

The second, or *contingent annuity*, is one for which the date either of the first or the last payment depends upon some event, the time of whose occurrence can not be foretold. Thus annuities whose payments begin or end with the death of an individual are contingent annuities. The simplest of these is the *whole life annuity*, payments of which are made through the life of the individual. Next is the *temporary life annuity*, payments of which are made for a fixed period of years during the life of an individual. The *joint life annuity* is one in which payments continue as long as all lives survive, and the *joint life and last survivor annuity* provides payment as long as one, at least, of two or more lives survive. Annuities may be made contingent upon other circumstances, but those dependent upon life are by far the most common. All these "life" annuities are subject to the same classification as the *annuity certain*. They may be immediate, due or deferred; paid annually, semi-annually or for other periods and they may vary in amount. In addition, the life annuities are said to be curate or complete. The annuity is *curate* when payment ceases with the last annual, semi-annual or other periodical payment before death, and *complete or apportionable* if it includes a proportionate payment between the last regular payment and the time of death. The *forborne temporary life annuity* is one in which the successive payments of the temporary life annuity are not taken as they fall due, but are left to accumulate at compound interest and distributed among the survivors.

The sum of the successive payments accumulated to the end of the period during which the annuity is payable is called an *amount* of the annuity. The *present value* is the sum of the present values of the successive payments. An annuity of which the present value is k per unit of annual rent is said to be worth k years' purchase. The total amount payable in a year is called the *annual rent*.

This by no means exhibits the forms or combinations which are possible or which actually occur, nor does it completely define some of these forms of annuities. For instance, with a joint life annuity, what is to be paid at the successive deaths up to the last? The shares of co-annuitants, who have died, might return to the estate, but in actual practice, these shares are added successively to the shares of the survivors in equal portions until the

last survivor receives the whole. In contingent annuities, the most common circumstance which terminates the contract is that the annuitant shall become financially independent as by marriage or re-marriage, or attainment of majority, as for instance, when a man provides for a widow, or daughter or son by will. Here we have, of course, the disposition, by annuity, of lump sum settlements of workmen's compensation and life insurance cases.

ANNUITIES BY OBJECT OR PURPOSE

Annuities may also be considered according to the object of the annuity, (a) annuities providing for others and (b) annuities providing for one's self. The first type of annuity is probably the older, and is of testamentary character, taking the place of a legacy in the lump. Until recent times, these annuities were chiefly charged directly on the private property of the testator in the hands of trustees, and with certain European families this practice is still common. In Europe, these charges on property constitute an element of high social and, at times political, importance. Some entailed estates are always encumbered with many absolutely fixed annuities to family connections or dependents of the houses, while the income from which they are to be paid may shrink indefinitely as it has done in certain specific cases. This has occurred with grave consequences to such annuitants during periods of monetary inflation. *Per contra*, a period of monetary deflation such as the world is facing now may redound to the benefit of annuitants, and may lead to a revival of annuity business on a large scale. For the past 150 years the administration of annuities has been gradually taken over by incorporated insurance institutions and combined with the business of life insurance. The insurance companies pay the annuities on contracts matured at the death of the testator, the payments beginning either then or at a later specified time.

In the United States, the latter system has replaced almost entirely the old types of annuities in which incomes were bought for self or others for a term or for life, by paying a lump sum to a person, a corporation or public body, not a life insurance company.

These older individual contract annuities, although they were

based on the same mathematical foundation as the annuities administered by insurance companies, were historically of two definite types. There was one type of annuity which was bought for security of income and the other for investment or on speculation. The latter type of annuity is the older and resulted from industrial and social conditions which have since passed away. They arose partly because of the paucity of investment securities, and partly because of the laws against usury, which could be and were evaded through the purchase of annuities. It is historically incorrect, however, to assume that annuities were developed chiefly as means of evading usury laws.

The favored method of borrowing money by the medieval "companies", and municipalities and States as well, was by annuities which were sold on rough estimates of the chances of life, in which the buyers were always keener than the sellers. Until recent times the bargain nearly always ran against the payer of the annuity, especially since the sharp trend toward lower mortality rates set in. Many shrewd investors accumulated great properties by careful investment in annuities on sound lives, because they were permitted to propose the individuals upon whose lives they laid the wager. These judgments as to the soundness of lives were often based at an early period upon the advice of physicians. This practice persisted until mortality tables were constructed upon the actual experience of populations or insured groups.

The second object of insuring one's self against the chances of fortune has had one broad aspect,—such annuities were usually taken out in early life instead of being dependent upon the annual accretions of a savings fund to the point where an annuity could be bought by the individual.

The amount surrendered to the grantor of the annuity was commonly obtained through the sale of an inherited property by women, or by men of quiet tastes, to produce a sure income free from care. While annuities of this type are frequently encountered in the countries of Europe, their adoption is becoming commoner in the United States. Large, inherited fortunes have been few in this country until very recently and the desire to lead a life of ease is, fortunately, equally rare. But as family properties increase and the life struggle becomes more intense there may be greater demands upon the annuity system.

PSEUDO-ANNUITY OR "RENT CHARGE" PRACTICE IN ASSYRIA AND
BABYLON

From the researches of Trenergy, one develops the idea that in Babylon there must have been a fairly wide-spread practice of granting a series of periodic payments secured by land or other property. It is definitely known that a well-developed system of individually underwritten transport insurances prevailed in Babylon as early as 2500 B. C. Banking service seems to have been quite well developed because Babylon was a busy manufacturing centre, dependent upon India and China for raw materials and upon Phoenicia for an outlet in the Mediterranean area for manufactured goods. There were in Babylon great banking houses which existed for generations and there was also an efficient medium of exchange and what corresponds roughly to the commercial paper of our contemporary banking system. Interest was charged for loans to manufacturers and traders, and there were legal codes which, from time to time, established the reasonableness of certain rates. Annuity and other insurance practices may, indeed, have been adopted from the commercial codes of the Hindus and Chinese, antedating the Babylonian era.

ANNUITIES IN EGYPT, 1100-1700 B. C.

A careful search through the legal codes of Egypt by archeologists brings forth evidence that an annuity was purchased by Hepd'efal, a Prince ruling in Sint in the Middle Empire. This time in the history of Egypt ranged from the reign of Aahmes to the close of the XX Dynasty (Sethnakt).

ANNUITIES IN ROME

There is much evidence from the available text of the Roman Civil Law that the Romans and their predecessors had the statistical material and the required skill in arithmetic for the construction of crude annuity tables. There is also evidence in the recorded decisions of the Roman Jurisconsults that the purchase and sale of annuities was widely prevalent and that some statistical knowledge was extant of the effect of mortality on the funds of the mutual aid societies which had wide vogue among the civil and military populations. According to Mommsen, the Romans of the second and third centuries A. D. were better qualified in

the arts of calculation, and had more effective ways of doing business, than did the peoples of Europe in the 16th century. The Romans had a knowledge of arithmetic, algebra, the use of interest and discount. They also had a metallic currency, a system of bookkeeping, banking facilities, and practiced instalment buying and selling.

In the *Lex Falcidia* (40 B. C.) there were provisions that the heir or heirs of an estate should receive not less than one-fourth of the total property left by a testator. It was frequently the case that the will was made at a time when the testator was in easier circumstances than at the time of his death. It became necessary in such cases to reduce proportionately the values of the several legacies. In the case of an ordinary legacy, this reduction presented no important difficulty; but when the testator had left a life annuity to one or more legatees, the question arose as to the basis of reduction of such annuities.

In order to meet this contingency of capitalizing annuities a table was set up at a time not specified. Emilius Macer was the first to place this table on record, but the evidence is that these values were used for many years prior to Macer's authorization of the table in one of his *responsa*. Macer also sanctioned at about the same time the use of another and probably more correct table, the authorship of which was attributed to the Pretorian Prefect Ulpianus (about 225 A. D.). The values in Macer's table showed that up to 30 years of age, 30 more years of life were expected. Between 30 and 60 years of age as many years of life were to be assumed as were wanted to make up 60 years. The table of Ulpianus showed distinct signs of an effort to approach more exactly the values of annuities. His table is given below.

THE TABLE OF ULPIAN

Age	Years	Age	Years
Birth to 20	30	44 to 45	15
20 to 25	27	45 to 46	14
25 to 30	25	46 to 47	13
30 to 35	22	47 to 48	12
35 to 40	20	48 to 49	11
40 to 41	19	49 to 50	10
41 to 42	18	50 to 55	9
42 to 43	17	55 to 60	7
43 to 44	16	60 and up	5

Much diligent inquiry has been made to establish whether the values shown in Ulpianus' table are those of the ex-

pectation of life or the values for an annuity of 1 per year. It would be futile to review the dispute. The scholars who insist that these figures represent the expectation of life at the various ages, maintain that the original experience was probably that of some one or a group of Roman mutual aid societies and that the computations were made by a rather clever person unskilled in actuarial work.

Although Macer's table was so openly incorrect, yet it appears to have been used quite generally; possibly because it was easier to remember and also because it gave smaller values for all ages above 50. Further reference to the *Basilikon* (the code of Basil I, 9th century, chiefly adapted from Justinian) shows an amendment introduced to render the table less unfair at the later ages. In the original form as quoted by Macer, the value of an annuity to a person aged 60 or more was nothing, whereas in the *Basilikon* the value at age 50 or over was five times the yearly payment. Both the Macer and Ulpianus tables were used, however; in fact, the latter table was the official annuity table of the Tuscan Government in Northern Italy until early in the nineteenth century.

There is some disputed evidence that the mutual aid societies of the Legions of Rome granted annuities to members who retired from military service at the age of 46. There is plenty of evidence for insurance scholars to review in the *Responsa* of Ulpianus, in the *Digests* of Justinian and in the *Basilikon* of Basil to the effect that the Romans were continually buying or selling annuities, both for life and for fixed terms, and that they had developed a species of tontine, which was pronounced illegal by Basil I.

ANNUITIES IN THE EIGHTH TO THE FIFTEENTH CENTURIES

Some time after Rome fell (fourth century A. D.), the money economy which the Romans had set up almost vanished, and the then known world entered upon a goods economy. There was kept alive, however, in Northern Italy, the faint spark of a money economy, which was fanned to a full flame in the latter part of the Middle Ages by the revival of manufacture and trade, and by the re-introduction of gold as a medium of exchange after the Crusades. Since there was little manufacture or extractive effort during the early Middle Ages, there was very little use for money

as an adjunct to productive processes. When money was lent it was used chiefly for consumptive purposes. And, possibly, because of the lack of intrinsic security back of loans for consumptive purposes, interest, or the price paid for the use of money and for the assumption of risk, was high and oppressive.

CHURCH BANS ON USURY, AND THE ANNUITY

In view of the statements which have been made quite frequently that the attitude of the Church toward interest was the chief obstacle to the growth of annuities, and later of life insurance, it might be well to examine some of the claims of the Church. With the exception of c. 27 of the Fourth Lateran Council, there was no canon law of the Church which took into consideration moderate interest; and the Canon Law nowhere states that interest is under any circumstance contrary to justice. The Church Councils and the Fathers did hold that the loan of things, or of money for the purchase of things, for immediate, necessitous consumption does not legalize any stipulation to pay interest, and that interest exacted on such a loan must be returned as having been unjustly claimed. In gratuitous contracts, the Church has been opposed at all times to claims of interest. Following the development of a money economy and the demand for productive credit, the Church held that it was permissible to charge interest whenever the lender was in danger of losing his capital or of exposing himself to a loss or to deprivation of a gain. This was *compensatory* interest. And the modifying reasons which authorized the charge of interest were called *extrinsic titles*. The Church has also admitted *moratory* interest, or a fee for delay in the re-payment of capital. The present attitude of the Church as shown in the *Sacred Penitentiary*, (April 18, 1889), is "to conform to the usages established amongst honest men as precisely one does to other prices."

The edicts of the Church related primarily to usurious charges on the consumptive needs of the poor and distressed. The first edict was directed against the exaction of interest on consumptive loans by the clergy; this ban was later extended to the laity. But as we have seen, when a money economy again returned, the Church stated its position very exactly on the

justice of taking compensation for risk in the lending of capital and for the deprivation of the chance to make profit, which the lender necessarily undergoes when he assigns command over goods and services to another person.

THE CHURCH AND THE REVIVAL OF RENT-CHARGE PRACTICE

It was the Church itself that revived public interest in life annuities during the eighth century. Monasteries and other religious bodies gave land in return for annual payments of money. The Council of Celchyth in A. D. 816 laid down a rule that the lands of the Church should not be charged for more than the term of the single life. The same restriction occurs in the deed drawn up on the dedication of the Abbey of Winchelcomb by Kenulf, King of Mercia, A. D. 811. Cardinal Henricus a Segusio, also named Hostiensis, suggested the broader elements of rent charge practice in his treatise *Aurea Summa* (1255). In 1308, the Abbot of St. Denis arranged with the Archbishop of Cologne to pay a life annuity of 400 livres to the Archbishop in consideration of 2,400 livres paid to the Monastery. In event of death during the first two years of the term of the annuity, 1,000 livres were to be re-paid to the heirs of the Archbishop.

In Italy, France and the Netherlands, there were formed certain societies which were called *Societas Sacri Officii*. These societies were formed in consequence of the system of saleable offices of the *Curia Romana* of which there were a great number. It was to the interest of the Papal finances to get as high a price as possible for these saleable offices, and the Popes permitted the clubbing together of several persons for the purpose of acquiring one or other of these offices when individual means proved insufficient. This device was formed in order to get the candidate out of the clutches of usurers. Associations of this kind were in existence as early as the time of Leo X. Abuses of this system lead to its abolition some time before the eighteenth century.

TRANSITION FROM "RENT CHARGE" TO ANNUITY

Early in the Middle Ages, a legal concept was formed in England that the right to a rent from a certain piece of land, was a

right capable of transference. The payment of the rent of land from a tenant to a landlord, "reserved" when the tenancy was created, was thought to be something which remained to the lessor after he had made the lease. Modifications were made in the laws governing the tenure of land enabling the paying of rent by the tenant to a third party who was not the owner of the land. It soon became the practice for a landlord to enter into a contract with a third party in respect to a certain farm on his estate, whereby, in virtue of a sum of money paid down, the latter became entitled to receive the rent while the land still remained in the possession of the owner. It was an easy step then to the purchase of the "right" to such a yearly amount unattached to any particular farm or piece of land, but simply a burden upon the whole estate. Later, property as houses, shops and rights of toll began to be "charged" as well as land. Afterwards, even movable personal property and personal credit could be hypothecated in consideration of annual payments made for a term of years or for life. In the thirteenth century such annuities were known. They were said, according to Jack, to have issued out of the grantor's chamber, "the place where he kept his treasure." In actual fact, the security for annuity payments was in these latter types solely the grantor's honesty and solvency, *i. e.*, the annuity was secured against the person of the grantor. These historic facts must have been taken into account by Lord Coke when he made his definition of the annuity in the seventeenth century. The legal literature of the late Middle Ages stipulates that there were rent charges in perpetuity, passing to heirs, (*census perpetuus*); sometimes for a period only, (*census temporalis*); limited for a definite number of years, (*census certus*); or by the death of the receiver of the rent (*census incertus*).

WAR FINANCES AND THE ANNUITY

In Germany during the eleventh century, it became customary for Counts and Barons in fighting their petty wars to hire mercenaries. Much of this expense was met by hypothecating land, with rents or annuities payable in gold. Henry I of England in 1103 secured the use of 1,000 men and three horses in return for a yearly payment of 400 marks to the Counts of Flanders. This was an early example of paying for a war on the instalment plan. In the Italian cities, the emergence of the money economy oc-

curred earlier than in the rest of Europe; in fact it never completely died out. Where the Italian cities needed money for conducting their wars, and for their other usual pursuits, they had recourse to "compera", or loans re-payable as annuities, and chargeable against the credit of these cities. Genoa, Florence and Venice used this form of funding. In 1470 Genoa had outstanding obligations of this type for more than 11,000,000 lire and in 1597 this annuity debt was 43,700,000 lire. This practice of the Italian cities lead later to the *montes pietatis*. In Germany this form of municipal financing was so lucrative that private enterprise in the annuity field was forbidden in some cities (1350).

FOUNDATION FOR THE MODERN ANNUITY IN FLANDERS AND BRABANT

It was in Flanders and Brabant, however, where the foundations for modern annuity practice were laid. There are existing to-day in the municipal archives of these cities evidences that the annuity business flourished in this area. In Tournai, there are on file one certificate dating back to 1229 and six for the year 1228, presumably cases where the annuitant died or the annuity was bought back by the city. There would be much more evidence on file to-day of these earlier annuity practices if the Town Hall of Tournai had not been destroyed by fire in the year 1250. Documents for the years 1304, 1323 and 1325 show that these annuities were paid at the rate of $14\frac{3}{5}$, $14\frac{2}{7}$ and $11\frac{1}{6}$ percent respectively. For the period 1396-1445, annuities on two lives were sold at $8\frac{1}{3}$ percent.

THE PURCHASING POWER OF MONEY AND THE ANNUITY CONTRACT: THIRTEENTH CENTURY

One of the Bruges contracts is of interest. In February, 1265, one Robert Norman of Utrecht, and his son, Baudoin, arranged for a survivorship annuity of 400 Parisian livres. The contract provided that if the purchasing power of the Parisian pound declined, the payments were to be made in the sou of Tournai at the ratio of 50 Tournaise sous to 43 Parisian livres. Consideration of the purchasing power of annuity payments may have been a quite general practice in the thirteenth century, an era

when there were wide fluctuations in the local supply of monetary gold, and consequently in gold prices. Possibly there is in this practice of the thirteenth century a suggestion which we ought to consider in insurance finance of the twentieth century. There is a distinction, in fact, between money income and real income, between legal tender, however "sound", and the flow of concrete benefits, or "money's worth", which the possession of money commands. Much evidence on this point was presented to the International Congress of Actuaries which met in London during June, 1927.

ADMINISTRATION OF ANNUITY BUSINESS: GHENT

The Ghent documents contain evidence that the annuity business was regulated in considerable detail. There were provisions for the replacement of the certificate in event of destruction or loss and a penalty of ten Parisian sous against the City for each day's delay in making the annuity payments. The Ghent annuities were of the so-called complete or apportionable type. The City also reserved the right to cancel each contract on payment of 700 Parisian livres. This suggests that the annuity was paid the citizens at the rate of $14\frac{2}{7}$ percent. The widespread popularity of the annuity may be assumed from the action in 1548 of Count William of Jülich, who applied for an annuity not only on himself but "for all his towns and villages and for his lands and people."

Prior to the fifteenth century most of the annuities took the form of rent charges, sometimes involving two persons. In Germany at the beginning of the fifteenth century annuities proper were first sold; that is to say, the charge was shifted from property to persons. This change in the annuity charge probably also accompanied a similar development in England.

Early in the fifteenth century, the annuities which were sold in Amsterdam, took into account the question of age. In Leyden, a manuscript for 1449 showed that half-yearly payments were made in June and at Christmas. An official of the town would search out persons entitled to annuity payments, post a notice on the church door, set up an office and then tell the annuitants to call for their money. This is one of the early examples we have of a

just zeal on the part of an insurer to see that persons insured receive the benefits they contracted for.

PERPETUAL ANNUITIES

About the middle of the fifteenth century several German cities granted perpetual annuities. This is shown by the Nürnberg archives for the years 1433 to 1458. This practice arose out of the high confidence of the people that the prosperity which Northern Europe enjoyed at that time would continue indefinitely. *Aeneas Sylvius Piccolomini* (afterwards Pope Pius II), wrote at that time that Germany was never richer, her people never more content, nor were living conditions ever better. Bishop Antonin of Florence remarked in his "*Summa Theologica*" that no one at that time had to work very hard or long to secure the necessities of life. We can understand, therefore, the confidence which the people of Germany had in the ability of their cities to pay perpetual annuities. These annuities were often on two or more lives. This annuity business was also conducted by private citizens. There is a record of annuity business privately transacted during this era in Luneberg. The type of annuity sold by these people was not specified in the records.

ANNUITIES AND THE USURY LAWS

The statement has often been made that rent charges were invented as a means for evading the usury laws. This is probably not true because of the antiquity of the annuity. It had precedence historically over any of the bans on interest and usury. It was true, though, that full advantage was taken of the lawful status of the annuity by monied persons who had to choose between the risk of confiscation of the whole capital of usurious loans and the safe practice of accepting periodical payments from a constructive "grantor" of an annuity. Probably the greatest force in the revival of annuity practice in the late Middle Ages was the abandonment of the system of Roman numeration (about 1150), and the adoption of Arabic numerals. Another stimulus was the translation by monks of Latin treatises on surveying and commercial calculations. The translation of Euclid's "Elements" from the Greek and the traffic between the Spanish and Arabian populations were also factors. The works

of Leonardo of Pisa (about 1200) and of the Dominican Monk Jordanus Nemorarius (1236) all lead to systems of calculation involving "interest" and other devices in arithmetic.

The invention of the printing press by Gutenberg in 1450 also had an important influence upon the dissemination of knowledge and upon the spread of current notions of annuity practice to the southern and middle German cities, thence to northern Germany, the Netherlands, England, Italy and France.

SIXTEENTH AND SEVENTEENTH CENTURIES

We have indicated that despite the ban on usury, in fact as a possible consequence of this ban, annuity practice flourished. It should be recorded that the ecclesiastical ban on usury on the Continent of Europe was also reflected in English practice. In Great Britain, the first enactment against usury was a decree of Richard I (A. D. 1197), forbidding the taking of any recompense on money lent. In view of the wholesale violations of the law, there was passed, several centuries later (1545), an Act (9th Henry VIII, c. 9) which restricted the rate of legal interest to 10 percent. This act was repealed in 1552; but in 1570, the legal rate was again fixed at 10 percent. In 1624, the legal rate of interest in England was reduced from 10 to 8 percent and remained at this latter rate until 1651, at which time, the Rump Parliament reduced the legal rate from 8 to 6 percent. This was legitimized in 1660 and remained at this figure of 6 percent until the year 1714 (Act 12, Anne, Stat. 2, C. 16), when it was fixed at 5 percent. It remained at that figure until the abolition of the usury laws in 1854. (17 and 18 Victoria, C. 90.)

A Dr. Thomas Wilson, writing in 1554, described in his "Discourse Upon Usury" the current practices of lending upon annuities in order to avoid the penalties of the usury law. (This book has been reprinted with an historical introduction by R. H. Tawney, by Bell of London in 1925.) During the sixteenth century much speculation in annuities was transacted by private dealers, especially toward the end of the century. There is on record the career of one Audley, who, although originally only a poor clerk earning six shillings a week, became an adept in avoiding the law, and so keen in his annuity dealings, that he became one of the richest men of his time. Much further

comment upon the abuses of the annuity system at this period in English history will be found in the writings of Francis, "Chronicle of Life Assurance" (1853).

Gerard Malynes in his book "*Consuetudo vel Lex Mercatoria*" (1622) discussed succinctly the annuity practice of the day in relation to the usury laws. This volume, one of the rarest comprehensive treatises on insurance extant, is said to be in the Insurance Library of Boston.

Several centers of world commerce notably Amsterdam and Rotterdam increased in activity and importance following the decline of Spanish rule and influence during the middle of the sixteenth century. Antwerp, which has been the chief exchange for marine and other insurance, had been unfavorably affected by religious warfare, by siege, and the Inquisition. What Antwerp lost, her sister cities of Amsterdam and Rotterdam, gained. By 1558, the States General developed and were making their own systems of taxation. In the early part of the seventeenth century the Dutch East Indies Company had been formed and this was the first great modern joint-stock corporation. In 1621, the West Indies Company was founded. Along with the development of world trade over these two centuries there was a strong revival of manufactures and decided briskness in annuity business.

In the municipal archives of The Hague there is an annuity register for the City of Delft for the year 1557 containing the names of annuitants of that city. An annuity certificate on file in Leyden for the year 1402 contains a death certificate signed by a physician. There is other evidence from the Leyden records that measures were taken by the States General to encourage the prompt reporting of deaths of annuitants to the Finance Minister. In the middle of the sixteenth century gratuities were offered to persons who reported deaths of annuitants to the Finance Minister. Rewards were also offered for frauds against the annuity funds. That the frauds perpetrated against the State annuity funds constituted a real problem in administering the system, is evidenced by the numerous edicts which were issued against such practices by the States General. The complaint against annuity frauds was heard also through the sixteenth and seventeenth centuries, culminating in the "Bubble Act" in 1720 in England.

About 1550, in the annuity practice of the Netherlands, life annuities on one life were offered at $16\frac{2}{3}$ percent and on two lives at $12\frac{1}{2}$ percent. That a large annuity business was done in Holland at the end of the sixteenth century is shown by a letter from John Hudde to Christian Huygens (August 18, 1671), wherein Hudde reported that he had prepared a mortality table from the experience of 1,495 annuitants in the United Provinces, upon whom annuity certificates had originally been issued during the years 1586-1591.

At the beginning of the 17th century the States General began to issue certificates with repurchase clauses. At that time, there were many persons of shrewd disposition who took out annuities in large amounts on the lives of young persons of strong constitution and the probability of a long life span. Physicians were employed by these annuity gamblers to pass on lives insured with the State Annuity Institution. It has been said that a large proportion of the annuities issued at that time were on the lives of children from 2 to 12 years of age. This wave of speculation was markedly checked later on by the rise of the so-called Tontines.

Little can be discovered on annuity practice in Germany during the early part of the 17th century. The Thirty Years War (1618-1648), the decline of trade in the North German cities, the lack of growth in the populations of these cities, the loss of their political independence, and other trials and difficulties of the times, rendered it impossible for the Germans to sustain an annuity system. Annuity practice was not entirely abandoned, however, as was evidenced when Count William of Fürstenberg brought home some 15,000 florins from some war which he had been profitably engaged in, and with it secured a life annuity of 1,500 florins from the City of Strassburg. In 1517, Hans Baldung Grün, the celebrated artist who was employed on the great altar of the Cathedral at Freiburg, secured an annuity of 25 florins, payable jointly to himself and to his wife, with a payment of 350 florins. The contract had the provision that at the death of either husband or wife, half the annuity was to be paid.

In Italy, there was evidence of the widespread practice of granting annuities based on loans. Benvenuto Cellini in his autobiography relates that in the year 1552 his fortune had suffered by the political intrigues of the times and that he was compelled to seek settlement of a debt of 1,200 gold thalers. He

secured, in settlement, an annuity of 15 percent. Cellini speaks of other contracts entered into for the payment of rent-charges based upon land owned by him.

TONTINES

The rise of tontines in the 17th century caused a gradual decline in annuity speculation on the Continent. The tontine was devised by Lorenzo Tonti, a Neapolitan physician and adventurer, who made a proposal to Cardinal Mazarin to resuscitate the French finances toward the end of the 17th century. His plan was as follows: A fund of 25,000,000 livres was to be collected and each year interest to the amount of 1,025,000 livres (4.1 percent) was to be paid thereon from the income of the state. The subscribers of the fund, or entrants, were to be divided into ten classes according to age; the ages below 63 were divided into nine groups, each consisting of seven consecutive years of age. Those above 63 were placed with the tenth class. Each "class" was to receive an annual payment of 102,500 livres. Contributions to the fund were greater for younger than for older persons and the interest rate was adjusted also according to age, a lower rate of return than the general average of 4.1 percent for the whole fund being paid to members of the younger class at entrance and a higher rate to those entering the fund at the higher ages.

Each class constituted a closed group or "pool," surviving members of each class receiving pro rata shares in an interest fund of 102,000 livres, which was distributed yearly to each class until the last member passed out of observation. After the death of the last member, the original fund reverted to the state. While Mazarin regarded the proposal favorably, the plan could not be established because of difficulties between the French King and Parliament. Tonti then attempted to promote his scheme through a lottery. Nothing came of this, however. Colbert, the French Minister of Finance, thought so little of the plan at the time Tonti invented it, and his opposition aggravated Tonti so greatly, that in 1669 Tonti wrote a pamphlet which landed him in the Bastille. It is said that Tonti died in prison about 1695, poor and forgotten.

The idea did not die, however. In 1670 the Dutch city of Kampen floated a tontine of 100,000 florins in 400 certificates of

250 florins each. This whole issue was bought up by one Jacob Van Dael, somewhat in the manner of the modern banking syndicate. A pamphlet or prospectus was published by Van Dael in which the following *prospective* survival table of the 400 annuitants was set forth.

VAN DAEL SURVIVORSHIP TABLE, 1670

Years	Number of Survivors
1	400
12	200
24	100
36	50
48	25
60*	12
64	8
68	5
72	3
76	1
80	0

*From the 60th year on the decrement is one death for each year of experience in the original table.

Van Dael suggested that no interest be paid to pool members until 24 years had elapsed; then 15 percent was to be paid. After 36 years, 32 percent; after 73 years, 400 percent, and after 80 years 1,600 percent was to be distributed to the survivors of the original 400. There was no mention of Lorenzo Tonti in Van Dael's pamphlet.

In 1671, the City of Amsterdam issued a loan of 50,000 florins in 200 certificates of 250 florins each. From the record we learn that after 38 years, the annual income of each survivor had doubled, at the end of 46 years it had trebled and after 67 years, *i. e.*, in 1738, the annual income to each survivor was ten times greater (80 percent) than at the inception of the scheme. The actual survivors in this Amsterdam pseudo-tontine were as follows:

Year	Survivors	Year	Survivors
1671	183	1706	100
1676	172	1711	97
1681	166	1716	64
1686	154	1721	52
1691	144	1726	40
1696	127	1731	27
1701	116	1736	22
		1746	20

In 1671, Van Dael also floated two similar tontines for the City of Groningen.

In 1674, there was issued in London a scheme of tontine annuities whereby sums in units of £20 were to be accepted and subjected to "so great an increase by survivorship as will most certainly accrue to many persons and especially to the longest liver of this rank."

In 1653, Paul Klingenberg, Postmaster-General of Denmark, a friend and co-worker of Tonti, attempted to found a tontine with the help of the Danish Government. The project failed, but incidentally it attracted attention to financial operations dependent upon human life contingencies. Tontine practices survived into the eighteenth century and so are significant chiefly because they represented a transition from the period when life annuities and gambling insurance declined, to a period when modern life insurance on an actuarial basis, arose.

JOHN DE WITT AND JOHN HUDDE

John de Witt was one of the outstanding personalities in this era of transition from the calculation of annuities on a guesswork basis to one based upon calculations which took into account the probable duration of human life. De Witt was born in 1625, educated at Leyden where he came under the influence of Van Schooten, an eminent mathematician. After a period of travel, De Witt studied at Angers where the degree of Doctor of Laws was conferred upon him. In 1647 he went to The Hague, occupying himself with mathematical studies, conducting a generous correspondence with Van Schooten and from time to time with Des Cartes. In 1653, De Witt became syndicus for Dordrecht in the Parliament of Holland and West Friesland. For 22 years he served as the head of the Government of his country. His efforts made Holland not only one of the most important of the seven United Provinces, but a mighty and respected force among European nations. William III, of Orange, while King of England, declared that De Witt was the greatest of statesmen and had served his country truly and well. The student of politics will find much of interest in studying the administrative achievements of De Witt. We shall have to limit ourselves, however, to his handling of the Dutch finances through state annuities.

In 1648, Holland had a state debt of 140,000,000 florins outstanding at 5 percent. De Witt took hold of financial affairs after 1653; by 1668, he had reduced the annual interest charge of 7,000,000 florins, by two-thirds. This followed his conversion of the state debt which began in 1655. In 1670, war threatened. Holland was surrounded by enemies who coveted her trade. In order to place the Army and Navy in condition, the Finance Commission proposed numerous measures for raising money among which proposals were mentioned: a loan of 3,000,000 florins at 4 percent, maturing in 41 years; a tontine for 41 years on the Kampen Plan; a similar loan for a duration of 10, 20, or 30 years, for persons who desired to buy short term obligations of the state. There was also a proposal for doubling the tax on flour products for one year. These and other proposals were made to, and were discussed quite fully by the Parliament, but the longer the debate continued, the deeper were the difficulties.

At length, De Witt told the Parliament flatly that it had been discussing problems and presenting resolutions which could be handled only with the help of mathematics. On April 25, 1671, the Parliament resolved to negotiate funds through the medium of life annuities. On July 30, 1671, De Witt presented to the National Assembly, a report explaining the basis upon which an enterprise could be carried out,—the presentation of his famous monograph "Waardje van Lyfrenten naer proportie van Losrenten." This treatise was first brought to the attention of the modern insurance world by Mr. Frederick Hendricks, who discovered the document itself. The treatise contained also, an interest table by Bellechieri and Lense and the table of mortality upon which the monetary calculations were based. The system of valuation was the same as the fifth method proposed by Tetens, the Dane. De Witt pointed out that his table presented the minimum values which the States General should accept, if the annuity scheme was to succeed. While there were many expressions of gratitude and appreciation from members of the Parliament for the work which De Witt had done, the plan was not adopted because of the opposition of political enemies. The De Witt plan had appended to it the certificate of John Hudde.

Much of the political opposition arose out of the fact that the prices set for annuities under De Witt's plan were to be higher than the Hollanders had been accustomed to pay or which they

thought were necessary. For one thing, De Witt's enemies charged that he had enriched himself through his contact with the state finances, a charge hard to believe, because of his secure, private financial position. These charges and others relating to his general conduct of the affairs of State, the heavy taxes necessary to the conduct of the war, caused strong opposition from the people. On August 20, 1672, De Witt was murdered by one Pöbel.

Leibnitz appears to have been one of the first to draw the attention of persons on the Continent of Europe to this report of De Witt's. It was, however, not well known in England. Both De Witt and Hudde labored not for their times but for later generations. De Witt's treatise has since been reprinted about thirty times. Four copies of the original treatise are known to exist.

Other events in the 17th century which had some bearing on the development of sounder annuity practices were the publication by William Webster in 1620 of his table of compound interest, "The True Valuation of Annuities, Leases, Fines, and Reversions"; the interest and annuity tables of William Purser in 1634; Hodder's book on arithmetic with its annuity table, 1661; Clavell's annuity table, 1669; the work of Pascal, Fermat and Huygens on the doctrine of chances in the middle of the seventeenth century; and the inception and development of vital statistics. Huygens' treatise, "Doctrine of Chances" was the first systematic discussion on probabilities which suggested ways and means of valuing life annuities. Later in the seventeenth century there was the work of Michael Dary, 1677, a paper by Adam Martindale published in the *Philosophical Transactions*, and the treatise by Mabbot, of Kings College, Cambridge, 1686.

This treatise by Mabbot contained tables for the renewal of leases and for the purchase of life annuities and was at first attributed to Sir Isaac Newton. The Mabbot tables were the first life annuity tables to be offered for public use in Great Britain.

In 1692, the first attempt was made by the English Government to raise money by means of life annuities and in connection with this effort there appears the first mention of life annuities in the English Statutes. Through the "Million Act" (4 William and Mary, c. 3) it was proposed to raise £1,000,000, to carry on the war against France, by means of tontine annuities, for the

interest upon which £100,000 payable annually was to be set apart until A. D. 1700, and then £70,000 annually. In the event that the entire million was not subscribed by a given date, those who had subscribed were to have, in lieu of tontine advantages, an annuity of £14 in respect to every £100 subscribed for the remainder of their own or nominee's lives. There were no provisions or restrictions as to age. Some £882,000 were raised by means of this method. In connection with this Act a table of prospective survivors was made up which showed the expected number of persons who would die out of 10,000 annuitants, in each year from 1694-1792. There are some suspicions that the astronomer Edmund Halley had something to do with the invention of this table. Since the entire £1,000,000 was not subscribed to, another Act was passed in 1693 granting life annuities also at the rate of 14 percent per annum. The actual experience of this batch of annuitants was tabulated by Mr. John Finlaison in 1829, along with his valuation of a number of other tontines issued in subsequent years by the British Government.

VITAL STATISTICS AND THE ANNUITY

Mention has been made of Edmund Halley. And this suggests at once that the development of vital statistics had an important bearing upon the preparation of the first annuity table (Halley's) which took into account the probable duration of human life as computed from mortality tables drawn from the experience of populations.

The Council of Trent had ordered (1545-1563) that parish priests keep a record of baptisms and marriages. Pope Paul V in 1614 ordered that a register of funerals or burials be kept also. At about the same time the Evangelical churches of Germany began to keep records of baptisms, marriages, and funerals. In Frankfort such a record was ordered in 1531 and established in 1551. Leipzig and Hamburg kept these records as early as 1595-1603. England also started the ecclesiastical records in 1538. The London Bills of Mortality which assumed so important a part in Dr. Richard Price's early actuarial work for the London Equitable, were established about 1592. On January 25, 1622, John Graunt published his "Natural and Political Observations Upon the Bills of Mortality of the City of London,"

the first treatise to discuss and to present somewhat in the modern manner, the data which afterwards were called "vital statistics."

After Graunt came Sir William Petty with his "Observations on The Dublin Bills" (1683) his "Political Survey and Anatomy of Ireland" (1691) and his "Political Arithmetic" (1690 and 1711). In the same century with Graunt and Petty there came a group of scholars in many fields whose emphasis upon induction and whose researches in mathematics and mechanics, encouraged numerous inquiries in the natural sciences and in political economy.

The first life table based upon recorded mortality in modern form was published by Halley in 1693 from materials collected by Kasper Neumann, the Breslau theologian. Neumann's inquiries came to the attention of Mr. Justell, Secretary of the Royal Society, probably through the offices of Leibnitz, the mathematician. The materials which Neumann sent to Justell were used by Edmund Halley in building the Breslau Life Table. Later the German mathematician Euler gave considerable attention to a refinement of Halley's method.

Halley not only constructed a mortality table but he laid down most clearly and distinctly the principles on which a life table should be constructed, and by so doing, contributed the cornerstone of actuarial science. While his actual methods were laborious he succeeded in presenting a table of annuity values at five-year age intervals as being "the short result of a not ordinary number of arithmetical operations."

The principles which Halley established did not, at once, enter into the plans of those who conceived the various annuity schemes which became a veritable public nuisance at the beginning of the eighteenth century. Halley's annuity table was the first to utilize mortality data drawn from actual experience, as well as a compound interest table. Halley had the advantage of Stevin's compound interest table and of Sherwin's logarithms in carrying through his annuity computations. He did not have, however, the use of commutation columns which later proved to be so helpful in annuity computations. These were invented by John Nicholas Tetens, a Danish mathematician and actuary about whom more should be known. American actuarial students ought to know that until the end of the nineteenth century in Germany, Tetens's work "Introduction to the Calculation of Life Annuities," was considered to be the classical and

standard textbook on actuarial science. This text was written in 1786 and was reprinted in several further editions. Teten's pupil, Struve published in 1803, and in 1806, a further treatment of the same subject. (Tetens' work was superseded by Zillmer's "*Mathematischen Rechnungen bei Lebens-und Rentenversicherung*", Berlin, 1861 and by Zillmer's later "*Beiträge zur Theorie der Prämien-reserven bei Lebensversicherungsanstalten*").

In 1698, an annuity project was set up by the Mercers Company of London mainly at the instigation of Dr. Assheton. The plan was to grant life annuities to the widows of the members at the rate of £30 for every £100 paid down by the member of the fund. In 1699 or 1700, another similar institution was formed under the name of the "Society of Assurance for Widows and Orphans" which has long since passed out of existence. The treatise of John Ward of Chester, England, in 1698 on algebra, contained an appendix which had in it a discussion of compound interest and annuities. In 1703 an act was passed in England in which life annuities were granted upon a similar plan to that in the Mercers Company but on less unfavorable terms to the purchaser. But the annuities granted under this act were subsequently taken up by the South Sea Company. In 1704 another act was passed for raising money by the sale of annuities as a war measure.

ANNUITIES IN THE EIGHTEENTH CENTURY

This century was to mark the decline of annuity schemes based upon guess-work, high expectation, and the sort of literary exploitation which today is known as "high-pressure salesmanship". The work of Halley, DeMoivre, Simpson, Dodson and Price through this century established the landmarks of modern life insurance. In 1705 the Amicable Society for Perpetual Assurances was established. It was incorporated by Royal Charter in 1706. The plan was to raise a fixed contribution from each member and from the proceeds, to distribute a certain sum each year, to the representatives of those that died during the year. No one was to be admitted under the age of 12 nor above 55 (afterwards lowered to 45) for all were to pay the same contribution. In 1734 the Society made arrangements for guaranteeing that the "dividends" for each deceased member should not

be less than £100. This was the first approach to assurances of a definite sum at death, whenever that might occur. The minimum dividend was afterwards increased, but still the Society adhered to the plan of rating all members alike, irrespective of age.

The dissatisfaction of Dr. James Dodson with this plan of the Amicable, led to the formation of the Equitable Life Assurance Society of London in 1756. Dodson found himself ineligible for admission to the Amicable on account of his age and he, therefore, interested himself in the project "to form a new society upon a plan of insurance of more *equitable* terms than those of the Amicable, which takes the same premium for all ages." Dodson's scheme gained the support of a number of persons and application was made for a Royal Charter. This was refused on the report of the law officers of the Crown on the ground that the scheme was too speculative. The Society was started, however, without a Charter under the name of "The Society for Equitable Assurance on Lives and Survivorships." It was to issue policies for the assurance of fixed sums on single or upon joint lives or on survivorships and for any term. At its inception, the Equitable Society conducted an annuity business. *Premiums were to be regulated according to age and lives were to be admitted with due regard to their state of health and other circumstances.* Provision was made for the investment and accumulation of funds and also (somewhat imperfectly) for the disposal of surplus.

Dodson, unhappily, did not live to see the project carried into effect; but in spite of its many original defects which had to be removed by experience, the edifice he erected remains to this day one of the most distinguished of life insurance institutions.

The famous interest tables of Smart appeared in 1707; a second edition was published in 1726 and this contained an appendix on annuities, with a suggestion for the improvement of the London Bills of Mortality. In the same year, Charles Povey, the founder of the Sun Fire Office, proposed a curious scheme "The Proprietors of the Traders Exchange House." At the end of the first five years, 50 of the poorest members were to receive an annuity of £10 for life; after another five years the other members were to receive the same grant. Povey was one of the most eccentric and remarkable characters in insurance history. His exploits have been fully set forth by Mr. E. R. Hardy in his book

"Making of the Fire Insurance Rate," Spectator Company, New York.

The year 1710 was marked by a lottery drawn in London, consisting of 150,000 tickets valued at £10 each; each ticket was entitled to an annuity for 32 years, the blanks to 14s. per annum, and the prizes to various annuities arranging from £5 to £1,000. In the same year, John Ward's "Clavis Usurai, or a Key to Interest," was published. Edward Hatton's "Index of Interest" appeared in 1711. This was the first attempt to popularize the arithmetic of life annuities. Thomas Langham's "Tables of Simple and Compound Interest" were also published in the same year but contained no reference to life annuities. There was some material on the present value of sums of money, of annuities, and leases, calculated at various rates of interest.

In 1714 several proposals were made for raising capital for questionable mercantile enterprises by means of annuities. Under date of January 15, 1714, it was proposed to raise £20,000 on annuities for 14 years *at 50 percent per annum* "upon a good and solid security" to finance the extraction of oil from beech-nuts! On January 26, of the same year, a proposal was made to raise money through annuities for the purpose of "raising a stock to improve the fishery." This Fishery scheme reappeared in 1716.

In 1714, also, we hear again of the scheme built on the plan of the Mercers Company project which was mentioned for the year 1698. It was discussed in a very lengthy prospectus, wherein 40 percent per year was "not rashly offered by the proposers, or without due consideration," but tables had been calculated to "prove" the practicability of the plan! The public was invited to accept the proposal provided it would give itself the time and trouble to examine it. Walford, who did "take the time and trouble to examine it" closes his observation with "Most virtuous, most noble, and most foolish proposers!" The full detail of this scheme is given in Walford's Insurance Cyclopaedia, Vol. I, p. 110.

Another wild annuity contrivance was proposed in 1716 whereby subscriptions were to be received to establish a *Publick Treasury* to grant annuities for life and to loan money upon real security to wholesale dealers, shopkeepers, and others; also, to pay the King's customs for merchants for goods imported, without interest, "the Treasury only taking the discount for

prompt payment allowed by Acts of Parliament." While some capital was subscribed, the matter was held in abeyance until 1720, a fateful year for such schemes.

The Mercers Company issued another notice in 1717 wherein it was stated that payments were to be made at the rate of 25 percent per annum to the widows of subscribers. That the time was drawing near for the dissolution of many of these fanciful schemes is shown by the experience of one Augustine Woollaston of Fleet Street, London, who "did in August of 1716 put out proposals to grant annuities for the term of 14 years, payable half-yearly, after the rate of 20 percent per annum. This, therefore, is to acquaint all persons that the said Augustine Woollaston will not grant anyone annuities after the 26th of this instant, October."

ANNUITY FRAUDS, 1698-1720

In 1718, the author of "The Political State of Great Britain," brought out a number of definite charges as to annuity frauds. He specified that there had been many frauds by false certificates that certain persons were alive. Persons of the same family name took upon themselves the given name of some annuitant. (This has happened in the annuity experience of British Companies comparatively recently!) The author suggested various means whereby these wrong practices could be checked. The full detail is given by Walford in his *Insurance Cyclopaedia*, Vol. I, p. 114. A meeting was called of all persons concerned in annuity funds to meet on November 24, 1718, "to consider and consult together of this or some other proper method to prevent these frauds." A committee was appointed to supervise an investigation. This committee brought in ten recommendations for the prevention of imposition upon the annuity funds. The next step was to publish a pamphlet "New Proofs in the Supposed Frauds in the Survivorships," which contained a series of discussions under 11 distinct subjects. Much of this discussion led to the restrictive action which was adopted in 1720 and which will be referred to later.

A subscription of £1,200,000 was proposed in 1719 for granting annuities for life and for assuring lives, the purpose of the subscription being to provide money to better the water supply of York-Buildings and Westminster in London. The water com-

pany which had supplied water from the Thames River (established October, 1691, on a charter granted by Charles I, in 1674), required funds for the extension of its facilities.

Toward the close of 1719 a Thomas Burgess proposed a subscription of £1,200,000 for securing annuities, settling jointures and assuring lives. A petition was presented to the King in Council by Sir James Hallet and others, praying for a charter of incorporation. This petition was opposed by the Amicable Society.

PROSCRIPTION OF UNSOUND ANNUITY PRACTICE, 1720

In the same year, the national finances were at a low ebb. The life annuities granted at the close of the preceding century were in arrears and what had seemed originally to be bargains for annuity buyers began to take on a dark, forbidding and uncertain aspect. But apparently an easy way out of the difficulty seemed to be at hand. The South Sea Company was rising to the height of its power. Its Governors, with the King at the head, were ambitious to grasp control of the national finances. They offered to the short term annuitants of the Government (32 years) South Sea stock to the amount of $11\frac{1}{2}$ years purchase, with additions in South Sea stock to the amount of the arrears on the annuities. This was quickly taken advantage of by the disgruntled and despairing annuitants. Early in the following year (1720) a similar arrangement was made with regard to many other classes of annuitants. The burden which was apparently eased from the Nation to the South Sea Company was in the amount of £666,821 per annum. After 1720, however, the South Sea bubble burst. One can imagine the plight of the annuitants.

The year 1720 marked the beginning of the end of the era of inflated annuity proposals. Early in the year (January 11, 1720) a proposal for an annuity capital of £100,000 was made and this was known as "Baker's Annuities." The Rainbow Coffee House scheme for £1,200,000 was launched on February 6, 1720 and the Draper plan for £1,000,000 on February 23. There was a further scheme, the Robins Coffee House plan for £1,200,000 to be advanced on goods, stock, annuities and talleys. On July 12, 1720, however, the Lords Justices in Council met and after taking the many proposals under consideration, ordered the petitions for incorporation to be dismissed. On February 22,

1720, the journals of the House of Commons show that a committee was appointed "to inquire into the several subscriptions for fisheries, insurances, annuities for lives . . . and to inquire into all undertakings for purchasing joint stock . . . and that it report the same . . . to the House." The preliminary report of this committee on March 18, 1720, said that several persons concerned in this undertaking, "had endeavored by corrupt and other undue practices to obtain charters to carry on their projects." The final report of the committee was issued April 27, 1720.

As a result of this inquiry, there was enacted (6 George I, c. 8), the so-called "Bubble Act," which placed a damper upon all these nefarious schemes. The South Sea bubble burst soon thereafter and more than a half century followed in England before there were any more important annuity schemes offered. Thus, half a century was devoted by scholars to the perfection of the scientific basis for the computation of annuity and life insurance tables.

ABRAHAM DEMOIVRE

There came definitely into insurance history in 1724 the name of Abraham DeMoivre. DeMoivre was a French Jew born at Vitry in Champagne, France. After the Edict of Nantes, he removed with his parents to England (1688). He was a gifted mathematician who laid the foundation of the theory of functions. His first work (1711) "De Mesura Sortis" was a treatment of certain questions in the theory of probability. After the fashion of the day, he busied himself with questions in games of chance; in fact, he used to hold consultations with gamblers in various London Coffee Houses. In 1718 his celebrated treatise "The Doctrine of Chances" appeared and of this text, there were three editions.

His text "Annuities on Lives" was first published in 1724 and was also issued later on in four editions, with incidental improvements. But the name of De Moivre is chiefly associated with his well known hypothesis: that out of a given number of persons living an equal number will die each year until all are extinct. He appears to have been well aware of the nature of this hypothesis and to have made the assertion that with a more bountiful supply of mortality data some other hypothesis or law of mortality would be developed. In view of this reservation by DeMoivre

himself, it is hard to understand why the "hypothesis" has been taken so seriously by various commentators. He first investigated Halley's tables and pointed out how the laborious processes employed by Halley could be shortened. We probably owe to DeMoivre the phrase "expectation of life." The fourth edition of his treatise on annuities (1756) with which was combined the third edition of his "Doctrine of Chances," has been translated into German by Emanuel Czuber. This edition with many marginal notes by DeMoivre was published by a friend according to an agreement which had been made with DeMoivre in the year before his death. DeMoivre died November 17, 1754, poor, deaf and blind.

The year 1726 was marked by the appearance of Richard Hayes' treatise "A New Method of Valuing Annuities Upon Lives." This work was of importance chiefly because it was one of the first popular and arithmetical demonstrations of the annuity principle. Halley and DeMoivre had each explained the methods of calculating annuities but neither had supplied a complete table. A new edition of Hayes' work was published in 1746 in which he admitted that life insurance was simply an annuity reversed. In 1729, the third edition of Mabbot's "Church Leases" was published.

John Richards published his work "The Gentleman's Steward" in 1730. This was the first time that annuity values for two or three lives, made by actual calculation on observed experiences, had been published. It is rather interesting that these early popular arithmetical discussions of the annuity were called in existence chiefly for the purpose of estimating the values of leases on lives and for other dealings in connection with estates and tenures, and not strictly for annuity purposes. It will be recalled that the Bubble Act of 1720 placed a damper upon annuity schemes. Edward Lawrence's treatise on "Estates Upon Lives" was published in the same year and contained Dr. Halley's annuity table.

In 1735 Gael Morris published his "Tables for Renewing and Purchasing of Leases and Also for Renewing and Purchasing of Lives." He used Halley's table at 4 percent and popularly illustrated the application to life leases of certain of DeMoivre's problems.

In 1737, a Weyman Lee, published anonymously, his "Essay to

Ascertain the Value of Leases and Annuities." In the following year, in a new edition, the name of the author was revealed. The book contained many errors which were corrected in a new edition in 1751. But in both textbooks, Mr. Lee persisted in his error that the value of a life annuity at any age is the same as the value of an annuity certain for as many years as the expectation of life at that age. Many other persons have held this view, and a clear demonstration of the inherent fallacy in Lee's assumption was set forth by Hare in the following century.

KERSSEBOOM'S TABLES, 1738

The first of Kersseboom's three tracts on "Mortality Observations in Holland" was published in 1738. In 1742, the second and third tracts appeared. These tables were constructed from the registers of many thousands of life annuities in Holland which had been kept for upwards of 125 years. The annuity values based on Kersseboom's table were judged by Milne to be of doubtful value since Kersseboom neither published the whole of the data from which the table was formed, nor explained the manner of its construction. In 1738, John Smart, author of the famous interest tables, published a table of mortality drawn from the London Bills of Mortality for the ten years 1727-1737. This table is not very well known, although it was the first mortality table deduced purely from English data. In order to condense discussion, a list will be given of the minor publications on annuities during the remainder of the 18th century.

- 1739 John Richards, "Annuities on Lives."
- 1741 John Ennis, "Arithmetic of Annuities."
- 1747 James Hodgson, "Valuing of Annuities upon Lives Deduced from the London Bills of Mortality."
- 1753 James Hardy, "A Complete System of Interest and Annuity,"
- 1754 S. Stonehouse, "The Valuing of Annuities on Lives."
- 1754 Edmund Hoyle, "An Essay Towards Making the Doctrine of Chances."
- 1762 Benjamin Webster, "The Complete Annuitant."
- 1763 Benjamin Martin, "Decimal Arithmetic."

In 1740 Struyk, a Hollander, published a folio work in Amsterdam in which he gave two tables deduced from separate observa-

tions on the lives of male and female annuitants. These were obtained from the registers kept for about thirty-five years in that city. The tables taken jointly differed little from the table of Halley, but showed a greater mortality than did Kersseboom's table. In 1741, John Peter Süssmilch, a Lutheran Military Chaplain, published his "Die Göttliche Ordnung" wherein he offered a life table. This was not as good as the Halley table and von Baumann endeavored to improve it in 1755. This was practically all of the investigation into mortality which had been done in Germany during the 18th century.

THOMAS SIMPSON

Thomas Simpson, another of the great minds in insurance history, published his "Doctrine of Annuities and Reversions" in 1742. Simpson, like DeMoivre, had also written on the doctrine of chances and he regarded his life contingency problems as so many applications of the principles of that doctrine. We owe to Simpson the use of the word "decrement" for expressing the number who die in a life-table year of age, out of a given number alive at the beginning of the interval. He was the first author to recall Halley's emphasis upon the proper place in the discussion of problems involved in life contingencies of the actual facts of a mortality table and to discourage the use of "hypotheses" and so-called "laws of mortality." He advanced actuarial science by providing the formula for deriving the annuity value at any given age from that of an age one year older. He incurred the wrath of DeMoivre, however, who seemed to think that Simpson's labors were superfluous in a field which he, himself, had cultivated. Simpson's publication "The Nature and Laws of Chance" in 1740 led to the preparation of his later work on annuities in 1742. In his treatise on annuities he also gave a table of mortality deduced from the London observations.

In 1744, DeMoivre, presented to the Royal Society in the form of a letter to William Jones, a paper in which, among other things, he endeavored to determine the value of life annuities when a proportionate payment is allowed according to the interval between the payment and the date of death, that is to say, he dealt with the "apportionable" or "complete" annuity.

HARDWICKE AND THE RE-PURCHASE OF ANNUITIES

In 1745, Lord Chancellor Hardwicke decided in the case of *Lawley v. Hooper*, that the grant of an annuity for life, containing a clause for redeeming or repurchasing the annuity on six months' notice, was a mere loan, and usurious, and he decreed redemption of the payment or purchase money at legal interest. On this occasion, the Lord Chancellor said "I really believe that ninety-nine in one hundred of these bargains are nothing but loans put into this shape to avoid the statute of usury."

Under the authority of 19, George II, c. 12, it was arranged to raise a certain sum of money on annuities and by a lottery. The annuity provision of the act (Section 64) provided for the sale of annuities at 13 percent for one life and 4 percent for perpetuity. A very large proportion of the capital was supplied by Hollanders who, almost without exception, nominated children and in a decided majority of the cases, girls. They seemed to have studied carefully Kersseboom's third essay or tract which appeared in 1742. These results showed a decided superiority in the mortality of females. The English contributors, on the other hand, were selecting nominees indifferently as to sex and age, some lives being proposed up to ages 50 and 60. These lives were included under Mr. John Finlaison's review of 1829.

In 1746, M. de Parcieux published his famous and very popular essay on the probable duration of human life. His results were deduced from the mortuary registers of different religious houses in France and from the lists of the nominees of the French tontines. In this work he also showed a table of the value of annuities on single lives, at three rates of interest, calculated from his table of mortality for the tontine annuitants. The work also contained an algebraical theory of annuities.

JAMES DODSON

James Dodson, another of the outstanding personalities in the development of actuarial science during the 18th century, published Volume I of his *Mathematical Repository* in 1848. In this work he strongly recommended the hypothesis of DeMoivre as the best means of determining annuity values *until the results of the London Bills of Mortality should be more dependable*. The second and third volumes of this *Mathematical Repository*

appeared in 1753 and 1755, respectively. In 1754 Dodson published his work "Concerning the Value of an Annuity for Life," and in 1757 in the *Philosophical Transactions* he published a paper "A Table of Annuity Values." Dodson seemed to have had a thorough mathematical and general scientific training. He studied annuities with DeMoivre. In 1742 there appeared his tables "The Anti-logarithmic Canon." He later became a teacher of mathematics in a school of navigation, and a member of the Royal Society. Dodson's *Mathematical Repository* would make a good text for actuarial students even at the present time. The writings of DeMoivre and Dodson awakened, in England, a vigorous interest in the scientific approach to most of the problems of life insurance and actuarial science.

In 1752 Dr. Thomas Simpson published his "Select Exercises." It was a supplement to his work on the "Doctrine of Annuities." This tract gave a new table of annuities on two joint lives and on the survivors of two lives. There is also shown a mortality table calculated on the London Bills of Mortality. It may be mentioned in passing that the book of James Hardy, published in 1753, "A Complete System of Interest and Annuities," mentioned for the first time insurance on lives. Hardy was, however, a disciple of Weyman Lee, the gentleman "who refused to be convinced that he was wrong." In 1753, also, James Dodson, in a letter to the Royal Society proposed a simpler method than that of DeMoivre for computing the value of an "apportionable" or "complete" annuity.

"An Essay on Insurance," by Nicholas Magens, a merchant of Hamburg, was published in London during 1755. This essay, in two volumes, is in the Insurance Library of Boston. These two volumes, are, by far, the most important treatises ever published on insurance, considering particularly the need of times when the treatise was prepared. In the opinion of Dr. Frederick L. Hoffman, the work will ever remain a classic of the highest merit in insurance literature. The first volume explains the nature of the various kinds of insurance practiced by the then commercial states of Europe, and shows their consistency and inconsistency with equity and the public good. In 1756, Dodson contributed to the *Philosophical Transactions* a table of annuity values based upon a compound of the Breslau Table and of a table based upon the London Bills of Mortality. This com-

pound table was constructed by a Doctor Brackenridge, whose name is not otherwise known in insurance history.

We have previously referred to the formation of the Equitable Life Assurance Society of London in 1756, and to the part which James Dodson had in forwarding the plan.

On January 11, 1759, the Presbyterian Ministers Fund was founded in Philadelphia, Pa. While the original purpose of this corporation was for the relief of poor and distressed Presbyterian Ministers and of their widows and orphans, the corporation later on specialized in annuities. In fact, from 1845 a special feature of the work of this organization was the underwriting of annuities. Until 20 years prior to 1875, the name of the corporation was "The Presbyterian Annuity Company." But since 1875 this organization has become quite prominent in life insurance for clergymen and has had a singularly successful experience.

The year 1760 was marked by the appearance of Euler's formula by which the value of an annuity on a single life could be derived from that of an annuity on a life one year older. This formula had been given by Mr. Simpson 18 years before, for effecting the same purpose, in the case of any number of joint lives.

In Germany during 1765, Lambert published the first part of his treatise on annuities. The third part was not published until 1772. During the same year in London, the London Annuity Society was founded and in 1776, the Laudable Society of Annuitants, was established.

Dr. Richard Price, a noted Unitarian clergyman, and later one of the staunchest friends of the independence of the American Colonies, published in 1771 the first edition of his work "Observations on Reversionary Payments; on Schemes for Providing Annuities for Widows, and for Persons in Old Age," to which was added "Four Essays on Different Subjects in the Doctrine of Life Annuities and Political Arithmetic." The date of this work has been erroneously stated by some authors as 1762 and by others, 1769. Dr. Price, in 1771, and a Mr. William Dale in 1772 drew very marked attention to the promises which had been set forth by several of the London annuity societies. These two men proved that the annuities proposed were much larger than the subscriptions justified and through the controversy which ensued, the science of life contingencies became, in a

measure, popularized. In this same year, the British Government again raised a further sum by the sale of life annuities and a lottery. John Finlaison included the results of this annuity project in his "Observation No. 2," 1829.

About this time numerous small annuity societies were projected in London and in the provinces, all of which met with vigorous condemnation by Price and Dale. Cornelius Walford was the first to direct attention to the work of Dale, who, it appears, was a member of one of the annuity societies and wrote from direct observation. It seems that the fame of Dr. Price really caused Dale's work to be passed over.

In 1772, Baron Francis Maseres published "A Proposal for Issuing Life Annuities in Parishes for the Benefit of the Industrious Poor." A bill was introduced in Parliament in 1773 with a view to the development of the project, but this resulted in no definite action.

The Reverend William Gordon, a clergyman in Boston, proposed, in 1772, a plan for a society "For Making Provision for Widows by Annuities for the Remainder of Life." This document is one of the rarest publications on insurance extant in America. Mr. Gordon in a sermon preached in Boston in 1777, argued in favor of extending life insurance to the general population but nothing came of it, except that some encouragement was given to the promotion of tontine schemes which came perilously near being in conflict with the British law at that time.

William Morgan, the nephew of Dr. Richard Price, published his "The Doctrine of Annuities and Assurances on Lives and Survivorships," in 1779. In the same year, a number of annuity proposals were made to the American Colonial Congress. Lotteries were quite common at that time in the colonies and absorbed most of the savings of the people. It had been resolved in the Congress in April, 1779, "that funds be borrowed on the credit of the United States in annuities on one and two lives, without distinction of age and that the annuity should not be less than \$50 on one life and \$70 for two lives yearly income. Strangers not naturalized, or citizens, or the subjects of any nation or country could acquire the said annuities and should not be likely to forfeiture or confiscation even in the case of war between the United States and the country to which the annuitant should happen to be a citizen." No action was taken in the

matter by the Congress but it is significant that this seems to have been the first suggestion in our country for governmental funding on the annuity plan. This item was extracted from the Journal of the Colonial Congress by Dr. Frederick L. Hoffman and further details will be found in his work on insurance science and economics.

Attention should be directed to the elaborate treatise on insurance by John Weskett which appeared in 1781. According to Hoffman this work is a particularly clear and comprehensive exposition of the principles and practices of insurance. Weskett's work is practically a comprehensive dictionary of insurance containing a concise enumeration of all the terms which were used at the time, and a full exposition of the practices and usages of every branch of insurance then known and understood. As an outline of the whole philosophy, science and law of insurance, it has not had its counterpart in any subsequent treatise on the subject. In 1781 de Parcieux published at Paris, his treatise on annuities. As we have previously mentioned, John Nicholas Tetens published in two parts, his introduction to the calculation of life contingencies in 1786.

In 1792 the Universal Tontine was organized in Philadelphia. It was contemplated, no doubt, at that time to transact business in all states then constituting the Federal Union. The originators of this plan included citizens of Philadelphia and Boston. The scheme was based upon the idea of the Boston Tontine Association established in 1791. This latter association failed in its original intent and ultimately became the state bank. A similar proposal in New York City also came to naught, but out of the Universal Tontine in Philadelphia, there developed the Insurance Company of North America.

In 1798 the Itinerant Methodist Preachers Annuity Society was founded in London.

We have now brought this record to the close of the 18th century and have reached the point where the transaction of annuity business was largely taken over by incorporated life insurance institutions whose calculations were based upon the fairly substantial basis of observed mortality experience. Insurance supervision by the states was established in principle (Massachusetts, 1799). It would extend this article too much to continue with a full discussion of the development of annuities

in the 19th century or to the time the usury laws were repealed in England—1854. The material shown is, possibly, a third of the amount of original data collected. Nothing has been said of the *montes pietatis*, only a scrap of the early history of vital statistics has been given, and the treatment of the legal and external economic aspects of the annuity has been much abridged. There is much that could be stated on nineteenth century annuity practice from the works of Charles Ansell, the father of actuarial science in Great Britain during the 19th century, and from the writings of Charles Babbage, Joshua Milne, Francis Bailey, Griffith Davies, David Jones, the Finlaisons, Augustus DeMorgan, J. W. Lubbock, Cornelius Walford, Jenkin Jones, William Farr, Samuel Brown, and the others who held aloft the torch that guided life insurance through several perilous eras during that century. Enough has been given, however, to show that the annuity has a record of possibly not less than 3,500 years of service. It may be feasible in a later essay to take up the exceedingly interesting career of the annuity during the 19th century, especially to consider its decline after 1854, and to suggest from the entire review of the annuity, certain amendments which could be made in current annuity and "rent-charge" practice. And by "current annuity and rent-charge practice" is meant any of the activities of investment banking institutions, insurance corporations and Courts having to do with periodical payments secured against legal persons, or against land and other property.

Except in a few of the companies, to-day the annuity is the step-child of the insurance business. Much can be done, and perhaps much will be done, to revise plans of annuity contracts to meet the needs of the public in the future. Estate economists, persons interested in trustee life insurance, the courts seeking for the the best disposition of lump sum settlements, and moneyed persons may find the certain yield of the life annuity more attractive than the slowly falling yield on the fixed rate securities which will be available to private investors in the future. Something could be said also of certain academic proposals at the present time for the drafting of an annuity plan providing for payments constant in purchasing value.

One of the most important topics which could be discussed is the rise of that form of annuity which is called a "pension."

This would take us into the development of early pension plans in England, the utilization of the idea in the organization of social insurance in Germany, the service of the annuity in France, the development of municipal and industrial pensions in the United States, and into other fields which fall outside the range of the present article.

I trust that I have given enough information to engage the further interest of our students in historical inquiry in the insurance field, and in the discovery of practices long since used and forgotten. These, when resurrected and stated in terms of today's insurance business could be applied with benefit over the entire field of personal insurance. The history of the annuity shows a succession of waves of interest and of working efficiency, the duration of which has depended largely upon the state of external economic and political conditions and upon the growth and decline of various philosophies of jurisprudence. Possibly in this historical review and in others which should be made, there are ideas which can again be applied in this current age characterized by a highly developed social jurisprudence, an advanced state of industrial organization, and a Renaissance of interest in the economic principles and practices which affect the business of insurance.

For much of the material in this article I am indebted to the works of Walford, Heinrich Braun, C. F. Trenerry, Vermeersch, Farren, Francis, Endemann, Ehrenberg, Jack, Hoffman, Gram, Grosse, Low and many others, whose writings I was privileged to examine during the long period in which the preparatory work on this paper was conducted. A short bibliography follows.

SELECT BIBLIOGRAPHY

1. Ansell, Charles. "A Treatise on Friendly Societies." London. 1835.
2. Ashley, W. J. "An Introduction to English Economic History." 2 Vols. Longmans, Green. London.
3. Braun, Heinrich. "Geschichte der Lebensversicherung und der Lebensversicherungstechnik." Koch. Nürnberg. 1925.
4. Ehrenberg. "Zur Entwicklungsgeschichte der Versicherung." Zeitschrift für die ges Versich. Wissenschaften, Berlin, Vol. I. 1901.
5. Hoffman, Frederick L. "Insurance Science and Economics." Spectator Co. New York. 1911.
6. International Congress of Actuaries. Transactions of the Third Congress, 1900. (Contains a series of articles on the history of life insurance.)

7. Jack, A. Finland. "An Introduction to the History of Life Assurance." E. P. Dutton and Co., New York. 1912. (A special edition of 375 copies was prepared in 1926.)
8. Pollock, Frederick and F. W. Maitland. "The History of English Law before the Time of Edward I." 2 Vols. Cambridge University Press. 1923.
9. Tarn, A. W. "Historical Review of Life Assurance." Insurance Guide and Handbook, Supplement. Layton. London. 1912.
10. Thomas, Roland. "Richard Price: Philosopher and Apostle of Liberty." Oxford Univ. Press. London. 1924.
11. Walford, Cornelius, Article, *Annuity*, in Insurance Cyclopedia, Vol. I. Layton. London. 1871.

GUARANTEEING FIRST MORTGAGE REAL ESTATE
BONDS

BY

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Mr. Chairman, Gentlemen, I should like to begin my remarks with an apology, as I have had very little time to prepare this talk and will have to refer to my notes from time to time. Usually a little story is not amiss and I am reminded of one characteristic of the colored race.

A Southerner had in his employ a colored retainer who was forever talking to himself. One day the Southerner asked Rastus, "What is the idea of talking to yourself all of the time?" "Boss," answered Rastus, "There is two reasons why I talks to myself; in the first place I lak's to talk to an intelligent man more than anything else in the world, and in the second place, I lak's to listen to one." But I realize that I am talking to an intelligent audience and I will endeavor to be brief and to the point.

I suppose most actuaries are Scotch, please pardon my reference to the noble race. It is often mentioned that the English and the Scotch make the best actuaries and accountants because of their national trait for close figuring, and it has been said that a Scotchman was too tight to pay attention. I suppose most of you are familiar with the definition of "efficiency" which consists of buying goods from a Jew and selling them to a Scotchman at a profit. But sometimes I think that instead of ridiculing thrift so much, most Americans ought to start practicing it.

Gentlemen, to get into the mortgage business, I might go back to the start of guaranteed mortgage companies. I think it is some forty or forty-one years ago that the Title Guarantee and Trust Company was started, and in my opinion it is the outstanding institution of New York in the guaranteed mortgage field. My view is perhaps a little prejudiced because most of our people are products of that institution and one of our men was long President of it.

*This paper presented by invitation of the Committee on Program.

The mortgage business I think is a business alone and it is useless to attempt it without the following: First, you must have large capital and second, you must have a capable Board of Directors thoroughly conversant with real estate and mortgage practice. Then you can start to build your organization. Some seven years ago we started the Prudence Company which is a subsidiary of a corporation by the name of Realty Associates, started in 1901. We put in two millions of dollars getting started; this was to be used in advertising and in getting the organization together. We lost \$1,250,000 the first two years, but we soon overcame that and we increased our capitalization until we have, today, \$29,000,000 in capital funds, about fourteen million in capital, surplus and reserves and fifteen million in revolving funds. I will explain later the purpose of a revolving fund in this business. This gives you an idea of the capital required to conduct the mortgage business conservatively; by conservatively, I mean that the mortgage house should carry its loans through to completion; in other words, it should not sell against a set of plans or a hole in the ground: it shouldn't sell the security when there is nothing there. Most of the difficulties and troubles in the majority of mortgage loans happen before completion and while the credit risks of most builders are all right in good times, in average times they are not so good. I think our business is highly specialized. You must first have the fundamental basic knowledge of real estate and the investor. That is especially so when you are guaranteeing everything you sell. There are no "ifs" or "ands" about the guarantee of conservative real estate first mortgage houses in New York. By that I mean in New York City where there are four or five of what we deem to be the leaders of all the real estate first mortgage companies; those who have been in business a considerable number of years and have built up large capital, surplus and reserve funds and who guarantee what they sell and who only sell against completed properties.

After you have your Board and have accumulated enough capital you can start your organization and one of the first departments you have to organize is an Appraisal Department made up of a chief appraiser and several assistants. In our company due to the size of New York City we have a separate appraisal department for each Borough and each of these depart-

ments is complete in itself and is headed by an expert appraiser. Ordinarily the city is divided up into sections and the assistants keep all of the data in regard to applications for loans, etc. The chief appraiser should be a pretty good man himself. Naturally he is a young man, not too young, not a boy. He must know the locality, keeps in touch with all that is going on in the district and makes his reports in detail. He gets details of sales that do not appear in the business papers. Those sales are all kept on record. Details of sales are also gotten from the stamps that are used. Stamps are not as reliable because a broker may put on more stamps than necessary for reasons of his own or they may be affixed by an inexperienced person. The appraiser must be familiar among other things with the rents, building vacancies; know whether a building is renting well, or whether it is vacant most of the time, and what the rents are, because fundamentally real estate is not at all different from a railroad or an industry, as the consideration of earning power is a very important one. The value of a railroad or an industrial security is judged by the earning power of the property or company instead of the physical value of the property. This is just as true in the case of real estate mortgages. The value of real estate is simply a capitalization of its net earning power. As the values must be based on income and the appraiser must use judgment as to what that income is and that of course requires experience. At the present time we are at the peak of high rentals and high values, most people think.

An application is made for a loan, the application is looked over and passed upon and if we are interested the property is then examined by experts from our loan, appraisal and engineering departments and a full report made to the Loan Committee who have to pass upon it. The Loan Committee is made up of men who are experienced in all phases of real estate mortgage financing. This committee should always be composed of men experienced in real estate and banking matters. We think we have the finest Loan Committee, Mr. Frank Bailey, Mr. Arthur H. Waterman, Mr. Louis J. Horowitz. Mr. Leo S. Bing and several others who are not quite so familiar to you are on it.

Our appraisal department alone costs about \$500,000 a year. That is just the expense as it produces nothing but data, details and opinions as to values. When you get through building your

appraisal department you get to the engineering department. This is also most important.

In many boroughs and many cities, the code in reference to building construction is not lived up to. You cannot depend on the political appointees of any municipality to live up to rules and regulations and pass proper judgment on plans and construction. We have to watch plans carefully to see that we get a properly constructed building. The engineering department passes on the plans. You would certainly be surprised if you saw the number of plans that are drawn up that are all wrong. Plans without enough closet space, insufficient lighting, poor layout, lack of sufficient elevators, plumbing, etc., are some of the things that have to be watched. As long as there is the required number of cubic feet to a building, that is all that seems to matter to some people. These are only some of the elements that we have to consider when making a loan. It is nonsense to say that if a building contains a certain number of cubic feet that is all that is necessary. A poor building might contain the same number of cubic feet as a well built building, but the latter will rent better and give a higher return on the investment. It will have less vacancies than a poorly planned one. Prominent architects often make plans but practical experience in handling real estate is needed in addition to theory. The engineering department also passes on the amount of the advances to be made from time to time on the building. It knows all about the building, how much of the work is done and how much is to be done, and they base their figure for advances on that.

A good many laws are passed every year for the purpose of helping the mortgage business. We have passed in our State during the last year some legislation of very material help to the mortgage business which allows a foreclosure for interest or taxes or an installment of principal without declaring the full amount due. This is a help to the borrower, a help to any guaranteeing company and to the investor. You cannot just take any appraiser's word for values as there are all kinds of appraisers. I am sorry to say this but there are only a few real good ones. It is much better to have your own appraisal department headed by a real expert having thoroughly competent men under him.

In this mortgage business the same as in the ordinary run of

business, the borrower doesn't pay more for his money than he does for anything else. One great fallacy is to have a very high class architect figure the cost of the building and have somebody figure the cost of the land then add the two figures together and submit that as the value of the property. That is all wrong. The two must be taken together to be figured properly and by the one appraiser. In figuring the income, we use what is called a work sheet, everything being shown in detail on one side for the operating expense and the other side for income. The operating expense includes charge-off for proper expenses; allowances for interest, taxes, foreclosure expense, vacancy, etc., that might accrue if your appraisal is wrong and you have to foreclose on the property. Sometimes your judgment may be wrong, or a mistake may be made in figuring, and these allowances must be made. I think you will agree that we might be at the peak of prices; in fact we think we are and also we believe most cities of this country are over-produced in hotels and office buildings, and at this time we are not making mortgage loans on either of these types, regardless of the equity behind the mortgage. Also in New York City I will say that changes of streets, subways, etc., have created bad fluctuation in values, but the percentage of loss occasioned by such changes is very small in a large volume of business such as ours.

After a loan is made most everybody thinks you are through with it. No guaranteed mortgage house is through with the loan until the loan is paid off. I am not trying to be critical as to the surety companies. If they went to the same expense that we do, they could guarantee loans too, but I say that they are not equipped to do it. They haven't the organization nor the capital to do this and that is what I want you to keep in mind. Surety companies don't watch advances. They have no way to follow the guarantee after the loan is made. On the other hand we have an organization that finds out whether the owner pays his taxes; if it is kept up, etc. If it is near the ocean, if it has a water frontal, we make what we call a frontal loan. By a frontal loan we mean our mortgage is so worded that in case of heavy storms or erosions by sea; or shifting sands, causing damage to the property on which we have the mortgage; we can go in and make the necessary repairs in the event that the borrower does not repair the damage. It might mean putting in new bulk-

heads and jetties and some fill, the expense of which would have to be paid by the borrower. All those things have to be watched and they are only a few of the things done by a mortgage guarantee house.

I don't believe the surety companies get any part of the preferred business. I say this because the borrower goes first to a life insurance company, from there to a savings bank, from there to a guarantee mortgage company, from there to some of the other bond houses that don't guarantee their goods, and finally to the surety companies. Why do they ask for your guarantee? Because none of these others will take the loan. Because you can do it cheaper and the borrower doesn't have to pay for your guarantee. Now that is in a small way the substance of the mortgage business. I have not touched on the matter of the sales department or the bookkeeping and record end of the mortgage business. These are very important, but I have tried to be as brief as possible.

(EDITOR'S NOTE: At the conclusion of his address Mr. Greve invited the members to ask questions. The following is a transcript of the discussion.)

- Q. I would like to know whether you feel it is good business for surety companies to guarantee the individual mortgages that are placed as collateral or part of an issue against a mortgage? I understand National Surety Company guarantees only principal and interest of the entire loan.
- A. As I stated before, I do not think the surety companies are properly equipped to guarantee mortgages; however, to anyone who has the proper organization for guaranteeing mortgages it is especially good business to guarantee individual mortgages placed as collateral provided they guarantee all of the mortgages behind the collateral. Some of the surety companies guarantee only part of an issue, which is the worst thing you can do as partial guarantees are unfavorable to the surety company or to any guarantor because they might have to bid in the property at a foreclosure sale at an amount equal to or greater than the entire loan to make good its guarantee; and if you have to do this you are forcing yourself to protect the other fellow who has no guarantee and it is apt to cost you money. You can guarantee most any type of mortgage, provided you have enough knowledge.
- Q. What do you think of the individual mortgage and the small home owner?

- A. There is no question about the small home owner or the individual mortgage. The small home owner is the best risk. From our experience it is proved that they are the most reliable and during the last twenty years \$220,000,000 has been loaned by one company to small home owners with a loss of only \$20,000. It would take some of you fellows a long time to figure the percentage of loss on these figures. Last year one of the title companies' sales amounted to \$160,000,000. Their loss due to foreclosures for the same period amounted to \$125,000. Considering the volume of business done this is negligible.
- Q. Some of the surety companies guarantee the entire issue of bonds. If anything went wrong or one of the issues went into default would it bankrupt the surety company?
- A. I cannot imagine a piece of real estate that goes to nothing, yet there are some examples in Florida where the shrinkage is stupendous. They have hotels and office buildings ten stories high, or more. I don't know what they want the office buildings for and I think it would be well if six or eight stories were chopped off, but taking the Florida cases as an extreme example I do not feel that the surety companies who guarantee an entire mortgage against one of these propositions would go broke. But they would have to take a substantial loss.
- Q. Isn't it true that the cost of the surety bond is passed on through the investment and taken out of the investor?
- A. In the case of a surety guarantee to the bondholder it is customary for some of the companies to charge the customer one-half of one per cent and in some cases one per cent. If, however, you are referring to the bond of completion, I would say that borrowers go to brokers as a rule to place the loan and they look for the cheapest places to borrow first. Brokerage is usually high. A good bulk of the new issues comes through the speculative markets and while the borrower doesn't want to pay any more than he has to, he would have to stand the cost of the completion bond.
- Q. How do you figure your guarantee compares with the surety company guarantee?
- A. We feel that our guarantee or the guarantee of any one of the five leading companies in New York is superior to a surety company guarantee, due to the fact that we have an organization that is built purely from a view point of making and selling a special security with an unconditional guarantee. We do everything. Put in our own money first, do not sell until completion and have the proper facilities for full investigation before the loan is made and for the proper

follow-up after the loan is sold. Furthermore, we are guaranteeing only one commodity whereas a surety company is guaranteeing thousands of different risks.

Q. Do you expect to have any losses?

A. Yes we expect some losses in bad times and we set up a proper reserve to take care of them. To date, however, we have not had any losses. The usual losses in the guaranteed companies are very small, they always get the preferred mortgages, but it is not human not to make mistakes at some time or other. Many of the companies who can't sell their bonds themselves and whose credit isn't any too good go and buy a surety guarantee in order to try to sell the goods and we think that this is a risk.

Q. Isn't it true that some mortgage companies get into trouble because they don't handle each loan separately and because they put all their funds and mortgages into one pot?

A. No. The answer to your question is that the men behind the companies don't have the proper knowledge and experience in the real estate mortgage business and that is the reason for the trouble. You can't run a business properly unless you know all that there is to know about it.

Q. What is the purpose of your company's revolving fund?

A. The revolving fund is to enable us to carry through our building loans. This fund amounts to \$15,000,000 and is with the Central Union Trust Company. We put our building loan mortgages in this fund and advance to the borrowers from same as the building progresses, on the reports from our engineering department. In this way we carry all of our mortgages through to completion and not one cent of any mortgage is offered to the public until the building is fully completed and income-producing. Many companies as you know sell the so-called security to the public before a spade of earth has been turned and simply against a set of plans and specifications.

Q. You mean by this that you take a risk when you sell against a building which is uncompleted?

A. Ordinarily the bondholder would be taking a considerable risk, but it is possible to so rig the business that you can sell against uncompleted properties, but we do not feel that this is the proper kind of business when you are guaranteeing everything that you do.

Q. What is the basis of your guarantee? The capital invested in your business?

A. Our guarantee fund is composed of capital, surplus and reserves of over \$14,000,000. This is in the form of bank

deposits in the state of New York, securities and first mortgages. We have nothing behind our guarantee but first mortgages, securities and cash and the securities are mostly such as are legal for savings banks in the state of New York.

Q. Is this capital and surplus invested in your mortgages?

A. Yes, we invest our money in first mortgages, buy them back, sell them again and thus make a turn-over. History has shown that a conservative real estate first mortgage is the safest investment known and over a period of time it also offers the highest yield.

Q. Suppose you have two buildings exactly alike. One is a 60% loan and the other an 80% loan; is there any difference in the rate of interest in these two?

A. There might or might not be a difference in the rate of interest, but there usually would be a difference in the initial cost of the loan. We do not make 80% loans. In the case of the 80% loan the fundamental 20% depreciation is out and the mortgagee gets it. We will not guarantee depreciation. I don't think anybody can live and guarantee 80% loans, but you can bet your last dollar that if the mortgagor owned both of the buildings that he paid a lot more to get the 80% loan than he did to get the 60% loan regardless of the rate of interest in the two cases.

Q. What is a conservative ratio of outstanding guarantees to capital, surplus and reserves?

A. I think a conservative ratio is twenty to one.

Q. Is it about that with your Company now?

A. No it hasn't reached that point as yet.

Q. How do you select the territories in which you operate?

A. It is purely a matter of judgment in choosing the right place for doing the best business. I might add that we are now experimenting with an office in Jamaica, Long Island. We are trying to get our personnel together so we can operate from that end. When we feel that we want to branch out we send out investigators and make a careful study of all conditions in the territory selected. In this investigation we do not necessarily stick to purely conditions as affecting the first mortgage industry but make a careful survey of everything. We then try to figure the best section in which to commence the next operation.

Q. How do you secure diversification in your mortgages?

A. We loan on all types of property except absolute specialties, by the latter I mean a business building that is constructed for just one specific business and which is not readily adap-

able to other kinds of business. Churches and legitimate theaters also might be called specialties, however, a theater which had stores on the street front, which is carrying the interest and amortization charges on the loan without regard to the theater itself would be considered a good loan. We do not buy anything but individual loans and we have them on many different classes of buildings. I will give you an illustration. We recently took an issue from the Famous Players, some twenty-five million in all. We didn't sell or guarantee this issue, but have sold it to another bond house. The reason being that the issue includes too many theaters for us so we merely acted as negotiators. We know pretty well how many hotels, office buildings, apartment hotels, two and three-family houses, industrial buildings and garages there are in any section of the country, but we make it a practice never to loan on too many buildings in any one industry nor to loan too much on any one class of property or too much in any one section of a city.

- Q. Do you intend to branch out?
- A. Yes. Branching out can be done but it is a slow process and a very expensive one. Ordinarily a branch office will not pay for several years. It requires a lot of money to get started and while everybody thinks it is very easy you must have considerable capital and surplus. We don't believe in getting rich over night but believe that the slow conservative road is better.
- Q. Do you loan against small mortgages?
- A. Yes, we make hundreds of loans against individual homes which we sell in New York state mainly to savings banks. These mortgages are legal for savings banks and also legal for trust funds in our state.
- Q. How can you compete with the insurance companies and banks?
- A. We compete with them in this way. We solicit our own loans. We have loan negotiators in the field following up every possible lead and trying to loan the other fellow some money. Furthermore, we are in such a position that when we find a borrower whose proposition is attractive, we can give him an immediate answer and give him the money at once. Many of the insurance companies and banks may investigate the loan, but before they can accept it it might have to go before their next loan meeting and many times they are not in a position to loan the money at once even if they do accept the loan, but tell the borrower to come back at the end of the month or two months. The borrower is usually willing to pay a little additional for prompt service.

Q. Would your loan on a private residence be higher than a savings bank would loan?

A. No, we sell our mortgages to savings banks.

Q. Do you retain any of a mortgage yourselves?

A. The answer to this is yes and no. In the first place we make building and permanent loans and we retain the building loans ourselves until completed before selling. We may then sell the whole issue to a savings bank or to the public. Permanent loans of course can be sold at once. We make and sell only first mortgages and do not sell any seconds ourselves. We have what we call three classes of goods. First, we have a bond which is a first mortgage collateral bond issued against a group of first mortgages deposited with an independent trustee. We also sell what is called a Certificate which is a participation in one specific mortgage. These are sold legal for trust funds in New York state. We have also had a number of legal issues in the state of New Jersey. In the third case we sell the individual mortgage. These mortgages range from \$2000 to \$2,000,000, and in the case of insurance companies and savings banks we often sell them mortgages of one million or over. In all three cases the goods are unconditionally guaranteed as to both principal and interest. Individual mortgages are legal for savings banks.

Q. If you have a default on a payment of principal and interest on a mortgage would you take it over?

A. Yes, we could do that. We don't take property, however, to hold or operate, but immediately sell same. Of course you have to consider the circumstances. In the case of mortgages on small homes the people are usually a little late in their payments, they are seldom prompt. However, they simply need following up and we have a very efficient system of follow-up and so far have not had any trouble in getting the money. Individual home owners are not dishonest; they are merely sometimes a little lax in their business methods as applied to their own home. In the case of the guarantee company, however, it has to pay its interest on the date when due. In the case of our company, we will cash coupons on our bonds fifteen days before the interest date if they are brought to any of our offices. This is a special accommodation. In the case of interest checks on certificates or mortgages, the checks are mailed out by us to the investor the night before in territory adjacent to New York, but if the investor lives far away such as in Texas or California we make it a point to see that our checks to all these distant customers are mailed four or five days earlier so that they

will receive same on the date due. In most cases on our larger mortgages, however, the interest is always ahead of time and it is only exceptional cases in which it is sent to us a day or two late. Conservative money can only be made in a conservative mortgage business by doing a large volume of business and giving service.

Q. With experience but no capital could a surety company do as you have done?

A. No. You can't take the conservative loans without capital. Suppose you make a million dollar loan on a certain building in Boston, you want to borrow that money, most bond houses you say will loan you the money, however, they will charge you interest on the entire million dollars right from the start. We don't. We charge interest on the money as it is advanced. If a builder wants fifty or a hundred or two hundred thousand dollars, as the building proceeds he only pays interest on the amount drawn and then when the full amount has been paid to him and the mortgage closed, then only do we begin charging him interest on his total loan. It requires a large amount of capital to carry the building loans through to completion if you do any volume of business.

Q. Do you think a surety guarantee is needed?

A. No. In the first place you don't need any surety company guarantee if you have both the ability and capital to run your business and in the second place you can sell your goods better on your own guarantee which is far better than the guarantee of any surety company. In our case we have more money behind our guarantee than any surety company and as stated before, this guarantee is only behind our securities and doesn't have to cover a multitude of various risks. In our case we don't have to put the borrower to any additional expense; we don't charge him anything more for the guarantee. We charge the investor for that, but he is assured that we believe in what we sell him and we say if your security is as good as you say it is why not so certify by endorsing your all on the security to show your faith.

Q. The bond house that has to get the surety guarantee on a proposed loan also has to get some money to advance to the borrower. How does he do it?

A. Yes, it is very true that the builder must make payment to contractors for materials and work done. Very few builders have the capital to finance their building through without a loan. Now, unless the mortgage or bond company has the capital of its own to finance the loan to completion it has to go out and sell the construction loan to the public. Many

real estate loans are made and sold to the public before the building is up, sometimes and in fact, very often, even before the old buildings are torn down, the entire issue of bonds to cover the new proposed building is in the hands of the public and these are sold in the guise of first mortgage real estate bonds and they should be called by their proper term, construction bonds. The mortgage guarantee companies don't conduct their business in this way.

Q. When such a company as the one mentioned in the last question buys a surety company guarantee does it ever dispense with the guarantee?

A. Yes, sometimes they may sell an issue without a guarantee or they may sell only part of the issue guaranteed and the other part unguaranteed.

Q. Do your customers dispense with the guarantee?

A. No, in the first place we don't sell anything unguaranteed and our customers seem willing to leave their money with the guarantee company. This is a funny thing to say, but the ordinary investor doesn't know what he is buying. He buys on the reputation of the company and the faith he has in it. It seems that the fact that the company has seen fit to guarantee with its own capital, surplus and reserves, its securities, that he has more faith than he would in one who didn't.

Q. Do you believe that in order to successfully launch a mortgage company it is necessary to start on a very large scale?

A. I don't think a mortgage company can be successful unless it has a very considerable amount of capital.

Q. You mean you can't start out in a small way?

A. I don't think so.

Q. Is it that competition is too great?

A. No. It is true that you have competition with the life insurance companies, savings banks and trust companies and now along come the national banks. Of course by having a surety company guarantee your mortgages it enables the small financier of good judgment to start a mortgage company. Don't construe from my remarks that a fellow can't do it. It can be done. Some fellows are satisfied with small profits and to wait a long time to get any place. I am talking generally. Probably that is the reason why they want the surety company, but the surety company can't make any money on a small volume of business of that kind. To do that business safely they must do the same as we do; put the builder and contractor on the bond, and

another reason why they must do as we do is because they are guaranteeing, really they are buying the bond when they guarantee.

Q. Would you say, Mr. Greve, that it was a lack of capital that was the cause of the failure of Miller and Adair?

A. No. The Adairs are very nice people, but it was too bad that both of these concerns knew nothing about their business. They got into the bond game and yet they didn't know anything about it. After they had profitably picked the mortgages they turned around and lost on every bond they handled and you can't do business without volume. You must have an organization to carry your overhead, to get your information on loans to sell, etc., and unless you can sell what you take you are not going to get very far; and as I stated before, it is not good policy and you can't live long upon loans ranging from 80% to 100% of the value of the property.

Q. What are real estate bonds ordinarily netting the investor, that is, what is the rate of interest?

A. In today's market guaranteed mortgages, bonds and certificates yield five and five and one-half per cent.

Q. How long are the maturities at these rates?

A. Seven to ten years, that is as long as any of the maturities run with the guaranteed houses.

Q. Is there any reason for that?

A. Yes, long maturities in real estate bonds are not conservative. There are too many uncertainties and changes in real estate such as changes in neighborhood, changes in land value, depreciation of property and changes in the times.

AUTOMOBILE FINANCING

BY

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This subject is broad enough to permit a variety of presentations. In this paper it is considered generally, not with an elaboration of statistical analyses, but rather in a way likely to be most interesting to men whose contacts with it are indirect rather than specific.

Time sales, or arrangements for purchase under deferred payments, have a long history in financing systems. The application of such plans to automobiles is comparatively recent. A brief statement of the causes which led to this application will not be out of place.

In the beginnings of the automobile industry, which is still youthful, most of the manufacturers did not have financial strength. Dealers in the early days gave but little time to this enterprise and still placed their main reliance for support on the bicycle shop or some other small business which was more dependable as a source of living income; financial strength was notable chiefly by its absence. In those days an automobile was regarded as the highest type of luxury, the purchase of which was considered only by people distinctly well to do. One had to be eccentric to own an automobile in those days.

Following the emergence of the industry from its purely experimental state, there was a gradual development of mechanical process. As this went on and handwork decreased, it was soon apparent that an increase in production would bring more than a corresponding decrease in cost. Naturally many minds were engaged on the question of utilizing this potentiality.

It was clear that to attain substantially larger production prices must come down to a point where they would be within reach of a much larger potential purchasing group. But it was equally clear that the financing of such an increased production would place an insupportable burden on a financing structure already weak. Momentarily it appeared that a vicious cycle had

* This paper presented by invitation of the Committee on Program.

been established. As usual in such cases, men began to feel around for a way out.

It did not seem that the manufacturer could supply the need because he required for essential expansion and normal working capital more than he could command. It was hard to see how the dealers could supply the required arrangements because they were already extremely hard put to it to carry a minimum stock in trade. Quite apart from the possibility of financing a larger production, both manufacturers and dealers faced another problem already a contention between them, namely how to care for the dull season, which, during the days when the open car prevailed, was most embarrassing to all parties of interest. The dealer had so many problems of his own that it was quite beyond his ability to give aid to a purchaser who perhaps could really afford a moderate priced car, but, for one reason or another, did not find it practical to pay for it at the moment of purchase.

In these circumstances, and over a considerable period, all sorts of expedients were tried. Many of them failed. Gradually and naturally, special agencies for automobile financing came into being. As the business progressed through its early stages, it gained many elements of strength. A considerable element of dependability and standardization came into play, and it became practical for banks to take a larger part than they had been willing to theretofore. In the course of the natural developments of this period, the so-called finance company came into play. As a natural evolution, the industry worked in to the present practices of automobile finance.

There are, of course, infinite varieties in the different stages of present-day automobile financing. It will suffice, perhaps, to give a broad outline of the practices generally in effect.

Most manufacturers today are relieved from financing a car when they have completed its sale to a distributor. They are left free to utilize all of their funds in manufacture and in carrying their product to the point of first sale. They are able to confine their main thought and energy to problems substantially similar to those encountered by most manufacturers. Some, however, have seen fit to interest themselves in the later stages of financing, either through subsidiary companies designed for this purpose, or by an arrangement with some finance company whereby the latter will offer some special plan to the dealers of this particular manufacturer.

It is comparatively rare today for the dealer to concern himself with financing beyond completion of the secondary sale. Generally speaking, he gets back his investment and his profit when he sells a car. Up to this point, it falls to him to arrange the financing from the moment he purchases cars from the manufacturer. In some instances he carries the burden entirely with his own funds. More often he borrows either from a bank or a finance company, either on his unsecured credit or by pledge of the cars, or by both methods. The loans against cars take various forms, but in almost every instance require the dealer to provide a percentage of the cost price. Sometimes the cars involved in such loans are lodged in public warehouse, but in other instances are carried on the dealer's floor. The dealer's capital, therefore, is used both for his ordinary working capital requirements and to provide the equity in the cars against which he has borrowed.

The dealer knows that the bulk of the people who will purchase cars from him will want a fair amount of time in which to complete payment. He, therefore, makes an arrangement either with a bank or finance company, so that when he completes a sale, they will help the purchaser to pay him the full sales price of the car. When this has been done in any given case, the dealer is enabled to pay off his loan, restore to his general funds the amount he has had tied up in the car, and to obtain his profit in cash.

The bank or finance company extending the so-called "consumer credit" naturally has certain rules which they require the potential purchaser to meet. The financing agency is concerned with the ability of the purchaser to consummate payment, because otherwise the car will revert to them, thus bringing trouble and possible loss. The agency is also concerned with minimizing the chance of loss in the event repossession becomes necessary, and protects against those possibilities, first by requiring a substantial "down payment," and second, by limiting the period within which payments must be completed.

Their object is to have a combination arrangement on these two points which will leave a value in the car at all times at least equal to the amount unpaid on the purchaser's note. It is perhaps unnecessary to remark that these principles are sometimes deviated from, and even when applied in good faith, do not always produce the desired result.

From the standpoint of banks and finance companies which

operate in this field of financing, there are but comparatively few fundamental principles of operation with which they must constantly concern themselves. First of all, the financing agency is selective as to the make of car which it will finance, giving regard to its standing, popularity, wearing qualities, used car price, depreciation, etc.

In the second place, the financing agency is concerned to have their plan one which places a responsibility on the dealer. Otherwise, he is encouraged to make sales without regard to the purchaser's ability to pay. Various devices are used to secure this point of protection such as dealers' endorsements, agreement to repurchase the car if it is not paid for, arrangements whereby the dealers' profit, or part of it, is withheld until payment is completed, etc. Naturally, the financing agency gives consideration to the financial resources of the dealer, but it is perhaps rare when these are sufficient from a protective point of view, so that generally reliance is placed on some other feature of the plan.

A point of paramount importance is the credit or ability of the purchaser to pay. There is no easy way to picture the particular considerations which must be present in a satisfactory risk. A carefully managed agency, however, makes rather thorough inquiries as to the purchaser's standing in his community or neighborhood, his reputation for steadiness and honesty, his employment and the wages he receives, as well as collateral information such as ownership of property, etc.

Finally the agency is concerned with the amount of the "down payment" and the length of period over which the payments are to be made. Their object here is to have the owner possess at all times such a substantial equity in relation to value that he will strive mightily before giving up his claim to the car. They are almost equally concerned that the combination of "down payment" and instalments in hand at any time shall cover at least approximate depreciation which would be measured against the car in the used car market.

There are, of course, other considerations of importance to the financing agency. Enough has been said, however, to indicate the main principles by which the soundness of a given instalment plan may be measured. It is rare indeed to find a record where these considerations have had full weight and failure recorded. Almost invariably if cases of trouble are investigated, it will be

found that the causes lie in the neglect of, or departure from, one or more above mentioned principles.

There are, of course, forces at work most of the time which tend to have a pull away from sound principles. The dealer, in his concern to make profits, is apt to pay but little attention to the credit worth of the potential purchaser. Finance companies have grown up and spread out so rapidly that their local organizations have oftentimes been weak and have failed to give the applied local supervision and service which is peculiarly essential in this business. As in any other attractive new business, many finance companies have sprung up, not always with sound management, and, naturally, an intense competition has been developed, with the usual experience that some began to offer terms which temporized with safety. At the height of this development, inadequate "down payments" were required, and too long a period allowed for payments, with the result that the owner made but little effort to continue to hold the car, presenting the vehicle to the company with a balance due on it greater proportionately than the depreciation which they had anticipated. Numerous companies in the haste of financing neglected the investigation of the individual's credit, with results naturally to be expected in such circumstances.

Experiences of the type just mentioned are not unique to the automobile financing business. Their equivalents are to be found in the records of practically all other lines of enterprise. Apparently the peak of these difficulties is quite well behind us. The troubles have been real, and in some cases have produced substantial loss. They have, however, brought their own corrective, and it is probably accurate to say that the automobile financing business generally is on a more conservative plane today than it has been at any time in its comparatively brief existence.

With the development which has been broadly traced the automobile business itself has had an enormous expansion. It is hard to escape the conviction that perhaps the largest single reason for this industrial growth is the financing system which is related to it. Out of the comparatively easy financing grew a tremendously larger volume and out of that came lower prices permitting general purchase. The retail value of automobiles sold this year will probably be something like eight times that of those sold in 1913, despite the fact that automobile prices generally have gone down perhaps 30 to 40% between the years mentioned.

Out of this growth has come one of our leading industries employing directly and in accessory and supply lines a veritable army of people. A large part of the product of a number of our basic industries goes into the automobile field. It is probably not inaccurate to say that a continuation of these conditions is dependent in large measure on the automobile financing methods which we have just discussed.

The comments which have just been made apply to this caption, Economic Consideration, but there are other considerations which require mention. As with every other great development, the building up of automobile financing has brought evil as well as good. It is difficult, however, to avoid the conclusion that the net effect has been beneficial.

It is sometimes charged that the development of automobile financing has impinged upon our national thrift. An examination of the ordinary measures does not give warrant for this conclusion. The deposits in our various banks, particularly savings banks, are greater than ever before, and the growth in the number of depositors has been in keeping. I am told that there are now in this country about four times as many savings bank depositors as there were in 1913, and the deposits have gone up more than 200% since that time. Figures on life insurance do not reflect cause for alarm; I believe that the life insurance now in force is at least five times that in existence in 1913. There does not seem to be any marked reduction in the number of persons buying and owning homes.

On the other side, we find wages and salaries paid out by industries enormously greater than they were before the automobile development attained large size, and we find both average wealth and average income per capita figures show commendable increases. In part at least, these developments are undoubtedly due to the marked increase in production which has come about in relation to the developments which we have discussed.

There is probably very little realization of the part that the automobile has played in the opening up of our country, and particularly in our suburban developments. The advantages to what we may term our national health are probably just as great as those which have come in purely material things.

Approximately three-quarters of all new cars are sold on instalments. This leads in a good year to perhaps two billion of instal-

ment paper, but it should be realized that this amount is never outstanding at any one time. The average debt will run about half of the total paper. Furthermore, the average time that the average debt has to run is, say five or six months. These points are made in relation to the fears often expressed as to the effects of an industrial depression on automobile financing.

All in all, there is no reason for doubt that the development of automobile financing has brought benefits measurably greater than its faults. If it is held to sound principles, there appears to be every reason why it should contribute large benefits in the period ahead.

(EDITOR'S NOTE: At the conclusion of his address Mr. Hunter invited the members to ask questions. The following is a transcript of the discussion.)

Q. May I ask a question about the General Motors Company? Do they have any agreement with the General Motors Acceptance Company as to the repossession of cars?

A. They have an agreement with dealers. If he saw fit a General Motors Dealer could make his financing arrangements through some other companies. They are not obliged to go to the General Motors. It is a very sound plan. Naturally most dealers take it.

Q. Would General Motors Company refuse an application from their dealers to finance?

A. I never heard of such a case. They depend on their dealers to inquire as to the credit of the purchaser. That is the thought they try to keep foremost in the minds of the dealers. I think they have done very well in having a sound standard of credit. They don't accept the word of the dealer alone. They, themselves, investigate. That is of course a very conservative way to do business.

Q. Is the General Motors Acceptance Corp. a different concern from the General Motors Company?

A. Yes.

Q. General Motors Acceptance Corp. is simply a credit company and controls the business?

A. Right. They also have an arrangement where they set aside a certain percentage of the business they handle, I think $1\frac{1}{2}\%$, for the benefit of the dealer. They make quarterly payments.

The dealer has credit kept constantly in his mind. If things don't go through he has to take these things back. That is not at all pleasant for anyone.

Q. Are loans made through a financing company almost without any security except the car?

A. A man might borrow direct from a bank if he has any other property. They have simple rules and ask people to follow them out. They can borrow money from banks because it is cheaper. Of course when you buy a car on instalment, you pay more money for that accommodation. The Finance Company has to do extra booking. The bank knows you. There is about a \$1.50 expense on every car investigation for every contract. They have to make a complete set of records for small transactions as well as large ones. They have to handle insurance policies. They have to make complete bookkeeping records. They have to send you out a notice of your instalment. Sometimes it is 12 notices for 12 payments. Very often they have to remind you to pay your money when you owe it. They have to send a man to get it if you don't pay after these notices. They exact a fee, if they can. If that fails to get your money then they have to chase you to get your car. Sometimes they have to chase, too. They have to have a large staff of lawyers to take care of the legal work. They sometimes have to bring a car many miles from where they find it. They may have to recondition that car and they may have to repaint it. They may have to take out dents or have the engine repaired. Then they have to maintain a used car sales agency to sell these cars. There is a great deal of bookkeeping entailed. Naturally the bank has to do very little. If you wish to borrow \$1,000 for the purchase of a car you go into the bank with perhaps 10 shares of Amer. Tel. & Tel. stock. They have at all times something that they can sell for more than they owe you. There is occasion for them to charge very high rates.

Q. Suppose you have a good-sized automobile dealer, could he handle his own financing cheaper?

A. Some do, and some don't. There are several reasons. In the first place these men are in that business because their primary ability is along sales lines. They are not as good on financing as they are on selling. Another reason is that most of the automobile manufacturers very thoroughly discourage their dealers from doing

the financing. They think, and wisely, that if the dealer is all mixed up on financing, the work he should be doing on sales would go into financing work. Some of the large manufacturers practically insist that dealers sell cars and get out of the financing end. Hardly any dealer has the law of average work for him like a financing company in getting credit results. Dealers don't usually do their own financing work.

Q. Does Ford do his own financing in this part of the country?

A. Ford dealers make their own arrangements. They are free to go wherever they want to.

Q. What happens to all the old used Ford cars?

A. Used cars of all descriptions move South. I don't know if any of you men have noticed it. Some time or another one asks himself, "What becomes of these old Fords?" The further South you travel, the more you will find. By the time you get down to the Andes the original Ford will be found there.

Q. Is there any published information regarding default in payments?

A. Most figures we have are conflicting. Some are issued by the National Association of Financing Companies. Remember this, the business is a very young industry. You haven't got dependable statistics yet. They will vary materially. They have been affected by variations in employment and other causes. This thing is perfectly plain, the poorer the plan the larger the repossessions.

Q. What is the effect on auto financing of new models coming out?

A. Financing companies always have that in mind. They protect themselves against it. An owner who has bought a car just before a new model is announced has such a large stake in it that he is of course unhappy, but he isn't going to give it up. Buick back in '23 brought about almost a revolutionary change. Their older model was a good looking and good working car and the owners did not give them up because of the new model just for the same reason as mentioned above. Depreciation on the older models was large but people didn't throw those cars away. Generally speaking, a company or bank is watching that sort of thing all of the time.

ABSTRACT OF THE DISCUSSION OF PAPERS READ
AT THE PREVIOUS MEETING

THE PROGNOSTIC VALUE OF SCHEDULE RATING—CHARLES N. YOUNG

VOL. XIII, PAGE 14

WRITTEN DISCUSSION

MR. ROY A. WHEELER:

I feel that Mr. Young has placed too great a stress upon the prognostic value of schedule rating as a justification for its continuance not only because of doubt as to a proper basis of measuring the schedule's prognostic value but also because of the possibility that either the fact or degree of approximation may at some time justify its abolition.

It is my understanding that the Schedule Rating Plan has been conceived as a refinement of the manual classification system differentiating by physical conditions rather than by process and product with the result that just as a manual pure premium requires for its justification the aggregate experience of all risks within a manual classification, so likewise a schedule pure premium requires for its justification aggregate experience on all risks having similar physical conditions. While we would expect some degree of correlation with individual risk experience the degree, however, would be affected by many other factors such as inadequate exposure, causes other than physical, relationship of present day physical conditions with the average physical conditions over the period during which the experience is accumulated.

Mr. Young has pointed out that his analysis of 60 risks shows a numerical balance of 10 risks and a monetary balance of \$6,200 in favor of the schedule. If the schedule rate on these risks, which in the aggregate shows a 4.3% lower rate than that warranted by the experience, were increased to reproduce the aggregate experience, the resulting rates would show a numerical balance of 4 risks in favor of the manual and a reduction in the monetary balance from \$6,200 to \$4,477 in favor of the schedule. Of this monetary balance in favor of the schedule over one-half is due to a single risk whose rate is determined almost entirely by experience rating.

Since the most disturbing cause of an absence of correlation

is the element of inadequate exposure which is only to a limited extent eliminated by the use of normal losses, the thought occurs to me that this factor might still be further eliminated by substituting for the modified losses the expected losses underlying the experience rates, such experience rates to be computed with respect to the manual rather than the schedule. Even on this basis weight is given to the prognostic value of the Experience Rating Plan by assuming a degree of correlation between future and past experience.

I believe that Mr. Young's suggestions for further investigation should be given serious consideration.

AUTHOR'S REVIEW OF DISCUSSION

MR. CHARLES N. YOUNG

Mr. Wheeler's effort in ascertaining the effect of an increase in the premium at schedule rates on the ability of the schedule to approximate the experience on individual risks is deeply appreciated. It is a laborious task, and bears witness to his interest in checking the conclusions of the original paper. While he did not quote that paper with exactitude, his method of procedure appears to have been to add 4.3 per cent. to each entry under Item 19, Normal Expected Loss at Schedule Rate. While this is not quite accurate, for reasons given in the original paper, it will afford a sufficiently close approximation to be of interest. The author has, therefore, checked Table I very carefully with this revision, obtaining a monetary balance of \$4,168 in favor of the schedule—a fairly close check on the figure given by Mr. Wheeler. However, this figure still produces a Monetary Coefficient of Risk Equity of plus .40 in favor of the schedule.

Up to this point the difference lies not so much in the facts as in their interpretation. Certainly, the larger risks are responsible for the larger part of the above monetary balance. Reverting to the original Tables I, II, and IV, it may be seen that the 25 risks which are evidence against the schedule develop a normal expected loss, at manual rate of only \$57,579, an average of \$2,303 per risk. The 35 risks, which are evidence in favor of the schedule, develop a corresponding figure of \$100,003, or \$2,857 per risk. If we eliminate entirely Risk No. 10, the heaviest evidence in favor of the schedule, we still have

an average of \$2,601. This is not evidence against the schedule, it is rather evidence that the risk experience points to the schedule rate as the compass to its pole, swinging freely on either side if the risk is small, but with oscillations damped by the magnetizing influence of the law of averages, as the size of the risk increases.

However, the author was entirely unable to check Mr. Wheeler's finding that the revised numerical balance showed 4 risks in favor of the manual. He found 33 risks in favor of the schedule, against 27, a balance of 6 risks, supporting the original findings.

Mr. Wheeler's closing suggestion apparently loses sight of the fact that the very factor described by him has been used in the present investigation, as a common denominator for the computation of both Schedule Premium and Experience Premium Indices. It will be at once evident that as correlation involves the testing of two *variants*, it would be impossible to have this factor in the numerator. The manual premium for each risk is the logical norm for this test.

SOME OBSERVATIONS ON ACCIDENT AND HEALTH INSURANCE—

THOMAS F. TARBELL

VOL. XIII, PAGE 47

WRITTEN DISCUSSION

MR. EVERETT S. FALLOW:

Mr. Tarbell's paper brings out clearly the many obstacles which have been encountered in the development of accident and health insurance in this country. The subject is most important as is evidenced by the fact that accident and health premiums written by insurance companies in 1925 amounted to over one hundred and twenty-nine million dollars and those by benefit associations to nearly forty-one million dollars. Approximately eighty per cent. of these premiums were accident. It may readily be appreciated, therefore, that accident insurance and health insurance occupy very prominent positions in the list of the various lines written.

Accident contracts sold in this country in 1865, provided for the payment of a stipulated amount in the event of accidental death and a certain amount per week in event of non-fatal injury resulting in total disability. The weekly indemnity period was

limited to twenty-six weeks and the contract contained no other benefits. The evolution of the contract from that time is a most interesting story. A brief *resume* of the coverage provided in the present day contract indicates the drastic changes that have occurred. Specific payments are made for dismemberment and loss of sight. The weekly indemnity period for total disability has been increased from twenty-six weeks to life indemnity. Partial indemnity is paid for injury resulting in partial disability which prevents the insured from performing one or more important daily duties in connection with his occupation. The insured is allowed to elect lump sum payments for certain injuries—such as dislocation of the shoulder or fracture of the collar bone—in lieu of weekly indemnity. Payments are made in addition to other indemnity for certain specified surgical operations. Hospital indemnity or nursing indemnity is paid in case the insured is taken to a hospital or requires the attendance of a nurse. If injuries do not result in death or disability nor necessitate an operation but do require surgical treatment, payment is made for such treatment usually not exceeding an amount equal to one week's indemnity for total disability. Payments are very often increased in case the injury occurs in connection with public conveyance, elevator, burning building, and certain other specified causes of accident.

Accident risks were originally divided into several classes for rating purposes and those engaged in the least hazardous occupations were designated as belonging to the select or preferred class. In this class the original premium charged was \$5 per \$1,000 principal sum and \$5 weekly indemnity. This same premium is charged at the present time but the insured, as previously indicated, obtains benefits which have been greatly increased when compared to the original coverage, that is, in place of changing the premium from time to time, the coverage was increased as indicated by the experience.

While it is true that no reports have been issued covering combined accident experience, nevertheless, on several occasions the larger companies pooled their experience, and this experience formed the basis of rating reviews and determined the classes into which the various occupations were placed. Previous to 1922 there were no standard codes for accident experience purposes, but at that time the Committee of Five on Statistics of the Bureau of

Personal Accident and Health Underwriters prepared a plan for compiling personal accident statistics, and practically all the larger companies writing accident insurance are using this plan. The Standard Manual Committee of the Bureau of Personal Accident and Health Underwriters is engaged in a review of the standard accident manual and will make use of the experience which has been tabulated by the companies on the basis of the Bureau Accident Plan.

An insurance company writing a large volume of accident premiums was one of the original companies to adopt the punch card system of compiling experience and the first line for which experience was tabulated was accident insurance. Some of the most important and most valuable analyses which that company has used in its underwriting and rating program are as follows:

- (1) Classification and Policy Form,
- (2) Classification and Age,
- (3) Classification and Size of Policy,
- (4) Occupation and Classification,
- (5) Policy Form and Kind of Benefit, such as death, total disability, partial disability, double indemnity, hospital benefit, etc.
- (6) Cause of Accident,
- (7) Nature of Injury,
- (8) Length of Period of Disability.

By means of the above experience this company is enabled to determine accurately the progress of its business and to make the necessary adjustments in underwriting practice.

A proper valuation of outstanding claims is of vital importance, both in connection with the Annual Statement and also in connection with the final deductions to be drawn from experience data. Death, dismemberment, and loss of sight claims call for specific payments for which there should be no difficulty in obtaining a proper valuation. On the other hand disability claims vary to a great extent, and it may not be amiss to outline briefly a method of valuing such outstanding claims used by one of the larger accident companies.

Disability claims incurred prior to seven months before date of valuation are reserved for on the basis of individual estimates where the policy period is limited, and on the basis of the table prepared by the Actuarial Committee of the Bureau of Personal Accident and Health Underwriters where the policy pays life

indemnity. Claims incurred within seven months prior to date of valuation are reserved for on the incurred notice average basis. The notice average is obtained by dividing the amount of claims incurred during a given period by the number of notices received during that period. Under this method the number of notices received during a given month is multiplied by the notice average to produce the initial reserve to be set up for claims incurred during that month. This reserve is reduced at the end of each month by the actual amount of claims paid during the month in connection with the particular notices. In the writer's opinion, the notice average basis for computing the reserve to be carried for temporary disability notices received under accident and health policies is much superior to the method of using individual estimates. The notice average should, of course, be tested at frequent intervals in order to make allowance for changes in the factors which cause it to vary. Changes in underwriting practice in regard to the amount of weekly indemnity granted would affect the notice average. Similarly variations in the cause of accident, such as the increased number of automobile accidents, require frequent study. However, the effect of all such factors would be taken care of by a notice average based on the latest possible statistics.

During the past ten years health insurance has been one of the most troublesome lines of insurance with which casualty insurance executives have had to contend. Prior to 1916, the health policy paid full weekly indemnity while the insured was totally disabled and confined to the house, and fifty per cent. of the weekly indemnity while totally disabled but not confined. The disability period was limited to fifty-two weeks. Competition then brought forth policies which allowed full weekly indemnity while totally disabled, whether confined or not, and the indemnity paying period was increased from fifty-two weeks to life indemnity. In addition, partial indemnity, usually limited to twenty-six weeks, was paid for partial disability which prevented the insured from performing one or more important daily duties in connection with his occupation. These policies were issued at inadequate rates, and as a result companies became burdened with a rather large volume of unprofitable health insurance. In 1921, as stated by Mr. Tarbell, the Committee of Five on Statistics of the Bureau of Personal Accident and Health Underwriters devised a plan for compiling

health statistics. Three reports have been issued by this Committee and as a result of reviews by health underwriters of the statistics contained in them, the health insurance program of a majority of the companies writing this form of insurance has been placed on a sound basis.

MATHEMATICS FOR STUDENTS OF CASUALTY ACTUARIAL SCIENCE—

JAMES S. ELSTON

VOL. XIII, PAGE 55

WRITTEN DISCUSSION

MR. A. H. MOWBRAY:

When one finds one's self in complete general agreement with the author of a paper it is difficult to present a discussion that adds materially to it. After accepting an invitation to present a written discussion of this paper I find myself in that position. Indeed it seems odd that anyone should think it unnecessary that a defense be presented for the mathematical requirements in our examinations. And yet I presume that in the absence of frequent evidence in the papers appearing in the *Proceedings* of its use this question may arise in the minds of students, especially in view of the bugbear non-engineering students in our American colleges make of mathematics. It may be remarked in passing, though not germane to this discussion, that an investigation of the origin of that attitude would appear to furnish a topic for an interesting study.

The best definition of the word Actuary I have found reads: "One whose business or profession it is to solve, for insurance companies or others, problems involving, separately or in combination, probabilities and interest." If we may accept this definition of our profession then we must realize that a thorough grasp of the theory of probabilities is fundamental to all our work, whether in a particular problem we give it conscious recognition as such or not. Since all of our rate making work must rest on analysis of statistical data we also require the technical equipment for this work and this also calls for thorough familiarity with the same theory of probabilities. Most of the bad errors which have been made in the use of the correlation theory could have been avoided by a careful consideration of the mathematical basis of that theory and the use of common sense in judging whether the conditions to which it was attempted to apply it were consonant with that theory.

Probably nowhere does the old adage, "A little knowledge is a dangerous thing" apply with greater force than in the field of applied theory of probabilities. A superficial knowledge apparently serves in many cases so far as the internal evidence of many of our papers and methods are concerned. But I think a more careful study will disclose that in the case of those methods which have stuck there has been in the background a careful recognition of sound principles and that those methods which have been weighed in the balance and been found wanting in practice have as their foundation a misinterpretation or misapplication of the theory of probabilities.

Mathematical technique will not take the place of commonsense. But the more thorough-going the understanding of the mathematics the less the likelihood of such observance of technique as against commonsense. In the pioneer days of workmen's compensation insurance many rough and ready methods had to be used but with the development of the business the tendency has been toward more refinement and with that developing refinement more thorough knowledge of fundamentals will, I think, be found requisite.

The recent presidential address of Col. Ayres before the American Statistical Association has pointed out one pitfall our students must avoid—the inability to so express themselves as to be thoroughly understood by those executives and others who have not learned the shibboleth of our own technique. It is requisite that we consider carefully our mathematics in seeking the solution of our problems. It is equally requisite that we interpret the resulting methods in the language of the man on the street for the benefit of laymen executives and assureds, for in the end they must approve our methods as sound until by the test of time they come to be accepted as are the calculations of engineers and architects without review by their clients because the professions have established the reputation of building well.

Probably no two members of the Society would make exactly the same recommendations as to source, material and methods of study as to the particular subjects set in the syllabus. Fundamentally this part of Mr. Elston's paper is sound and his recommendations good and the writer is not disposed to try to improve upon them.

REVIEWS OF PUBLICATIONS

RALPH H. BLANCHARD, BOOK REVIEW EDITOR

Modern Insurance Tendencies. S. S. Huebner, editor. American Academy of Political and Social Science, Philadelphia, 1927. Pp. vii, 238.

In this volume, Dr. Huebner has produced a worthy successor to a similar edition of the Annals published in March, 1917. The limited scope of a review does not permit of full justice to each and every one of the twenty-nine articles comprised within its covers. Their variety exhibits in excellent fashion evidence of the thought which Dr. Huebner conveys in his concluding article on Insurance Instruction in American Universities and Colleges, namely, that insurance is not merely a business of vast and imposing magnitude, but that it discharges functions which constitute it a vital economic and social agency. Nor shall we dissent from his ranking insurance as a fundamental division of economics, and therefore a proper and important part of the education of every student of business, of economics, of sociology and of education. He computes the annual contribution of America for insurance protection at about \$6,000,000,000; the assets of insurance companies at an amount equal to 1-25th of the nation's total wealth. It is to be expected that these vast operations correspond to a real economic need and represent the performance of functions vital to the community's well-being.

These functions he defines generally as (1) providing protection against, and indemnifying for, loss of life and property values (2) prevention of losses.

The second field may be mentioned first. In acting for the prevention of losses, insurance performs what is perhaps its most salutary economic function. Indemnifying for losses merely distributes the loss burden. The loss no longer falls with crushing weight on an individual; but however widely the burden be distributed, the community is so much the poorer for the loss. Prevent the loss—increase the span of life, avoid accidents or lessen their severity, prevent property losses, and the community is so much richer.

First in point of importance, therefore, we should put the articles on "The Role of the Life Insurance Company in Health Conservation Programs" by Lee K. Frankel, the "Fire Prevention Work of

Stock Fire Insurance Companies," by H. A. Smith, and "Insurance Companies and Accident Prevention," by James S. Kemper.

A far from unimportant point on this hand may also be drawn from Professor McCahan's article on "State Insurance Funds," namely, that in state insurance schemes, loss prevention activities have been neglected or materially limited.

As to the first field, that of protection and indemnity, Dr. Hueber points out that the relation of insurance to the community is manifold, and touches community life both directly and indirectly. Life insurance capitalizes life values, and applies to them the economic principles taught and practised with respect to property values. It bears a vital relation to thrift and investment, to the proper performance of family and business obligations, to the creation, protection and settlement of estates and to educational and philanthropic bequests. Property insurance and, we may add, casualty insurance, protects against loss of property values. All forms of insurance serve as a basis of credit and as a means of eliminating the casual element. All economic enterprises, family, business or vocational, involving either property values or human life values must rely upon all the leading lines of insurance as a necessary adjunct. The specialist in corporation finance, investments, industrial organization and management, commercial credit, wills and trusts and taxation must know the services, principles and practices of insurance as thoroughly as any other basic subject involved in applied business. It is essential to every person who has family or property of his own to safeguard, or who is actively interested in the well-being of others.

To this very much abridged excerpt from Dr. Huebner's article, this may be added. He has pointed out that one significant development of the last ten years has been a reaching out into new fields of activity, or the more intensive development of old fields.

A goodly number of the titles are perforce slighted. He who reads the volume from cover to cover will find in it much to justify the above.

Specific mention is made of the following:

(a) "Co-operation Between Life Insurance and Trust Companies," by Edward A. Woods.

It is well to have it brought to mind that while insurance has great possibilities it has also distinct limitations. It is proper to point out that a trust company can do some things better than

an insurance company, and vice versa. Each having its appropriate field, the recognition of this fact and the evolution of a generous co-operation is an excellent thing for both.

(b) "Investment Tendencies of Life Insurance Companies," by Frederick H. Ecker.

The magnitude of the accumulations of life insurance companies render the management of their funds a matter of the first importance. These funds are impressed with an obligation not only to policyholders but to the public. Their investment must follow not only the laws of supply and demand; it must take cognizance of the greatest economic need. This, Mr. Ecker indicates, the companies do recognize in their investment policies, and there is much in the investment history of the life insurance companies that amply corroborates his statement.

He adds one word of some significance, namely, that it is important that the funds of life insurance companies be given freedom to follow the lines marked out by the laws of supply and demand, "consistent with absolute safety." One ventures humbly to suggest that there is no such thing as absolute safety in investment; but his point is incontestably sound. Damming up the natural flow of investment does the community no good. It forces an abnormal tide of investment funds into restricted lines, producing a diminution of return to the company on the one hand, and stimulating inflation of values and speculation on the other. And, one may add, the restrictions in many investment laws, while excellent in their intention, add but little to the safety of a company. It is quite possible to keep within the letter of any investment law and lose money freely. The only real safeguard lies in the character and competence of the officers charged with the responsibility of investing the company's funds. Lacking that, the investment law has no more efficiency for good than any other form of words printed on paper. Undoubtedly investment laws have their utility, though many of them need revision. They do on occasion furnish a definite and conclusive answer to the bond salesman.

(c) The articles on "Insurance of Sub-standard Lives," by Robert Henderson; "Group Life Insurance," by William J. Graham; ". . . Protection for the Disabled Life Insurance Policyholder," by Edward W. Marshall, and "Salary Savings Insurance," by Richard L. Place, are interesting as indicating fields that are being largely developed. The same may be said of the

articles on "Use and Occupancy Insurance," by Willis O. Robb; "Weather Forms of Insurance," by G. Wright Hoffman; "Modern Trends in Accident and Health Insurance," by Austin J. Lilly and "Automobile Insurance," by H. P. Stellwagen. Failure to do these articles a fuller justice reflects the limitations of the reviewer.

(d) The article on "Life Insurance Companies and Pension Plans," by M. Albert Linton, is an interesting commentary on the harm that may be done by an entirely praiseworthy endeavor which omits to take cognizance of principles familiar to all underwriters. The distress caused by the failure of private pension plans should be noted along with the calamitous results noted in Professor McCahan's article on "State Insurance Funds;" the serious impairment of teachers' pension funds; the practical insolvency of bank deposit guarantee funds. Add to this what Dr. Knight has to say on "Fraternal Life Insurance" and the disasters that have been entailed by the failure of Fraternalists to observe proper reserve requirements. The conclusion in all cases is the same. A private or public venture in order to succeed must do the same things and observe the same standards, whether it be an insurance company, a private business, a city or a state; and, if the same things be done, the cost is approximately the same.

(e) Dr. Stevenson's article on "Life Insurance as an Aid to Education and Philanthropy" merits the citation of the concluding sentence:

"Life insurance *can* aid in solving some of the most pressing problems which confront those responsible for the financing of philanthropic institutions, and *will* aid if intelligently used and understood."

(f) Mr. Holcombe's article on "The Modern Life Underwriter" lays emphasis on a point undeniably vital; that it is not enough to have something worth selling; it is necessary to have somebody able to sell it. The abilities of the agent must correspond to the task, and the company's ability to serve the public is measured very largely by the agent's capability.

(g) Mr. Larkin's article on "Non-medical Life Insurance" should be read with Dr. Fitzgerald's article on "Inspection Reports on Persons as a Factor in Life Insurance." Together they cover two sides of a subject distinctly controversial.

(h) Dr. McKenna's article on "The Guarantee of Mortgage Bonds by Surety Companies" is an illuminating discussion of a

new field, and one in which more than the ordinary number of pitfalls await the unwary underwriter. It deserves mention if for no other reason for the exquisitely conservative statement of a fact which will be endorsed by many:

"Although the mortgage business is proverbially safe, it is not impossible to lose money at it."

(i) Dr. Riegel's article on "The Regulation of Fire Insurance Rates" and Dr. Kulp's article on "Current Rate-making Procedure in Workmen's Compensation Insurance" touch on the great field where private insurance activity meets state regulation. Mr. Brosmith in writing on "Tendencies in State Supervision of Insurance" lists this point as one wherein state activity is distinctly on the increase, and this fact is borne out by Dr. Riegel's statutory citations. The latter points out the change in attitude on the part of states from an opposition to organizations for rating purposes to the recognition and encouragement of such organizations; and this tendency certainly seems marked. Dr. Kulp pays a not undeserved tribute to the increasing simplicity and ease of compensation rate-making procedure. It may be observed, however, that if certain stock carriers have their way, the present rate-making method will hardly deserve the name of "Permanent."

Mr. Brosmith's article above mentioned gives deserved attention to the difficulties entailed by conflicting state requirements, and the regrettably meager success in securing uniformity. He points out, too, that existing laws need much improvement in their reserve requirements, and to the end that the annual statement may disclose something like the actual condition of the company.

(j) Dr. Loman's article on "Compulsory Automobile Insurance" touches upon a topic distinctly alive, as witness the legislative calendars of many states. His presentation of arguments pro and con seems very fair; his conclusion is non-committal. To the arguments he lists, interesting commentary will be made as soon as the Massachusetts law has been in operation for a full year or so. With regard to his second plan, the abolition of common law liability and the substitution of a statutory scale of benefits irrespective of legal fault, I have a feeling that he has not developed sufficiently the constitutional objections. There are two distinct rights affected—the rights of the automobile owner, and the rights of the injured person. It is a simpler matter to charge the automobile owner with liability, irrespective of negligence, than to restrict

the injured person to a statutory right of recovery. In the compensation acts an incorporation of the act as an incident to the contract of service, expressly or by implication, is possible; but no such procedure is possible here.

(k) Mr. Rush's article on "Multiple Line Coverage" descants on a theme dear both to himself and to Dr. Huebner, and not at all unpleasing to the reviewer, who has entertained very similar views. Still it must be admitted that little progress has been made to the desired end; and in view of the extent to which the present separation of company powers is enwrapped about particular and extremely local interests, it seems hardly likely that Mr. Rush's ideal will be recognized until single line companies have somewhat more generally found organizations operating both fire and casualty companies under a single management to possess a distinct competitive advantage.

(l) Dr. Madden in his article on "Special Insurance Taxes" brings up a subject not new, yet never old. No tax is agreeable; insurance taxes and fees deserve a somewhat stronger designation. Mr. Madden's program, or rather, that of the United States Chamber of Commerce, would be a boon to the business if it could be adopted, and to the community as well; for the insured public coincides pretty closely, though not in exact parity, with the tax-paying public. But the fallacy of indirect taxation dies hard, and is apt to be more popular with legislatures than with its long-suffering victims.

(m) Dr. McCahan's article on "State Insurance Funds" has been several times mentioned. It deserves additional mention not only because it points out that state insurance activities have commonly neglected loss prevention, not only because a number of them, by the neglect of fundamental insurance principles have been brought into impairment or actual insolvency; but because there is a further principle involved. Insurance is a delicate function, properly quickly responsive to public needs. It operates at a decided disadvantage when constrained to the budgetary system, civil service system and administrative policies of the state. Not only is the state machinery awkward and cumbrous as compared with private business, but the states are already charged with functions to the measure of their capacity, and perhaps something more than that. One has but to watch the proceedings of the legislature, the vast, undigested mass of legislation annually

dumped into the legislative hopper, the struggles of committees, the overburdened calendars, the congestion of the concluding days when a preposterous mass of law is ejected in a time that precludes careful consideration or debate. No state has the right to do more than it can do well; and one is inclined to lean to Professor Dewey's theory of the state; that the true end of the state is not to perform but to regulate; that as much as possible should be left to private and voluntary organizations, and that the state will find its true part in bringing these organizations to work in harmony.

This brings us to the conclusion. Much of Dr. Huebner's excellent paper on "Insurance Instruction in American Universities and Colleges" has already been touched on. Dr. Huebner would have more attention paid to insurance in the regular curricula as well as in courses adapted to the specialist. He would have a specialized literature developed to bring insurance into its proper relation with applied economic subjects and with social service. It is probably true that writers on insurance have devoted themselves overmuch to the technical side of the subject, and have not considered enough its relation to other matters or to the community as a whole. Perhaps in the future we shall see properly developed the thought that the social organization is no longer amorphous but highly integrated, with every part closely related to every other, and that no longer is the loss or misfortune of any individual part matter of indifference, but creates reactions reaching far and wide through the social structure. Then perhaps it will appear with due clearness why the function of insurance in preventing injury and in storing up the resources of the community ready to flow to the injured part and repair the damage, so far as may be, is as vital to the social organization as nerve and blood to the individual.

CLARENCE W. HOBBS

Elements of Statistics (Fifth Edition). Arthur L. Bowley. P. S. King & Sons, Ltd., London. Charles Scribners Sons, New York. Pp. viii, 463.

The first edition of this book was published in 1901 and was based upon Dr. Bowley's lectures at the London School of Economics over the period 1895-1900. These were the years when an attempt was made in various countries of the world to bring within the understanding of groups of students of the natural, physical

and social sciences the essence of the more advanced work of Quetelet in Belgium, of Knapp and Lexis in Germany, of Westergaard in Denmark, and of Pearson and Edgeworth in England. Until 1895 no effort had been made to teach analytical statistics, or as it has been improperly named, "mathematical statistics," without a pre-requisite of real competence in mathematics at least through the calculus.

In Professor Bowley's first edition there was an obviously experimental attempt to algebratize statistical analytics. This was followed in the United States between 1907 and 1925, by a flood of books, the authors of which copied Bowley or each other, largely and none too successfully. It is interesting to view the judgment of Dr. Bowley himself in respect to this pedagogical experiment. He says (page vi):

In the first edition an attempt was made to obtain the principal results without the use of the calculus; but as the subject has developed during the past 25 years, *it has become necessary to abandon this attempt*. . . . A student will save time in the end by becoming familiar with the elements of the infinitesimal calculus before he commences the serious study of mathematical statistics.

The American author, C. H. Forsyth, who was taught in the classes of Rietz and Glover, and whose book does not resemble those of the algebraists, arrived at the same conclusion after an extended teaching experience. Incidentally, that is also the judgment of practitioners of statistics who have tried to make staff members out of the end-product of the classes taught by the faithful and persistent copyists of Bowley's first edition. One wonders whether Mr. G. Udny Yule will adopt Dr. Bowley's advanced position in preparing his next revision of that most excellent text of his "Introduction to the Theory of Statistics." Will American teachers of statistics profit by Dr. Bowley's experience?

In the present edition, Part I remains substantially as it was in 1901. That is unfortunate, because this section particularly needs revision. Most of it is dull and uninteresting, although it could have been made lively and fascinating. During the past 25 years there has been published a great deal of splendid material which could have been drawn upon in revising Professor Bowley's text on descriptive statistics. And by descriptive statistics we mean those processes of collecting the original observations, making the necessary classifications, tabulating the material and presenting it in concise tabular or graphic form. A text on descriptive statistics

is badly needed. There is no text on the subject available at the present time, perhaps because the authors of our statistical books found it easier to gloss over the real needs of the younger students of statistics and to do half a job in a field already badly crowded by mediocre texts on pseudo-analytical statistics.

There is room for courses and textbooks on descriptive statistics which will utilize the works of Augustus Meitzen, Robert Giffen, Charles Felton Pidgin, Richmond Mayo-Smith, W. B. Bailey, the Wright-Hunt volume on the History of the United States Census, and the text of reports by Francis A. Walker, John Shaw Billings, William Farr and Carroll D. Wright. (Ten consecutive applicants for positions in a certain statistical office had never heard of these pioneers in statistics!) Most useful material will be found also in the introduction to Volume I of the Australian Census of 1911 and in the papers of Athelstane Baines in the *Journal of the Royal Statistical Society*. The little book by the late Charles Felton Pidgin, published in 1888, was a step in the right direction. Dr. Roland P. Faulkner, the first teacher of statistics in the United States, based his work on Meitzen, whose text he translated from the original German in 1891.

If teachers of statistics had been thinking correctly over the past thirty years, the Pidgin book would have been elaborated and a genuinely useful text prepared for the student receiving his first introduction to statistical instruction. Instead, the authors who have cluttered up the field with their so-called elementary texts during the past 25 years, proceeded to teach mathematical statistics on the assumption that an adequate preparation in mathematics was not needed. Most students of the social and natural sciences have merely a reminiscence of mathematics, and for them a text should be prepared on those highly important branches of statistical effort which do not require mathematical preparation. The most pathetic spectacle in a statistical office is the former graduate student of the social sciences attempting to solve "problems" by "correlation" methods on a background of plane geometry. Perhaps this emphasis upon the teaching of pseudo-mathematical statistics is an hysterical reaction set up both by teachers and students in order to avoid facing the real work and drudgery of descriptive statistics. Incidentally, it may be a blind effort to avoid the rigorous discipline of the classroom in mathematics.

Part II of Dr. Bowley's book is entitled "Applications of Mathe-

matics to Statistics." This title tends to assuage some of the disappointment over the archaic Part I. The title suggests what so many experienced statisticians have believed to be true, that statistics and statistical method stop with the final presentation of data in tabular or graphic form and that mathematico-analytical procedures which are sometimes applied to statistical data are simply parts of the calculus of observations. The calculus of observations is, in its turn, a choice of procedures drawn from all branches of mathematics which serve in the analysis and digestion of numerical data wherever they arise, whether in statistics or in the physical, natural or social sciences. Many an engineer who has been adequately trained in the calculus of observations in the engineering laboratory is a better analyst of statistical data than are those persons whose experience has been limited to the relatively small part of the calculus of observations which has been stressed in our statistical texts and journals.

"Mathematical statistics" does not in fact exist; this name has been applied to a group of procedures such as the Scotch mathematician Whittaker has condensed in one or two chapters of his book on the "Calculus of Observations." Dr. Bowley's selection of the applications of mathematics to statistics seems to be adequate for those students who wish to master analytical work in statistics of intermediate grade. It may be well to suggest that, when another edition of Part II is issued, some thought be given to the more catholic approaches to statistical analytics, which have been made by the Scandinavian School. Much good material could be found in the works of Charlier, Westergaard, Gram, Thiele and the younger Wicksell in the treatment of data arrayed in frequency series. It might be well to bring in Charlier's concept that a frequency function may be expressed as an infinite series, where the coefficients of the independent variable are expressed as definite integrals either of the unknown function itself or of some auxiliary function. Emphasis upon Pearson's concept that a frequency function may be expressed as a closed and compact algebraic or transcendental expression is entirely proper, of course, but has not the breadth of the approach which the Scandinavian analysts have taken. Dr. Bowley's chapter on "Algebraic Probability and the Normal Curve of Error" is adequate in the sense that it treats only those implications which follow the doctrine of *a posteriori* probabilities. The chapter could be broadened by

adding to the description of Bernoullian series those for the Poisson and Lexian series. Discussion of this type has been set forth quite well in Mr. Arne Fisher's "Mathematical Theory of Probabilities."

The introductory sentence to Dr. Bowley's chapter on the "Theory of Correlation" is rather disappointing. He says, "One of the principal classes of problems in statistics is to determine whether phenomena are independent of each other and if not to measure their dependence." The inference is that these correlation methods enable one to determine whether phenomena are independent of each other and if not also to measure their dependence. These correlation methods can be used in a limited number of instances to measure approximately the dependence of one phenomenon upon another after the dependence has been established by logical procedures which fall entirely outside of the realm of mathematics. So far as insurance men are concerned, the distinctions between "statistics" on the one hand and mathematical aids to numerical analysis on the other, have been clearly set forth in the syllabus of the Institute of Actuaries in the fifties of the last century. This has been overlooked by statisticians, and even by actuaries. (See Walford's "Insurance Cyclopedia," Vol. I, p. 27.)

E. W. KOPF

Forecasting Business Conditions. Charles O. Hardy and Garfield V. Cox. Macmillan Co., New York, 1927. Pp. x, 434.

Probably books on business forecasting are of a class with professional football. As the latter has not been fully "accepted" by the sporting public, so the former are still on the doubtful list of the academic economists. At any rate the authors of this book explain, in the preface, that a shift in interest is in process among the economists and that they are leaving "long-run tendencies, normal conditions" and the like in the background and are beginning to study "the other things which are not equal." The authors' break with the old traditions is even greater, for short-time fluctuations may be studied from either a public economy or a private economy viewpoint, and they choose the latter. In short the thesis of the book is forecasting changes in business activity to enable business men to "minimize their own personal losses or increase their profits."

Forecasting is of several varieties. There is the type that

predicts the time of the reappearance of Halley's comet or the phases of the moon or the combination of hydrogen and oxygen in certain proportions to produce water. In the social sciences such prediction, such scientific finality, has not been attained and it has led many of the doubters to scorn any notion of prediction. The forecasting that is expounded in this book

is not prediction in any such sense as is the prediction of the tides, of eclipses, or even of the weather. It is not scientific in any strict sense of the term. The fluctuations of business activity with which it deals are only partially understood . . . the conditions themselves are never twice entirely alike. New factors are constantly being thrust into the problem. . . . Finally even if we had precedents to guide us into a sound and adequate theory, we would still have no certainty that we had all the facts necessary to an application of the theory to a given situation. We must always judge the whole from a sample. (Chap. 1.)

The book, taken as a whole, is descriptive—descriptive of five well-known commercial forecasting services and of the available series for studying conditions of production, transportation, finance, profits and the like. Chapters two and three, however, offer a sort of theoretical presentation as a foundation for what follows. In chapter two, "Depression and Prosperity," the tendency is to scout the idea of a general business cycle. It is recognized that high prosperity and deep depression are rare and that the cycle shows up in different industries at different times. On the explanation of the cycle as a banking phenomenon the position is fairly clear: "An improved financial organization has probably done away with the danger of money panics, but we are not yet certain that it has done anything to lessen the duration and intensity of the swings of increasing and decreasing business activity" (p. 13). Chapter three discusses the assumptions and methods that are at the basis of present-day forecasting—(1) the method of historical comparison, which assumes that there is a rhythmic sequence in business activity which makes possible prediction of the future from the past; and (2) what has been called "cross-cut analysis" or prediction from specific causes. The fourth chapter is a brief, non-technical description of the methods of analyzing time series—measuring and eliminating trend and seasonal deflation; expressing deviations in standard units; use of index numbers.

Following this introduction are five chapters devoted to an explanation of the forecasting services of Babson, Brookmire, Harvard Committee, Moody and the Standard Statistics Company.

The methods of each of these organizations are described in some detail and the extent to which they base their forecasts upon historical comparison or upon cross-cut analysis. The discussion of these services does not extend beyond description, no comments or criticism being attempted, but the authors do essay in the following chapter (X) a statement of their own theory of the causes of business cycles. "We do not believe that forecasting can ever become an exact science until we get beyond empirical deductions from the sequence of past phenomena and ground our analysis in a study of the effects which may be expected to flow from causes which we observe at work" (p. 120). A brief consideration follows of the theories of Mitchell, Fisher, Moore and others, with their own critical comments, and finally, a statement of their own position that the central causal factor is the overproduction and underproduction of durable goods. The most important statistics to study, then, for a measure of current conditions and a forecast of the immediate future are data on the volume of construction and on stocks of durable goods on hand. Certain series may be studied as symptoms but for knowledge of independent causes of business fluctuations, one "must look to such lines of activity as produce durable goods, capable of being stored up for future need and drawn out of store in times of slackened production" (p. 139). If, therefore, the business man is going to do practical forecasting, that is, base business policy on evidence rather than hunches, it is important that he do something more than purchase a commercial forecasting service—he must study the various indices of production and storage, and the symptomatic series as well. This discussion is followed by eleven chapters, the remainder of the book, describing in considerable detail, and with generally excellent critical comment, the available series in the fields of production, construction, transportation, finance, employment, trade and prices.

An interesting addendum, among the appendices to the book, is a series of extracts taken from the forecasts of the last four or five years by the forecasting organizations (excepting the Harvard Committee), the services of which are described in the text, together with Mr. Hardy's own forecast of 1924, a paper which he read at the annual meeting of the Statistical Association in December, 1923. A careful comparison of these forecasts with one another and with subsequent events leads one at least to be conservative in his judgment about the success of forecasting.

Any book is to be judged by the success with which it completes the task it set out to perform. The purpose of the authors, it seems to me, has been to describe and not to write a theory of business cycles, and to describe in such a way as to indicate to the business man how study of current data can aid him in formulating policy. In performing this task they have been successful. They have given a good description of forecasting services and of the economic data now available to any business man almost for the asking. They have not kept themselves entirely free from theoretical considerations nor is there any reason why they should have done so. They have more or less explicitly discarded the notion of a general business cycle that passes through a specified number of phases; and their critical comments in chapter ten on various cycle theories are good. One cannot fail to note the discrepancy, from the theorist's viewpoint, between their insistence in this chapter on studying the causes of business cycles and their attempt in the preface to relegate the theorist and his long-time tendencies to the limbo of the past generation.

BRUCE D. MUDGETT

Industrial Safety Organization. Lewis A. DeBlois. McGraw-Hill Book Company, New York, 1926. Pp. ix, 328.

This book is, to previous works, as a modern department store to the older specialty shops. In its numerous, well arranged and completely supplied departments are found the new as well as the standard models, and the remnants and discards are all properly labeled. Others have dealt with one particular phase of safety, such as accident prevention in a particular industry, the guarding of certain classes of equipment, the protection of certain parts of the body, and subjects of that character which, as a form of pioneer work, must be accomplished before the department-store era is reached. In the words of another, "Mr. DeBlois' book contains many things which the experienced man knows or should know but cannot always remember."

It is one of the mileposts in the evolution of safety and the literature on that subject. It is tangible evidence that safety is making progress. It shows what has been and is being accomplished and what problems must be met in the future. It treats safety from the engineering and administrative point of view, showing that

it is at once an humanitarian and an economic problem and that it actually pays not only because of the reduction in the indemnities to injured workmen and their dependents, which represent a small part of the cost of industrial accidents, but also because of the reduction in the more expensive property and time losses which usually accompany an accident. Safety is shown as something which, to be realized, must be considered and treated as an integral part of industry and industrial progress rather than as a social parasite that is being implanted by outside and impractical idealists.

There are chapters on accident records and statistics, the organization of safety work and the maintenance of interest in safety on the part of the employees, as well as the relation of safety to production and to human relations. All of these and many more are treated in an interesting, readable and thorough manner, with frequent use of concrete examples to clarify the difficult points.

Of course, these are some minor errors. What book is without them? They are not, however, of sufficient importance to warrant detailed comment and they do not detract from the book as a whole. Knowing something of the author's experience and reputation, I expected the book to be good and, having read it, am not disappointed.

LESLIE L. HALL

The Mathematics of Business. William V. Lovitt and Henry F. Holtzelaw. D. Appleton and Company, New York, 1926. Pp. xiii, 246.

There have been not a few books published on this continent with kindred titles, which state in the preface that they aim to give the student a grounding in the elements of interest and probability with their many applications, and at the same time to make the subjects popular with the "business" man. As a result, the type of book issued generally covers the whole field but lacks the necessary rigor in the definitions of the essentials. It is this rigor which alone can give rise to clear and independent thinking by the reader. The general tendency is to produce formulae without consolidating them with "verbal explanations" to make the student continually exercise his common sense.

In Chapters I-IX, the authors treat the subject of interest with

the usual applications to loans, bonds, etc. The definition "Interest is a payment for the use of money" is the first sentence. No verbal explanations are given of the relations between i , v and d . The symbol ' v ' is defined, but the authors prefer generally to use $(1+i)^{-n}$ for v^n , although they use $\frac{1}{s_{\overline{n}|i}}$ in place of $s_{\overline{n}|i}^{-1}$.

In the chapter on annuities, the questions are done mostly by substitution in formulae. The student is not taught to visualize the payments for himself. On pages 59 and 60 a method of approximation using the binomial (with repeated applications) is introduced, although, for most questions handled in the book, the more straightforward method of "proportional parts" would have been sufficient. Apparently from the "definition" of a bond, there are only straight term bonds! On page 100 the following occurs: "The rate of interest realized by an investor on his investment is called the investment or effective rate realized by the investor." The cart is before the horse in this chapter. The authors assume that the investor demands (p. 108) a certain investment rate and that the price follows. The more important question of finding the yield when presented with the price is treated in one short paragraph. Bonds with other than half-yearly coupons are not mentioned.

Chapter X deals with Probability, Permutations and Combinations. Here the authors start to tread on dangerous ground. Wrong impressions are continually created for the student. The following extract is quoted to show the authors' method of deducing the probability of living a year at any age:

For example, if we desire the probability that a man aged 30 will live one more year, we have no way of enumerating the equally likely ways in which this event may happen or fail. What we do is this. From a large group of representative men, aged 30, say 85,441, who have been observed in the past, it has been found that 84,721 lived to be 31. Then the fraction . . . is taken to be the measure of the probability that any single man aged 30 will reach the age of 31.

Chapter XI has to do with "Life Probabilities." On pages 140 and 141, after quoting a paragraph from Moir's "Life Assurance Primer" describing the American Experience Table the following is read:

As stated above, the table states within narrow limits what has actually been experienced by insurance companies over a considerable number of years, and, therefore, gives a reliable estimate of what may be looked for in the future. This table is the basis of computations for many problems having to do with life insurance, annuities, old age pensions and inheritance taxes.

One only needs to recall the origin of the American Experience Table to appreciate the above.

The Chapters XII and XIII are entitled "Pure Endowments and Annuities" and "Premiums for Life Insurance." On page 148, we have:

The American Experience Mortality Table is not used as a base for computation of annuity rates. . . . A Company would be likely to go bankrupt if it did use the American Experience Table, for the ratio of actual to expected deaths is about 0.7.

This is in contradiction to what has been quoted above and, further, no information is forthcoming as to the basis of the actual deaths.

The simple forms of "assurance" are taken up, commutation symbols are introduced, and single and annual premiums are produced. The authors have used N for the standard N_x .

In the remaining three chapters, Logarithms, Progressions and Computational Aids are treated. The section on contracted multiplication and division is good, but one wonders how many would stop to check additions by casting out 9's or 11's.

The usual list of interest tables, etc., appear next—the interest factors are given to seven places of decimals. The p_x for the American Experience Table is given to six decimal places, which further adds to the suspicion, which the reviewer has, that the authors really believe that the I_x column was produced first, followed by p_x from the ratio of d_x to l_x .

Throughout the book there are a good many exercises and answers for those who never know when they are right.

N. E. SHEPPARD

Advanced Life Insurance. Charles K. Knight. John Wiley & Sons, Inc., New York, 1926. Pp. v, 426.

The technical side of Actuarial Science has been developed with considerable thoroughness in the text books of the Institute of Actuaries of Great Britain, in the Actuarial Studies of the Actuarial Society of America as well as in a few other similar works, and has been amplified currently in the periodicals of these and other societies. These works have generally been accepted as satisfactory texts for students and as reference books for the practising actuary, but in consequence of the highly specialized treatment applied they have naturally not been found suitable for the casual reader

or investigator. To meet the requirements of this larger group of readers—lawyers, students of economics and statistics, life and casualty insurance agents and executives, for example—a new literature relating to life insurance has been built up. The production of this latter type of publication has been fostered, furthermore, by the increased popular interest in life and other forms of insurance in recent years.

While making a bid for the interest of the technical reader, the book which is the subject of this note belongs in the group referred to at the close of the preceding paragraph. Some analysis is introduced in connection with the study of compound interest, life annuities and insurances, policy values, etc., but such excursions are not exhaustive enough to satisfy the really advanced student, and at the same time are too involved to interest the reader who is seeking a general rather than a specialized comprehension of the subject.

It is believed, therefore, that the value of the book must be judged with reference to its discursive rather than to its analytical side. With this in mind it is to be noted that the topics touched upon cover the field of present day life insurance rather fully. The diversity of phases treated may be appreciated from the fact that some of the chapter headings are "Gross Premiums," "Insurance on Substandard Lives," "Government Supervision and the Management of New Companies," "Reinsurance," "Group Insurance," "Accident and Health Insurance," etc.

It is scarcely surprising that some inaccuracies have arisen as a result of the circumstance that the work is built largely on research and not upon intimate and practical contact with the life insurance business. In short, the work is distinctly academic in character.

JOHN S. THOMPSON

The Future of the Actuarial Profession. F. A. A. Menzler. Institute of Actuaries, London, March, 1926. Pp. 39.

The first ten sections of Mr. Menzler's paper lead to the conclusion that nearly all of the mathematical-statistical work being done at the present time is within the competence of actuaries to perform. The author suggests that a review of most contemporary

statistical publications in the field of public health, industrial hygiene and economics would convince the person with vigorous actuarial training that he is equipped with critical apparatus to enable him to appreciate fully and perhaps to conduct the studies in question. Mr. Menzler states further that it is possible also to detect room for improvement in the method of presenting statistical arguments, and that less often, but not infrequently, the adequately trained actuarial person may be granted the delight of discovering a statistical fallacy. It follows, of course, that any person thoroughly qualified in the calculus of observations could do the same thing, provided he were also well grounded in the subject matter to which this mathematico-logical technique is applied.

The suggestion that actuaries enter statistical work for which they are qualified by their rigorous discipline in mathematics both pure and applied, is only one of a group of indications in Mr. Menzler's paper for broadening the scope of the actuary's work. It is also suggested that there may be openings for actuaries in the administrative and investment services of the life companies, in the actuarial and general services of the non-life companies who today in England do not generally employ actuarial personnel, and in statistical and financial departments of building societies, trade and political associations, business establishments and governmental offices.

Mr. Menzler shows a peculiar state of facts in respect to the scope of actuarial employment in Great Britain. Between 1895 and 1925, there was an increase of 408 in the combined membership of the Institute of Actuaries and of the Faculty of Actuaries (Scotland). Against this large increase in the number of qualified actuaries, there occurred an increase of only 31 in the number of "chief officers" of life and composite insurance offices reporting to the British Board of Trade. The number of such "chief officer" posts held by actuaries decreased from 87 in 1895 to 86 in 1925. In 1924-1925, the number of posts below the rank of "chief officer," including "assistant actuary" was 215, and of these 58 were held by actuaries. There were 32 "assistant actuaries" in this latter group. From private sources, the reviewer learns that among chartered accounts in England the relation of suitable posts of employment to the number of qualified men available is quite similar to that shown by Mr. Menzler for actuaries.

The President of the Institute appointed a Committee* in January, 1926, to consider the various points made by Mr. Menzler. This Committee heard testimony from men representing all sections of the profession. After deliberation, this Committee concluded that the Council of the Institute is not concerned to take steps to limit numbers by making the examinations more stringent. On the other hand, it was thought that the Council should retain the "open-door" policy, but watch over and direct developments calculated to enable the Institute and its members to render further services of a useful character to the community. The Committee furthermore regarded unfavorably the alteration of the Syllabus at the present time. When the time becomes ripe for altering the Syllabus, the suggestion of Mr. W. P. Elderton could be entertained. Mr. Elderton proposed establishing a new qualification, "Associate of the Institute of Actuaries (Statistics)." The Committee held the opinion that enlargement of the scope of the profession was possible, and that the most obvious channel of expansion seemed to be in the non-life departments of the big composite offices. The appointment of a permanent Committee was recommended, the duties of which would be to keep in touch with contemporary openings for actuarial services, to maintain contact with statistical and accounting societies, to encourage the preparation of technical papers in fields which would broaden the interest of Institute members, and in other ways to be alert for opportunities to advance the professional standing of actuaries in the insurance and external spheres.

The actuary is primarily the rate maker and rate tester, the guardian of the solvency of insurance companies. A broad and adequate group of studies prepare actuarial students for responsible service in this fundamental insurance activity. Part of this equipment of actuaries trained in the rate-setting function under the British and Scottish syllabi, is a thorough mastery of the technique of interpolation, graduation or smoothing and of *a posteriori* probabilities. This is, of course, a part of the calculus of observations according to Whittaker's compend.† In recent years the actuarial societies have added "statistical method," another branch of the calculus of observations, to their syllabi. There is also a sub-group of studies in financial mathematics, the mathe-

* A. D. Besant (Chairman); J. Burn; L. E. Clinton; Alfred Henry; and Wm. Penman.

† Whittaker, E. T. and G. Robinson, *The Calculus of Observations*. London, Blackie and Son, 1924.

matics incidental to computations involving interest in combination with life and other contingencies. Volumes I and II of the old Institute textbook deal primarily with this branch of applied mathematics. Underlying the "applied" group there is rigorous discipline in elementary and advanced pure mathematics through the infinitesimal calculus.

Supplementing these studies which support rate-making and rate-testing technique there is in the syllabi a rigorous insistence on the other insurance subjects—law, substantive economics, money and banking, investments, accounting, insurance and financial history, and the whole field of insurance practice. This element of the actuarial program happens to parallel somewhat the study programs outlined for members of the Chartered Insurance Institute who are not actuaries, but generalized insurance practitioners. In fact, when the Faculty of Actuaries of Scotland was founded, it was proposed to train insurance managers as well as actuaries. In respect to breadth of training for actuaries, John Francis wrote, in 1848, of ". . .the science of which an actuary practices the application, and which, though at present it relates to life contingencies, yet must be held to include all contingencies to which the calculation of probability can be applied."

The discussion which Mr. Menzler initiated leads, therefore, to principles for the application of actuarial training which are as old as the profession itself. The employment of actuaries as insurance managers, and as statisticians in fields external to insurance, was perhaps a more general practice during the latter half of the nineteenth century than during the period, 1895 to 1925, which Mr. Menzler has described. In fact, the pioneer actuaries were mathematicians, statisticians, astronomers, and philosophers who brought with them into the insurance business that broad outlook upon human affairs which was so succinctly stated in the Charter of the Royal Statistical Society. The recent agitation seems to be a wholesome attempt again to secure for actuaries that breadth of view and those possibilities for wider service which members of the profession possessed in the days of Angell, Brown, Finlaison and Farr. Danish insurance literature is replete also with examples of the catholicity of actuarial service.* From Tetens, through Opperman, Gram and Thiele to the present incumbents of actuarial

* Gram, J. P., "Summary of a Report on Actuarial Science in Denmark." *Documents, Troisieme Congres International*, Paris, 1901.

posts in Danish companies, there are numerous instances of distinguished service by Danish actuaries in public finance, insurance administration, and in the development of the calculus of observations. There seems to be no real obstacle for a return by British actuaries to the principles and practices which produced so many scholars of very broad attainments during the nineteenth century in England, in the Scandinavian countries and in North Germany.

Neither Mr. Menzler, nor the Committee which conducted hearings on the scope of actuarial service, seem to have made any concrete suggestion as to what should be done specifically to remedy the narrow parochialism which may be the chief source of complaint at the present time. The Committee recommended no change in the Syllabus. Mr. Menzler, on the other hand, suggested a more vigorous introduction to elementary statistical notions in Part I, Section 3 (Elements of Statistics) of the Syllabus, and a slight extension of the statistical questions in Part IV, Section 3 (Application of Statistical Methods and the Employment of Official Statistics in the Solution of Actuarial Problems). The present list of readings for students gives the Eldertons' "Primer of Statistics" as the leading text under Part I, Section 3. It is difficult to understand why Yule's text was not specified. This book is held in high esteem by American teachers of statistics and actuarial science. Mr. Menzler suggested that an official textbook be prepared which would link up the various statistical methods and ideas so far as they touch on actuarial problems and at the same time reveal a little of what is going on away from the actuarial corner of the statistical field.

This may prove to be quite sterile. Would it not be better to re-state Sections 2 and 3 of Part I of the Syllabus, so that finite differences, interpolation, summation and "statistics" could be considered to be constituents of a new section headed "The Calculus of Observations?" This would include also the "probabilities" subject in Section 1 of Part I. The recent compend of Whittaker (*op. cit*) offers a basis for recasting the Syllabus sections which deal with study materials on the calculus of observations. A closer tie between the Institute and the Universities may be helpful. The arrangement existing between the University of Edinburgh and the Faculty of Actuaries of Scotland* seems to

* *Memorandum regarding the Diploma of the University of Edinburgh in Actuarial Mathematics.* Faculty of Actuaries, Faculty Hall, 14 Queen St., Edinburgh.

be admirable, and something resembling this plan could no doubt be effected in England as well as in other countries

Mr. Menzler hopes that actuaries "will be prepared to enter every field of activity for which our training fits us" That training would have to be broad; and so far as "statistical method" is concerned somewhat in advance of the scope of texts so far prescribed by actuarial societies. The "statistics" of the Institute's present Syllabus is of course unimportant; but it could take on real substance if it were considered to be co-equal with finite differences, advanced probabilities, interpolation, graduation and the other technical procedures within the calculus of observations.

Some effort has been made to outline a few sound conceptions of training for statisticians. The American Statistical Association held a symposium* on the training of statisticians at its meetings in December, 1925. In the nature of the case, no definite action could be taken in respect to a training program. The subject needs much further consideration by teachers and practitioners of statistics. Any plan which the statisticians develop may be of service to the actuaries.**

E. W. KOPF.

* Abstracts of the principal papers were printed in the *Journal of the American Statistical Association*, December, 1926.

** At the close of his paper, Mr. Menzler gives the Syllabus of the Casualty Actuarial Society.

CURRENT NOTES

SYDNEY D. PINNEY, CURRENT NOTES EDITOR

AVIATION INSURANCE*

The romantic history of transportation and the scarcely less interesting record of the development of insurance are curiously interwoven. For whenever man sought new means of covering distance he was faced by a multitude of hazards to himself and his property, calling for new ways of protecting his finances.

HISTORY OF TRANSPORTATION INSURANCE

The storm at sea, the hidden reef, and the other perils which beset the sailor were among the earliest of these transportation hazards, and probably the first known forms of insurance were the "bottomry bonds" placed on the small and primitive vessels which ventured into the Mediterranean.

Man progressed. He developed the steam engine to propel him over metal rails, and there arose the hazards of fog-hidden signals, and broken and washed-out tracks. Again the insurance system expanded to compensate man for personal injuries received in railroad wrecks and to safeguard his pocket-book when his goods were damaged or destroyed.

The automobile came and brought its own peculiar hazards. Automobile insurance thereupon was evolved in all its forms of protection against fire, theft, collision, property damage and liability. Insurance still kept abreast of man's endeavor to conquer space and time.

Latest of all, a new era in transportation began, when, one day in 1903, a crude, ungainly machine bumped along the top of a North Carolina hill, rose uncertainly in the air, soared for a few moments and then came back to earth. Man had begun to fly, but in the process soon discovered hazards heretofore undreamed of. As the airplane developed in utility and use, the need for protection against these hazards increased. This led to one of the most romantic chapters in the eventful history of insurance.

Until the time of the World War, the unfamiliar spectacle

*This article by Mr. Charles H. Holland, President of the Independence Companies, appeared originally in the May issue of the "Annals" and is here reprinted by special permission of the author.

of an airplane in the sky caused excitement with all who saw it, but with the return of peace the new vehicle became the servant of commerce. Soon it was carrying mail across continents, and was beginning to be used for fast express package service as well as for passenger transport and special duties.

Even before the war, underwriters began to consider the possibility of developing coverage for the risks of flying, a veritable insurance adventure hardly inferior to that of aviation itself. The first policy was written in England, in 1912, by Horatio Barber. However, the war put a check to thoughts along this line, and its close found the United States with hundreds of war planes, now idle, and many aviators who were anxious to find employment in flying. Thus began an effort to develop commercial flying, and in 1919 there arose a sudden activity in aviation insurance on the part of eight or nine companies.

The main drawback was the timidity of the companies to grant aviation insurance. The result was that no one company accepted more than a very few of the lines of insurance required by those engaged in aviation. At the same time, the limits of indemnity were, in many cases, insufficient to meet the requirements. The aircraft owner, therefore, in order to secure anything in the nature of comprehensive coverage had to obtain various policies from different quarters—some of these were foreign policies and there were gaps between the different coverages. The limits of indemnity were too low and in many cases the rates of premium very burdensome. This situation brought about conditions that bristled with difficulties for companies, agents and brokers, and aircraft owners.

Another drawback was the inexperience of most of the insurers. This led to the acceptance of many excessively hazardous risks from which large losses arose. It brought about higher rates of premium than would have been the case if more careful selection of risks had been employed.

ALL-IN-ONE AVIATION COVERAGE

It soon became apparent that conditions had not yet reached the stage of a sound underwriting proposition; the experiment proved costly to the insurance companies and was virtually discontinued. Meanwhile, the art of flying grew under the

irresistible pressure of civilization's demand, although sadly hampered by the lack of coverage, and in the summer of 1926, an announcement of complete aviation coverage in one contract was made. This means that the hazards of fire, lightning transportation, accidental damage, theft, robbery and pilferage, public liability, passenger liability, property damage, tornado, cyclone and windstorm, are all covered in a single policy, which, if desired, may be accompanied by other policies dealing with personal accidents, cargo risks and compensation and employer's liability.

RATES

In undertaking to meet the insurance requirements of the aircraft industry, it was recognized that, for the present, rates must be largely a matter of judgment, there being little available experience upon which to base them. The underwriter must apply the skill and experience obtained by him from other classes of business, but so many new factors enter into the computation of equitable rates for insuring aircraft that no definite figure can be named to cover all risks, or even to cover any particular type of risk. This means, in other words, that each risk must be rated upon its individual merits. Therefore, in every transaction the age and type of plane and engine (with particular reference to the number of engines and the factor of safety with one or more not working), the fitness and experience of the pilot, the topography of the country, the purpose and length of the flight, the time flown, whether over established air routes having adequate landing fields sufficiently near together, and the question of night flying, all influence the judgment of the underwriter in arriving at a charge for the coverage.

Depreciation is a very important point by no means to be disregarded. Aircraft demands the best of care, together with frequent minor replacements as occasion requires. It is necessary that special attention be given to the motor, which needs to be taken down and overhauled after every 75 to 125 hours' flight. If we can be guided by the prices set for used motors, the value of the engines should be written off after 150 or 200 hours of flight unless it was taken down and overhauled at such regular intervals. In the latter event, the average life may be increased to 500 hours, or more.

The extreme complication of such considerations as they affect the risk, and therefore the premium rates which should be charged, may easily be imagined. They make it quite evident why companies heretofore have been wary about taking chances in so unfamiliar a field. On the other hand, a certain element of public service is involved. The rapid development of aviation has an immense bearing upon the welfare of the country, and the insurance companies would fail unless they found means to raise from the aircraft industry the handicap of lack of protection.

Some coverage, it is true, has been written by foreign insurers, whose experience with this class of risks has been more extended than that of American companies; but clearly the business should make a strong growth on American soil, as has been the case with every other kind of insurance. Most of our states in their compensation laws require that the employees of aircraft companies, including the pilots, be protected by compensation insurance, and naturally a company undertaking this line would desire that there should go with it such other lines as it may write. Necessarily, a premium income for this class of business must be limited because of the infancy of aviation, and the principle of averages upon which all insurance is based cannot become effective unless the business be confined to comparatively few insurers.

If the business were to be distributed among a large number of companies, as is the case with other lines of insurance, a single loss sustained by any one company would disturb its average, and it is easy to conceive that the experience of most companies would be unfavorable, so that they would withdraw from the field and leave it without protection.

On the other hand, if the business is confined to a single company or to a small group, having as large a spread as the nature of the business will permit, an opportunity may be afforded for profit which would be reflected in the rates charged to the policyholders. Rates necessarily reflect experience, and companies should not write "freak" risks, because it would be an injustice to the aviation industry if companies whose planes are engaged in normal use were charged with losses that might occur under abnormal conditions. In other words, companies should endeavor to underwrite the business as conservatively as its nature permits, with a view to keeping down its cost and extending the range of its protection.

TYPES OF LOSSES COVERED

Paralleling, somewhat, automobile insurance, the modern aviation policy covers three types of loss. First, loss to the plane itself; second, injury or damage to persons or property in the plane; and third, injury or damage to persons or property outside of the plane.

In the first group the hazards covered are those of fire, theft, windstorm and accidental damage. The inherent fire hazards in a plane are very similar to those found in an automobile, the main difference being that when a plane catches fire it is seldom within a short distance of a fire house, as an automobile may be. Few planes are stolen, although the papers last summer carried the story of two which were taken from their "parking place" in an open field. However, as knowledge of airplane operation becomes more widespread, and the market for used planes and parts increases, the theft coverage will doubtless become an important one.

Windstorm coverage applies to damage suffered by the plane when the hangar in which it is housed is struck by the wind in such a way as to harm the plane. If the plane is aloft and the wind damages some part of it so that it makes a forced landing and is injured, it is covered by the accidental damage clause, which protects the owner against loss from a variety of contingencies.

In the second group of hazards, those which threaten injury or damage to people or property in the plane, we find such specific coverages as passenger liability and, in additional policies, cargo risks, personal accident and compensation, and employer's liability. The passenger liability coverage is an important one, as an injured passenger might bring suit against the company operating the plane in a ruinously large amount.

The coverage of cargo risks protects the plane owner or the shipper against loss or damage to any goods being transported, or the common carrier against his legal liability therefor. Personal accident coverage may be taken out by the pilot and passengers to cover them in case of injuries. This is particularly important, inasmuch as there are few life and accident policies which will cover an aviator. Compensation and employer's liability insurance should be taken out by companies operating airplane fleets to protect themselves when pilots or groundmen

in their employ are injured in the course of their duties. In most states, employers are compelled by law to carry compensation coverage, but whether required to do so or not few employers care to assume the burden of paying compensation claims out of their own pockets, and the coverage is therefore a popular one in large outfits.

The third type of coverages, those which insure against injury or damage to persons or property outside of the plane, includes two clauses, public liability and property damage.

There is almost no limit to the amount in which one can be sued for injury to a person. Anyone who has watched the trend of verdicts in liability suits against motorists must realize that juries are inclined to render verdicts stipulating immense damages. The public liability coverage is, therefore, one of imperative necessity.

When a plane runs amuck, any property it strikes in the process is going to be rather severely damaged, and insurance to pay for that damage and any suits arising therefrom is an important adjunct to complete insurance protection for airplanes.

Foreign companies—mainly Lloyds' organizations—have insured aircraft under policy forms and conditions which may be well understood abroad, and interpreted by foreign courts, but which are not in line with American methods. The companies now writing aviation insurance have prepared policy contracts predicated upon the well-established conditions of the fire insurance contract prescribed by the various states, and the standard automobile policy, so that most of the policy provisions already have been interpreted by the courts and little room is left for misunderstanding as to what the coverage actually is. The form, however, is elastic, and may be broadened by endorsements as occasion requires.

The aviation business of the companies writing this class of coverage is handled principally through special departments. Some of their underwriters are experienced aviation engineers who are well qualified to offer advice to policyholders having in view increased safety. The companies have built up an inspection and adjustment organization in keeping with the requirements of their policyholders, and have developed a very comprehensive classification system, whereby all aircraft business is classified according to the coverage written, subdivided under type of use

and plane. The losses also are classified according to the cause, but with a subdivision as to the experience of the pilot.

CAUSES OF LOSS

Aircraft accidents are seldom ever due to a single cause; usually several factors are involved, among which may be mentioned structural defects, engine trouble, lack of fuel, weather conditions, error in judgment, physical illness, fatigue and mental confusion. If only one of these factors influenced the situation the aircraft could usually be brought to a safe landing, but if, in the case of engine trouble, the pilot becomes confused and does something he should not do, or if his judgment is poor in an emergency, the result may be serious.

The experience of the German Aviation Pool show the majority of the serious losses to be the result of engine failure, and starting and landing accidents, which together accounted for 77.5 per cent. of the total number of accidents in 1923, 85.7 per cent. in 1924, and 68 per cent. in 1925. From this same source we note that of 106 aircraft insured in 1925, losses were sustained on 58. The Directory of Civil Aviation in England estimated that within the past year landing accidents in that country amounted to about 25 per cent., engine failure about 25 per cent., and weather conditions about 50 per cent.

The foregoing statistics show the importance of having the very best type of pilot obtainable—one who is physically, morally, and mentally fit and in every way competent.

The working safety of aircraft engines has not yet been satisfactorily solved, from an insurance standpoint. The ground organizations of the civil aviation companies still leave much to be desired. Salvage surveys and repairs in cases of damage still involve disproportionately high costs and difficulties. The enormous demand upon the nerves of the pilot is a very important factor in underwriting. Adverse weather conditions is a serious enemy of aviation. Starting and landing maneuvers (especially in case of forced landing) are not yet executed with the desired precision. Many difficulties remain to be overcome, such as adequate ground forces, repair and salvage forces, etc. The cost of repairs is very high, and almost impossible at any price in isolated portions of the country. Insurance can make a more rapid advance only when the facilities of landing fields and repair

shops are scattered at more frequent intervals along the main air routes.

The "Air Commerce Regulations" recently adopted by the Department of Commerce (Aeronautics Branch), having to do with the licensing of aircraft, identification marks, requirements in operation, licensing of pilots and mechanics, and air traffic rules, will have much to do in improving underwriting conditions. The necessity of a register of aircraft similar to Lloyds' Register of Shipping is recognized.

Errors in judgment are perhaps the most common cause of aircraft accidents. The pilot may misjudge his distance from the ground when landing, and flatten out too soon or too late; he may bank too much or too little; he may attempt to turn too near the ground and side-slip. A good pilot must subconsciously react quickly to counteract a sudden emergency in which he is placed. A fraction of a second may determine safety or a crash. Fatigue is a common cause for failure of the brain to respond promptly to an emergency. Fear does not occupy the important position sometimes accorded it, as a pilot has little time to think of danger during flight.

Naturally, as a result of the progress in perfecting aircraft construction, accidents are not caused as frequently today through the failure of some vital part of the plane as formerly. Careful inspection of the entire aircraft, however, is still most essential before attempting to take a machine off the ground. An aircraft is subject during flight to such severe strains and vibration that defects are sure to develop after any extended flight.

It is not uncommon for a plane to catch fire in the air. The chief causes are a defective gasoline feed system; the accumulation of inflammable vapors; gasoline, dirt or oil about the engine or manifold, which may become ignited through overheating or a spark. The danger from fire is most serious when a crash occurs, resulting in the bursting or puncturing of gasoline tanks or supply pipes.

EFFECT OF PROTECTION ON FLYING.

I have traced the history of insurance and transportation and examined, briefly, the various forms of aviation coverage; the next question is, naturally, what effect, if any, will this insurance protection have upon the development of flying.

The few months which have passed since the announcement of complete aviation coverage have not sufficed to show any marked change in the status of the airplane, but certain predictions may be made, which, because of past experience and present indications, are practically certain of fulfillment.

Large express companies, which had heretofore hesitated to utilize the airplane for the delivery of rush goods, are now planning to buy large fleets of planes and send them all over the country, safe in the assurance that each one is fully underwritten. The government will doubtless find more and more private interests willing to lease and operate air mail routes. A case in point is the Boeing Airplane Company, which is to operate an air mail route in the West.

It is not surprising that insurance should have a strong bolstering effect on aviation. There is scarcely a business today which would not collapse if the supporting framework of insurance were withdrawn from it. Insurance to the individual means protection against monetary loss; to an industry it means a firm credit basis, an assurance of immunity from the ravages which chance mishap can impose.

Recently, the editor of one of America's greatest aviation trade journals made the following statement:

"With the announcement of an insurance policy that would cover every risk in aeronautics the foundation of successful commercial aviation in America was laid. One of the causes retarding its growth has been the failure to secure insurance at a cost that would warrant complete coverage and without insurance it was impossible to establish the confidence necessary to encourage investment.

"In the transaction of business, credit is essential. It is mutual confidence organized. There are two pre-eminent attributes which inspire financial confidence in men and organizations—'what they are' and 'what they have'—otherwise known as 'character' and 'collateral'. These are the high C's of business—without them, credit cannot exist.

"Insurance will establish confidence in aviation and insure a liberal amount of available loan for development. Heretofore, well-organized air plans failed in the majority of cases due to their inability to secure proper financing."

That the leading airplane manufacturers of America are think-

ing along the same line may be seen from reading the following excerpt from an article written by Thomas H. Huff, President of the Huff Daland Airplane, Inc.:

"Above everything else the airplane at the present moment needs public confidence. Directly through the application of insurance to aeronautics will come public recognition of the safety of air travel. There will be an increasing demand on the part of business executives to use aircraft when they know that it is possible to insure the plane against loss or damage. Such insurance will have a far-reaching effect on the application of airplanes to commerce. Companies operating airplanes over large territories will have the assurance that their capital investment is protected."

A few years ago, the day when private planes would be owned by individuals was regarded as a purely visionary period; now, that day seems almost upon us. Naturally, individual ownership of planes will mean that each plane owner will require full protection against fire, theft, crash, and other contingencies.

WHAT PRACTICAL AIRMEN THINK OF IT

One could scarcely close a discussion of aviation insurance without making mention of the attitude of the practical airman towards it. Lieutenant George O. Noville, Flight Engineer of the Byrd North Pole Expedition, Supply Engineer of the Around-the-World Flyers, and recently selected to accompany Lieutenant Byrd on his proposed New York-to-Paris flight next summer, made this statement recently: "I have felt for a considerable time the necessity of adequate insurance as a means of permanently establishing commercial aviation in the United States."

The sentence indicates that aviation insurance is as enthusiastically regarded from the cockpit as it is from the swivel-chair.

Standing at the threshold of an age of limitless possibilities, there is the temptation to let one's imagination play with the coming rush of airplanes, which seems destined to transform our social and economic conditions. Scarcely less fascinating is the desire to foresee something of the vast possibilities of aviation insurance, and to feel that one may have had an opportunity to contribute in some degree to its pioneering. Insurance companies are "taking off" on a glorious adventure in aviation insurance.

POWER PLANT INSURANCE*

The power plant in industry stands in the same relation to factory operation as the heart to the human body. Any slowing down or giving out of any part of the power plant equipment means stoppage and loss in operation to the entire plant. If the stoppage is the result of an accident it may be most serious, including loss of life, fire and loss of business through deferred operations. Science has not yet made us immune from accidents in the use of mechanical equipment, especially that which is subjected to high pressure, high speeds or high voltages. The wonder is when we consider the stress and strains power plant equipment is subjected to there are not more breakdowns.

KINDS OF ACCIDENT

Boiler. It is said there are between 1,300 and 1,400 serious boiler accidents a year of which more than 500 result in the death or injury of nearly 1,000 persons, the property damage amounting to many thousands of dollars. A boiler may explode, collapse or be torn apart from internal pressure. The results of boiler explosions are appalling in their violence, often causing great property damage as well as loss of life. If the boiler is made of cast iron it may crack so as to permit the leakage of steam or water, causing damage. An ordinary cylindrical boiler, when working under a steam pressure of only a hundred pounds is possessed of sufficient explosive energy to project and carry it in a perpendicular direction, a distance of about three and a half miles, while the explosion of a heating boiler may be sufficient to shake a residence to its foundation.

The explosion of a boiler is sometimes due to hidden defects, failure of safety valves to operate, false water or pressure gauge readings, accumulations of scale or oil, forced firing and incompetent operation.

Pressure Vessel. A pressure vessel is one that is subjected to internal pressure of steam, air, gas or liquids, and is not set over a furnace. A few of the different kinds of pressure vessels are tanks (air, gas, rendering, pressure, etc.), dryers, feed water heaters, etc. These vessels are subjected to internal pressure

*This article was taken from the "Insurance Bulletin," which is published by the Insurance Department of the Chamber of Commerce of the United States.

and may explode. The following illustration will give some idea of the destruction which might be caused by the explosion of a pressure vessel: A 12,000 gallon tank was hurled from its position into a building seventy-five feet away. More than a score of persons were injured and considerable property damage was caused by the great concussion.

Engine and Fly Wheel. On account of the amount of energy harnessed and the speeds involved, engines are subject to failure which may release immeasurable forces. The breakdown of an engine may be due to cylinder failures caused by accidental entrance of water or liquid, frame cracks, crank and shaft failures, breakage of reciprocating parts or valve gears, fly-wheel explosions and other kinds of over-speed accidents. Sometimes a defect in the engine will cause the fly-wheel to be canted against the side of the wheel pit and broken, which results in the plant being bombarded by the flying fragments hurled from the wheel. Fly-wheels explode from many causes; the principal one is centrifugal force. When the fly-wheel goes to pieces the damage is usually serious. It may wreck the engine and other costly machinery, demolish or damage the property and kill or injure persons. Of course, there are many other causes of engine and wheel wrecks but whatever the cause the loss is frequently serious.

Steam Turbine. The paddle wheel is a good illustration of the principle involved in a turbine, which is a rotary engine for converting the energy of steam into mechanical power or electrical energy. Accidents which happen to a turbine are sometimes caused by the centrifugal force resulting from the speed commonly employed in it. This tends to burst the rotor. The steam pressure involved tends to burst the casings and the diaphragms which divide a turbine into various parts. Complex vibratory strains which rapidly cause the deterioration of rotor wheels will also cause serious accidents.

Electrical Machinery. High voltage is commonly found in the electrical machinery used today. A few of the many electrical machinery accidents which may cause losses are the burn-out of motors, generators, transformers and switchboards, and grounds or short-circuits in windings, commutators, etc. Other accidents are caused by lightning, broken electrical connections

and by the explosion of the rotor or commutator from over-speed. Serious accidents sometimes are caused by the breakdown of insulation. This may happen for reasons over which the owner of the apparatus has no control.

TYPES OF POLICIES

Proper protection against the financial loss through such plant accidents as mentioned above may be obtained to cover each type of apparatus for which insurance is desired. Each policy must specify a certain amount of insurance as a maximum limit in case of an accident to one or more objects insured, such as boilers, engines, etc. If personal injury is to be included with the property damage coverage, then a definite amount must be stated in the policy as the limit of liability for any one person. This limit is part of and not in addition to the total limit of liability under the policy. Usually the policies contain a provision under which the full limit of the policy automatically is restored immediately upon the occurrence of a loss so that the original amount of insurance, without diminution, again is made available for any subsequent loss that may occur during the policy term. These policies are usually issued in the following form:

(1) *Boiler and Pressure Vessel Policy.* Covering loss caused by the explosion, collapse or rupture of any power boiler, electric steam generator, portable boiler, steamboat boiler, track locomotive, cast iron boiler and heater as well as pressure vessels, such as steam pipes, air pipes, digesters, economizers, gas tanks, radiators, refrigerating apparatus and other vessels which are subjected to internal pressure.

(2) *Wheel Policy.* Covering loss or damage caused by the sudden stoppage and accidental bursting or dislodging of wheels while revolving, into two or more parts where one or more of said parts shall then be completely separated or dislodged from the other part or parts of the wheel.

(3) Prior to the introduction of engine insurance, fly-wheels were insured. But the engine proper, exclusive of a fly-wheel, was not covered. This created a demand for complete coverage of steam engines and reciprocating machines which was met by the modern engine policy. This form of contract is written to cover loss caused by the breakdown of engines and reciprocating

machines such as pumps, air compressors, ammonia compressors and gas compressors.

(4) *Turbine Policy*. Generally this is written to insure the entire unit against loss caused by explosion or breakdown. By a turbine unit is meant the complete apparatus of driving steam motors and driven objects mounted with the steam motor on a common bed and having a continuous shaft or shafts connected by means of couplings or reduction gears. It does not include any piping connected to it, nor the condenser, nor any other vessel or apparatus connected to it by pipe or wiring and not actually mounted and wholly supported on its bed.

(5) *Electrical Machinery*. Covering loss caused by the breakdown or burn-out of any generator, motor, transformer, rotary converter, switchboard, etc. This form of insurance is one of the latest additions to the insurance field and was first written in this country in a small way in 1920. The demand for it is rapidly increasing. Unlike boiler insurance, where the principal damage is caused to surrounding property and the boiler itself is but an insignificant part of the loss, the insured electrical machinery is itself the expensive piece of property most likely to suffer damage.

KINDS OF LOSS COVERED

Generally the policy provides for direct damage, whether it covers the boiler, engine, wheel, turbine or electrical machine. By direct damage is meant that damage to property and injury to persons caused immediately, directly and solely by the explosion or breakdown of such objects. The power plant policies are very similar; many of their conditions are identical and as printed, each covers specifically the same kinds of loss arising from direct damage as follows:

- (1) Loss or damage to the equipment itself.
- (2) Loss or damage to other property of the assured.
- (3) Loss or damage to the property of others for which the assured is liable.

(4) Loss on account of the liability of the assured for death or injury to persons not in his employ and for his liability to employees, if not in conflict with state compensation acts. By not in conflict with state compensation acts is meant those states in which no policy covering compensation may be issued unless it

is unlimited as to the kind of an accident that causes the injuries and unlimited also as to the total amount of insurance it provides.

(5) The policy also provides for the defense of suits, even though groundless, brought against the assured, because of any accident covered by the policy. In addition it provides for the payment of court costs assessed against the policyholder in such litigation as may ensue between the policyholder and the person claiming damages, and interest accrued after entry of judgment until the company has paid, tendered, or deposited it in cost of judgment or in part thereof. These several payments are in addition to the limit of liability assumed by the company because of the particular accident.

USE AND OCCUPANCY

While damage to such machinery and premises from a physical standpoint would constitute a direct loss, the inability to occupy and use the premises or the machinery might impair the earnings of the future and thereby constitute an indirect but, nevertheless, actual loss. To protect an insured against this indirect but actual loss, a standard use and occupancy endorsement may be attached to the policy. In consideration of an additional premium, therefore, this endorsement provides for the payment of a specific amount per day for each day of total non-production caused by the accident and arranges to pay a proportional amount based on the conditions of the endorsement for each day of partial non-production. These endorsements usually contemplate a maximum number of days during which full daily indemnity may be paid. The number of days for which such payment is allowed is usually fixed at 100 or 150, depending upon the total amount of insurance desired and obtained.

It is generally understood that use and occupancy insurance of the character covered by the endorsement attached to the power plant policies provides for payment of the actual loss of net profits and fixed charges and expenses which necessarily continue during a temporary shut-down of the property. The items to be included in these fixed charges and expenses must be determined by each insured for his own business. In a general way these fixed charges may be said to include salaries of executives and other employees whose services could not be dispensed with in event of temporary shut-down, taxes which continue,

guaranteed dividends, and special charges peculiar to the individual business.

The daily indemnity is usually determined by estimating in advance the probable use and occupancy loss, taking into consideration those expenses which would continue in the event of a total shut-down of a plant. Sometimes the daily indemnity is determined by taking the average daily income and deducting from it those items of expense which could be immediately terminated in case of an accident, such as ordinary labor, power, raw material, etc.

CONSEQUENTIAL LOSS INSURANCE

This insurance against indirect loss may be provided for under an endorsement attached to the policy. In contrast with use and occupancy insurance, consequential loss or damage affects real tangible property. It usually follows direct loss. To illustrate:—An accident has occurred to a refrigerating system in a cold storage plant. The freezing temperature necessary to prevent the spoiling of the stock of meat cannot be maintained. The temperature of the cooling room slowly rises and eventually spoils the meat. These perishable goods have not been destroyed or mutilated by the direct force of an explosion of the refrigerating system, but they spoiled as a result of the explosion to the refrigerating system—consequently the loss of the perishable goods is termed indirect loss.

POWER INTERRUPTION INSURANCE

This is a new form of insurance which is also known as Electric Current Interruption Insurance. It affords coverage against loss arising from the total or partial interruption of usable electric current and lighting or power when such interruption is caused by an accidental breakdown of the physical equipment of a public service electric light and power system from which such current is derived.

KINDS OF LOSS NOT COVERED

Generally power plant policies do not cover loss or damage:

(1) If due to a breakdown or explosion caused by fire or if loss or damage is caused by fire outside of the machine resulting from

a breakdown or explosion. For example:—An accident covered by the policy occurs, causing damage to property to the extent of \$25,000 and fire immediately ensues, causing the destruction of the entire plant. The policy would just cover the loss of \$25,000 which was the amount of damage caused solely by the accident. The owner would have to look to his fire insurance company for the remainder of the loss which resulted from the fire.

(2) If the safety valve, which regulates the pressure, is set to allow a pressure in excess of that authorized, or if any device regulating the speed is set to allow a speed in excess of that authorized. On the other hand, if the speed or pressure regulating device has become defective, accidentally resulting in an accident, the loss is covered by the policy.

(3) If the loss is due to stoppage of plant or any other indirect result of a breakdown or explosion; if the accident occurs to an electrical machine while undergoing tests, experimentation, repairs or if it is caused directly or indirectly by inundation, strike, riot, or civil commotion.

(4) The company shall not be liable for the value of, or the renewal or repair of any part of the equipment which has broken or failed because of deterioration or weakness of such parts produced by wear.

ENGINEERING INSPECTION SERVICE

A very important thing about power plant insurance, aside from indemnity for loss, is the inspection service rendered by the insurance company. This service is provided in the form of regular and thorough inspections of all insured equipment. Such inspections are made by engineers especially skilled in the detection of flaws, which if left undiscovered, may result in an accident and serious financial loss. The inspecting engineer also instructs the operators of the equipment in better and safer operating methods, as well as to check the maintenance methods in the plant, to be sure the equipment is not allowed to deteriorate to the point of breakdown or explosion.

Boiler Inspection. Examination is made of every accessible portion of the boiler and all fittings and connections are inspected. Sometimes the engineer making the inspection will go further than just making an inspection of the equipment and examine the mill tests reports which show the chemical and physical proper-

ties of the steel used. In this way the materials are checked to see that they conform in every way to standard requirements. Boilers are usually inspected twice a year unless more inspections are required.

Engine and Wheel Inspection. Governors, valves, gears, release valves and all safety devices are thoroughly inspected. Emergency stops are given actual working tests. The engineer observes the operation of the unit while under load. The load is then removed and the operation and action of the unit is again observed. Wheels are inspected while in motion and while stationary. Engines and wheels are usually inspected twice a year. Additional inspections are made whenever necessary.

Turbine Inspection. The unit is observed while operating under varying loads to determine the action of its governors and valve gears. The load is then entirely removed and the action of the emergency trip is carefully checked. While the unit is stationary, all its parts are carefully examined for wearing, derangement or injury.

Electrical Machinery Inspection. As with engines and turbines, the engineer observes the apparatus under load and while idle to determine whether it is functioning satisfactorily. Temperatures are checked and speeds are taken under various operating conditions. Currents and voltages are observed by the necessary instruments and the insulation resistance is determined by tests.

This service is one thing power plant policies do not guarantee. It is obvious, however, that the success of any insurance company is through its ability to reduce losses, and the reduction of losses depends largely upon the character of the engineering and inspection service rendered.

EXPERIENCE RATING FOR PLATE GLASS INSURANCE*

Experience rating has been successfully applied for several years to workmen's compensation, automobile, certain public liability lines, and the various burglary lines, but it has never been applied to plate glass insurance until recently, although various experience rating plans for this line have been proposed and considered during the last three years.

Plate glass insurance is one of the oldest casualty lines. It would

*By Mr. Fred S. Garrison, Assistant Secretary, The Travelers Indemnity Co.

appear that this line lends itself to experience rating as readily as the other lines to which the plan has been applied for years. The Plate Glass Experience Rating Plan may be said to measure not only the hazard incidental to ownership and control, but also to supplement the manual classification rate system by reflecting physical hazards not recognized in the rating procedure. For example, in a particular rating district or zone there may be two identical risks, except that one may be located on a windy corner, or large plates in the building in the middle of the block may face an intersecting street in such a way as to make the large plates more subject to breakage from windstorm. The other risk may be located in the same rating zone but not be so directly in the path of windstorms. Without experience rating there is no means of differentiating between two risks—or a risk in a corner building may be at the intersection of two or more trolley car lines and passengers may congregate in front of the glass windows and thereby greatly increase the chances of glass breakage. It is not fair to charge the same rate for such a risk as is charged for a risk of identically the same type, including the number and size of plates, which may be located in the next block or even in the same block but not be subject to the extra hazards mentioned. Experience rating will to a great extent remove the discrimination that has heretofore existed in connection with such risks.

The Plate Glass Experience Rating Plan adopted by the National Bureau of Casualty and Surety Underwriters in March of this year differs from most of the other plans in that the actual loss ratio produced by the incurred losses and the premiums earned for the experience period are used without bringing them down to present-day levels. The loss ratio thus produced is compared with the loss provision in the rating formula, which in this line is $42\frac{1}{2}\%$ of the premium. The difference between $42\frac{1}{2}\%$ and the actual loss ratio of the individual risk is then divided by $42\frac{1}{2}\%$. The resulting departure from Manual rate is then modified by a credibility factor.

A risk cannot receive a debit unless its loss ratio exceeds the permissible loss ratio, nor can it receive a debit if it has experienced only one loss. The maximum debit is 200%. No risk can receive a credit regardless of the number of losses if its loss ratio exceeds the loss provision in the premium.

A plate glass risk to be eligible for experience rating must qualify under each and all of the following conditions:

A. Have had an exposure of at least twenty-five plates of glass each year during the minimum experience period.

B. Have at least twenty-five plates of glass to insure for the ensuing year.

C. Produce a manual premium of at least \$250 for the ensuing year.

There is also a provision that if a risk is once eligible for experience rating, and has been so rated, it shall be eligible for succeeding years, provided the number of plates to be insured is not less than the number of plates insured when the risk was first experience rated. The purpose of this provision is to continue to experience rate a risk that was once eligible but owing to a reduction in the basic manual rates later may produce a manual premium of less than \$250.

While it is possible to bring the earned premiums for the experience period down to present levels, it was found that it would be impracticable if not almost impossible to give the losses similar treatment, particularly on the larger risks, because of the numerous fluctuations in the price of glass, which varies in different parts of the country and is changed from time to time everywhere. Even an index factor agreed upon for this purpose would in all probability not prove satisfactory, and in any event it would be subject to change from time to time. The sponsors of the plan finally adopted took the view that the purposes of both the insuring public and the companies would be best served if the plan was devised so as to measure the actual experience on an individual risk by the permissible or expected loss ratio. The debits and credits produced by the plan result from the application of the theory of probabilities to the comparative evidence of the hazards of individual risks as measured by the permissible loss ratio on the one hand and the experience of such individual risks on the other. In the application of the plan it was assumed that less dependence could be placed on the indications of the experience of small risks than larger risks. Accordingly it has been made possible for the smallest eligible risks with no losses to receive only a small credit and to be only slightly penalized for bad experience. As the size of a risk increases, the possible variations in rate become greater. The maximum experience period is four years and nine months and the minimum period one year and nine months.

The application of experience rating to plate glass insurance

partially corrects one of the most glaring and long standing defects in established underwriting methods. Probably in no other line of insurance is the selection so manifestly against the company. Naturally the average storekeeper or owner of a building, if he carries plate glass insurance at all, insures only those plates which he knows have been most frequently broken in the past and does not insure the plates which have seldom if ever been broken. Therefore, use is made only of that experience applicable to the plates of glass upon which insurance is desired for the ensuing year.

Some of the causes of plate glass breakage are not subject to the assured's control, such as windstorms, earthquakes and breaks caused by passersby. On the other hand, many of the breaks can be prevented by proper control and management. Many breaks are caused by the placing of miscellaneous articles in store windows and on showcases. A great many of such losses can be prevented by the assured if he will take the proper measures. Many office buildings are desirable risks and have shown a favorable experience. On the other hand, there are others which have proven very unprofitable. The cause for the bad experience in an office building is usually due to improper care and management, or an inherent condition of the building or parts thereof. Some chain stores show a favorable loss ratio, whereas other chains of stores show a high loss ratio, and both sets of stores may be located in the same cities and be engaged in the same kind of business. It is not always easy to detect the cause of bad experience on a plate glass risk, because a considerable number of the losses are due to unknown causes, but the fact remains that some risks are bad and others are good, and to all appearances they are of a similar type. But the most reliable test to distinguish a good risk from a bad one is a comparison of loss ratios on different risks over a period of years. Experience rating tends to shift the burden to the place where it belongs—namely, the risk with the high loss ratio, and at the same time reduce the burden on the better risks, which is as it should be. Several companies have made a careful review of the larger plate glass risks which they have lost in the last three years, and are convinced that if the present experience rating plan had been in effect earlier, it would have enabled them to retain a large proportion of these profitable risks on their books. It would also have enabled the companies to have continued to

carry at adequate rates risks having an unfavorable experience which are now carried at a loss, or which have been dropped altogether because of the inability of the company to charge adequate rates for such undertakings.

Contrary to the belief of some underwriters, some plate glass policyholders whose experience has produced a debit are continuing their insurance, as evidenced by several debit rated risks approved by the Bureau during the first six weeks of the operation of the plan. The very fact that a risk produces a debit on its own experience is the best indication that the assured in that case needed plate glass insurance.

Plate glass insurance is subject to competition from a few companies who do not charge standard rates. Another form of competition is the so-called 50/50 policy under which the company accepts the risk for one-half of the manual premium and the assured agrees to pay his own losses up to an amount not exceeding the other half. Under this plan the assured cannot possibly pay more in premiums and losses than he would pay in premium for full coverage, and if he has no losses he has had his insurance for one-half the regular premium. A similar plan has also been applied to automobile collision insurance. The authorities of some states have declared this plan constitutes rebating and unfair discrimination and refuse to permit its use in those states. It is possible that other states may take the same view. The companies advocating experience rating for plate glass insurance are firmly convinced that it will fill a long felt want in that line, and in time prove exceedingly beneficial.

NEGLIGENCE PRACTICES IN NEW YORK CITY AN INTOLERABLE SITUATION*

The practice of negligence law in this city, ancient but never very honorable except in rare instances, has reached such a low level that it is a public calamity and disgrace, but is reaping a golden harvest amounting to many million dollars annually. There are two groups of our citizenship who indirectly are responsible for this condition—the bar and the insurance com-

†This article was written by Joseph C. H. Flynn, Deputy Attorney General of New York State, and appeared originally in the "Spectator" of June 23, 1927.

panies. The best elements in each group have it within their power to root out this rotten business, but they do nothing about it other than to frown upon it and every once in a while pass resolutions condemning it. It is very hard to estimate the number of "ambulance chasers" in this city but it is very large, and the lawyers, doctors and "investigators" who live off this type of work are also very numerous. Of course, we all know that it is a crime for a person to solicit law business as do these "chasers" but one would never think so, for their work is carried on very boldly throughout.

Who are these people? Well, everyone whose business takes him into our court house very frequently knows who these lawyers and doctors are. There isn't anyone whose business takes him to police headquarters or to police stations who doesn't know the "chasers" with their photographs of large settlement checks, just as they know the fire "bugs" or adjusters who answer the fire gong and the gentlemen who carry bail bonds signed in blank by officers of surety companies. I am sure many of the trial judges must be sick and tired of looking at the same faces before them day after day and hearing again and again the same old story for, unfortunately, it does not make much difference how an accident happens, when it is recounted in court, with slight variations, it seems like a familiar old story. Usually it is a pretty good one, too.

A short while ago I was looking over a report filed with the insurance department by an examiner who had gone into the affairs of a company doing a liability business. I noticed that of the suits pending one lawyer had 111, two lawyers had 85 each, three lawyers had 78 each, and so on. It struck me as being a remarkable thing that 111 persons with claims against as many motor car drivers covered by the one company should gravitate to the one specialist in plaintiffs' causes, but nothing is done about it by the people who ought to do something.

In connection with this practice I think it is only fair to say that some of the insurance companies are not without blame. Many persons receiving injuries do not believe that an insurance company will deal fairly with them or that an adjustment will mean anything but a very bad result for them. Unfortunately, the experience of those they know justifies that belief. Again the companies indulge in a practice that encourages "ambulance

chasing" when they settle a batch of claims filed by one lawyer for a lump sum. There is no good reason for settling claims on a basis where "good ones have to carry the bad". That sort of thing breeds bad claims, and is manifestly unfair to decent, honest claimants.

I think that the root of all evil in negligence practice is the retainer contract that is tolerated. We know that many an honest claimant would never be able to start a lawsuit without the contingent retainer. We also know that in many instances a lawyer will earn 50 per cent. of the amount recovered. But in the main the so-called "fifty-fifty" contract of a retainer is nothing short of a legalized form of larceny, particularly when the "experts" have to be paid out of injured person's share. My idea is that the contingent contract should be permitted but that the amount allowed to the lawyer, the doctor and the other experts should be fixed by the court in which the action has been brought on affidavits showing services actually rendered, and if no suit has been formally started then the allowances should be fixed by a justice of the Supreme Court, sitting in special term for the hearing of *ex parte* business.

These negligence actions have cluttered up the calendars of our courts in the most disgraceful manner, and I have not the slightest hesitancy in saying that thousands of them noticed for the Supreme Court can be settled for less than \$200 each. I have been told that over 60 per cent. of the cases tried in the Supreme Court in Brooklyn result in verdicts of less than \$500 each, the amount it costs the State to hold a jury trial. This sort of thing could be stopped if we gave our judges power to impose costs on the attorneys personally who instituted these suits. I know that such a suggestion is drastic but some drastic action will have to be taken because this practice has made it almost impossible for our courts to function properly.

The suggestion has been made that all negligence cases be handled in the same manner as master and servant actions—before a commission working along the lines of a workmen's compensation commission. This would mean a compulsory universal insurance for automobile operators and all injured persons would be compensated whether they were negligent or not. If the bar and the insurance companies do not want this to come to pass, then it becomes their duty to act speedily and clean

up conditions that now exist. If they do not, someone will do it for them and maybe not to their liking, for the people of the State, and after all the public pays the bill, cannot be expected to tolerate outrageous gouging forever.

LONGSHOREMEN'S COMPENSATION ACT

The United States Compensation Commission has announced that under the terms of the United States Longshoremen's and Harbor Workers' Compensation Act, which became effective July 1, 1927, employers must satisfy the Commission of their ability to pay claims and become "self-insurers" or insure with a company approved by the Commission.

The Act provides that any employer required to obtain compensation, who fails to do so shall be guilty of a misdemeanor, punishable by a fine of not more than \$1,000 or imprisonment for not more than one year, or both. Every stevedoring firm is required to obtain a certificate of compliance, which must be presented to a vessel owner before he can employ such stevedores. Violation of this rule is also punishable.

Under the rules laid down by the Commission every employer who desires to become a self-insurer must make application for this privilege on a form provided by the Commission.

The Commission reserves the right to revoke the privilege of self-insurance at any time for a good cause shown. The privilege also may be revoked for disregard to any of the provisions of the Act as to the time and method of compensation payments, the furnishing of medical treatment, or the filing of all injuries and compensation reports.

A lengthy communication dealing with the Act has been sent to its members by the National Council on Compensation insurance. The Council states that while there are numerous interpretations as to the exact scope of the Act it apparently applies mainly to the following classes of workers: "Stevedores engaged in loading or unloading ships while actually on board ships and employees engaged in repairing ships while on navigable waters or in dry dock".

It is further explained that—"employees engaged as stevedores or longshoremen will be under the state law while on the dock or on land and employees engaged in ship repair work will also be under the state law while working in the shops or yards. Em-

ployees engaged in constructing new ships will be under the state law, inasmuch as ships which have not been placed in commission apparently do not come under Federal jurisdiction".

"The Act does not apply to employees engaged by the master to load or unload or repair any small vessel under 18 tons net, nor does it apply to the master or a member of the crew of any vessel."

The National Council on Compensation Insurance has calculated new stevedoring and shipwright rates for all compensation states in which its members are allowed to write this line of business. These rates provide coverage under the benefits of the Federal Compensation Act for injuries sustained off-shore and State compensation benefits for on-shore accidents.

The National Bureau of Casualty and Surety Underwriters has prepared rates for the employers liability states and also for Ohio, West Virginia, Washington and Oregon. The rates for the employers liability states provide Federal coverage for off-shore accidents and employers liability coverage for on-shore accidents. The Ohio, West Virginia and Washington rates provide Federal coverage for off-shore accidents only. In these states on-shore accidents must be covered in their respective State Funds. In Oregon the rates cover Federal compensation for off-shore accidents and coverage under the Oregon Compensation Law for on-shore accidents. These rates have been filed in all states in which filing is necessary and in a number of states they have been approved.

CONTRACTUAL PUBLIC LIABILITY MARITIME OPERATIONS

In the past it has not been uncommon for employees engaged in maritime operations, particularly stevedoring, to bring third party claims against ship owners in cases where there is even a remote possibility that the employee has been injured through negligence of the ship owner. These claims are most common in cases where the accident is the result of the breaking of rigging or some other part of the ship's equipment. It has been observed that since the Supreme Court decision in the case of the International Stevedoring Company *vs* Haverty, there has been a tendency for the number of these third party claims to increase.

It is the opinion of compensation underwriters that under the operation of the United States Longshoremen's and Harbor

Workers' Compensation Act, third party claims of this character against ship owners will be stimulated in the hope that judgment will be handed down in excess of the amount of compensation to which the injured employee is entitled under the law. The reason for this opinion is found in Section 33 of the Federal Act which defines the procedure to be followed in the payment of compensation for injuries where third parties are liable. The provisions of this section clearly indicate that the injured employee will be guaranteed the full amount of compensation, even though he may decide to bring action against a third party and the judgment handed down is less than the amount of compensation to which he would be entitled under the law.

Ship owners in the past frequently relieved themselves of liability by requiring stevedoring contractors to sign agreements whereby the ship owner is held harmless for all accidents suffered by any person or persons, whether employees of the stevedoring contractors or members of the public, and where such accidents arise out of the operations engaged in by the stevedoring contractors. In the future, ship owners will undoubtedly demand such protection to a greater extent than in the past. This involves an assumption of the liability on the part of the stevedoring contractor and the latter will look to the insurance carrier for the proper coverage.

The liability involved cannot in any sense be considered as an additional interest under the public liability policy of the stevedoring contractor. The coverage is rather contractual public liability which is ordinarily extended by means of endorsements attached to public liability policies issued to stevedoring contractors. It is the recommendation of the National Bureau of Casualty and Surety Underwriters that this form of coverage be offered only when concurrent compensation insurance coverage is also carried. The carrier may otherwise be in the position of paying a large number of third party claims to injured stevedoring employees, whereas many of these claims should have been settled under the compensation policy. Since all third party claims paid to stevedoring employees will correspondingly reduce the amount of compensation for which the stevedore contractor is liable, it is apparent that it is not feasible to write contractual public liability without the concurrent compensation coverage.

NATIONAL BUREAU OF CASUALTY AND SURETY UNDERWRITERS

During the past year the following revised rates and new and revised rating plans were adopted by the National Bureau of Casualty and Surety Underwriters:

New rates for manufacturers' and contractors' public liability insurance. For the first time the rates were made on a territorial basis.

Many changes made in the rates for the various classifications of burglary, theft and robbery insurance.

Revised plate glass rates and a new manual published.

Manufacturers' and contractors' property damage rates revised.

Complete revision of rates for employers' liability insurance accomplished and the new schedules were put into effect.

Revised automobile rates established and a completely revised manual issued. A distinct and complete property damage and collision manual for Massachusetts was also published.

The experience rating plan in connection with plate glass insurance became effective.

New public liability rates for theaters in Greater New York and Boston announced.

Revised public liability and property damage liability rates for apartments, tenements and residences in Greater New York became effective.

An experience rating plan applicable to apartment and tenement public liability risks in Greater New York also became effective.

PERSONAL NOTES

Ralph H. Blanchard is now Professor of Insurance at the School of Business of Columbia University in New York City.

Howard G. Crane has left the National Council on Compensation Insurance and is with the General Reinsurance Corporation in New York City.

Frank R. Mullaney is now Secretary of the American Mutual Liability Insurance Company in Boston.

Thomas F. Tarbell, formerly Actuary of the Accident and Liability Department of the Aetna Life Insurance Company, is

now Actuary of the Casualty Actuarial Department of The Travelers Insurance Company in Hartford.

Joseph P. Gibson, previously Actuary of the Security Mutual Casualty Company, is now Manager of the Illinois Agricultural Mutual Insurance Company in Chicago.

Albert E. Wilkinson is now Actuary of the Standard Accident Insurance Company in Detroit.

Edward S. Skillings is now connected with the Hartford Accident and Indemnity Company of Hartford.

Lloyd A. H. Warren has been advanced to the position of Professor of Mathematics at the University of Manitoba, Canada.

Robert S. Hull has resigned from the Travelers Insurance Company to become Comptroller of the Standard Accident Insurance Company of Detroit.

LEGAL NOTES

BY

SAUL B. ACKERMAN
(OF THE NEW YORK BAR)

ACCIDENT INSURANCE

MOTOR DRIVEN CAR:—Laporte *vs.* North American Accident Insurance Co., 109 Southern 767 (La. S. C.). Salo *vs.* North American Accident Insurance Co., 153 Northeastern 557 (Mass. S. J. C.).

Both of these cases involved the same policy form providing for recovery in the event of death by the wrecking or disablement of any private horse drawn vehicle or private *motor-driven car* in which the insured was riding or driving, or by being accidentally thrown from such vehicle or car.

The insured in each case was killed while driving a motorcycle. The holding in each case is to the effect that a motorcycle is not included within the term *motor-driven car* and no recovery was allowed in either case.

The Massachusetts court based its decision upon the statutory definition of automobile and motorcycle, and motor vehicles while the Louisiana court based its decision partially upon the definitions in the Encyclopedia Britannica.

AUTOMOBILE INSURANCE

INTEREST:—Cleghorn *vs.* Ocean Accident & Guarantee Corp. Ltd., of London, 155 Northeastern 87 (N. Y. C. A.).

In a suit brought to recover damages under an indemnity policy issued by defendant appellant for liability incurred by plaintiff as result of an accident caused by his automobile, interest from date of accident to date of entry of the judgment against plaintiff herein was included in the judgment.

This item was held to have been erroneously included. In the language of the court:

“By the terms of the policy the defendant was bound to pay ‘interest accrued on the judgment rendered’ against plaintiff.—The plaintiff, however, seeks to overcome it by the provision which required the clerk on rendition of the verdict in the action brought against plaintiff to add interest from the date of the death of the person who was injured. We do not think, however, that this latter provision overcame the provision of the policy. In fact, we see no connection between the two things”.

INSURED AND INSURER AS DEFENDANTS:—*Ducommun vs. Strong*, 212 Northwestern 289 (Wis. S. C.).

This is an action by a person injured in an automobile accident against both the insured and the insurer. The insurer filed a demurrer on the ground that its policy was one of indemnity only which imposed no direct liability. The demurrer was overruled and the insurer held directly liable, the court apparently being satisfied that the fact that the policy did not exclude direct recovery was sufficient for its decision.

The holding is controlled, however, by sec. 85.25 of the Wisconsin Statutes: "Any bond or policy of insurance covering liability to others by reason of the operation of a motor vehicle shall be deemed and construed to contain the following conditions: That the insurer shall be liable to the person entitled to recover for the death of any person or for injury to person or property, caused by the negligent operation, maintenance, use or defective construction of the vehicle described therein, such liability not to exceed the amount named in said bond or policy."

POLICY HELD CONTRACT OF INDEMNITY:—*Hamilton Fire Insurance Co. vs. Greger et al* (S. C. App. Div. 1st Dept. N. Y.) 218 N. Y. Supp. 534.

This action was brought by the insurer to recover from the insured the amount which the plaintiff had paid the defendant by reason of property damage to the automobile of the latter. The policy was one insuring against loss by reason of collision. Upon payment of \$2,000 for the loss, the defendant delivered to the plaintiff a subrogation receipt as provided for by the terms of the policy. By this receipt, the defendant assigned to the plaintiff all claims arising from the loss to his automobile, to the extent of the amount paid.

The defendant then brought suit in New Jersey against the railroad, with the train of which he had collided, to recover for personal injuries and damage to his automobile and to his personal attire. This action was settled before trial for \$3,000.

The court granted a motion for summary judgment, on the ground that an implied promise on the part of the defendant arose from the insurance policy and the subrogation receipt to return to the insurance company the amount paid him when reimbursed by the railroad company. The court disregarded,

as of no importance, the contention that the settlement of the railroad company covered personal injuries in addition to the property damage paid for by the insurance company and refused to consider that there was not a double payment for the property damage.

INSURED NOT SOLE OWNER:—Maryland Motor Car Insurance Co. *vs.* Harris 154 Northeastern 36 (App. Ct. of Ind. in Banc.).

This was an action to recover on an insurance policy for the theft of an automobile. The plaintiff had purchased an automobile on an instalment contract by which the seller retained title. When solicited for insurance the plaintiff had referred the agent of the insurance company to the seller for all information and data concerning the automobile. The policy contained a warranty that the ownership of the insured was sole and unconditional.

The court sustained the contention of the plaintiff that the conditions of the policy were waived. The bases of this were the facts that the plaintiff was not required to make a written application and had never done so, that the plaintiff made no representation or warranties of any kind in relation to the title and his interest therein, that he had never seen the policy, that all the facts in relation to the risk were ascertained by the agent of the insurance company and that the premium paid by the plaintiff was to cover whatever interest he had in the automobile.

FORFEITURE:—North British & Mercantile Insurance Co. Ltd., *vs.* San Francisco Securities Corporation, 249 Pacific 761 (Arizona S. C.).

A policy provided that the statement of the year model is expressly made a warranty. There was also a provision that if any material fact or circumstances concerning the insurance or the subject thereof was concealed or misrepresented by the assured the entire policy would be void.

The court held that this last provision restricted the ground upon which forfeiture could be had, *viz.*: upon only the misrepresentation of material fact. As the misstatements of the yearly model as 1918 when in truth it was 1916, was merely an immaterial fact, there was no forfeiture in spite of the fact that the statement of yearly model was a warranty.

It was also held that a provision requiring the insured to give written notice within sixty days of a loss, was not such a pro-

vision, in the absence of a clause that the policy would be void in case written proof was not given within sixty days, which would result in the voiding of the policy upon failure of compliance.

WAIVER:—*Di Francesco vs. Zurich General Accident and Liability Insurance Co., Ltd., 134 Atlantic 789 (Ct. S. C.)*

A policy of indemnity against loss from liability provided that the assured was to give the insurer prompt and efficient service in investigating cases of bodily injury or property damage. The defense contended that the assured had knowledge of the accident in question and failed to report in accordance with the policy contract.

The court held that the jury might reasonably find a waiver upon evidence that the adjuster of the insurer had accepted the report of the accident as stated by the driver of the assured's automobile.

WORKMEN'S COMPENSATION

SUBROGATION:—*Morris vs. Standard Oil Company, 252 Pacific 605 (Calif. S. C.)*

The plaintiff a minor, employed by the Chronicle Publishing Company, was run down by a truck operated by the Standard Oil Company. He brought an action for personal injuries against the Standard Oil Company and recovered a judgment for \$12,000. The action was defended by the Insurance Company, insurer for both the Standard Oil and Chronicle Publishing Company. As compensation carrier for the publishing company, the insurer supplied hospital and medical care and paid to the plaintiff disability indemnity.

During the pendency of an appeal of that action, the Industrial Accident Commission made an award of \$800.64 to the injured employee as compensation. This amount was paid by the insurance company.

The insurance company obtained a lien by order of the court upon the judgment for the \$800.64 paid as compensation.

A settlement was made by which the Standard Oil Company paid the plaintiff \$10,290.25 and obtained for the plaintiff a satisfaction of the lien in accordance with the item of the settlement.

The Standard Oil Company contended that this action for

\$800.64 cannot be maintained against it and sets up the illegality of the assignment.

The holding was for the plaintiff and the language of the court follows in part:

"Appellant's (the Standard Oil Company) first contention is that at the time its insurance carrier made the purported assignment to the employee it had no cause of action against the oil company. This contention is answered by the provision of the workmen's compensation Act (sec. 30 subd. (f) that when an employer is liable or furnished or provided any medical services required by the act, such insurance carrier shall be subrogated to all the right of the employer and may enforce such rights in its own name. The insurer, therefore, had a cause of action arising by way of subrogation or equitable assignment—The cause of action was assignable."

SUBROGATION:—*Smith vs. Yellow Cab Company*, 135 Atlantic Reporter 858 (Pa. S. C.)

The employee was injured through the negligence of an agent of the Yellow Cab Company and brought suit against the latter. The insurer of the employer notified the Yellow Cab Company not to make any adjustment with the employee without first advising it, as it has paid \$109.60 as compensation to the employee and claimed subrogation to the extent thereof.

The Yellow Cab Company made a settlement with the employee for a larger sum without informing the employer or the insurer.

This action was brought by the employer and the insurer in the name of the employee for \$109.60. Recovery was allowed because of the provision in the Pennsylvania Statute for subrogation.

RIGHT OF ACTION AGAINST TORT FEASOR BY EMPLOYEE WHO RECEIVED COMPENSATION FROM HIS EMPLOYER:—*Riddle vs. Higley Motor Co.*, 252 Pacific 231 (Kansas S. C.)

The plaintiff brought this action against the defendant on account of personal injuries claimed to have been caused by the negligence of one of its truck drivers. The defendant answered, in part, by alleging that the plaintiff had made a claim against his employer under the workmen's compensation Act on account of the same injury and that he had received \$900.00 in full settlement and was therefore precluded from bringing this action.

This part of the answer was held to be insufficient and a demurrer to it, properly sustained. To quote the court:

“The plaintiff can, as the result of a judgment in his favor, herein receive and retain no more than he is entitled to—the amount of damages he is found to have suffered by the fault of the defendant. The defendant will be required to pay no more than he is liable for on this account. And the employer, whose liability is not based on fault, can receive no more than reimbursement for the payment of the liability imposed upon it by the Statute. . . . until a judgment is rendered against the defendant which he is ready to pay, he has no concern with the arrangement between the plaintiff and the employer.”

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ABSTRACT FROM THE MINUTES OF THE MEETING
MAY 13, 1927.

The semi-annual (twenty-eighth regular) meeting of the Casualty Actuarial Society was held at the Hotel Statler, Boston, Mass., on Friday, May 13, 1927.

President Perkins called the meeting to order at 10:15 A. M. The roll was called showing the following thirty-four Fellows and sixteen Associates present:

FELLOWS

BLACK, S. B.	HAUGH	MOORE, G. D.
BREIBY	HEATH	MULLANEY
BUDLONG	HESS	NICHOLAS
CORCORAN	HODGES	PERKINS
DORWEILER	JOHNSON	PINNEY
DUNLAP	LESLIE	ROEBER
FALLOW	LINDER	RYAN
FONDILLER	MAGOUN	TARBELL
GARRISON	MATTHEWS	VAN TUYL
GINSBURGH	MCMANUS	WHEELER
HAMMOND	MELTZER	WOODWARD
	MICHELbacher	

ASSOCIATES

BATEMAN	DAVIES	PENNOCK
BLACK, N. C.	DAVIS, E. M.	POWELL
BUGBEE	DAVIS, M. E.	THOMPSON, A. E.
COMSTOCK	EGER	WARREN, C. S.
CONSTABLE	FREDERICKSON	WELCH, C. P.
	GILDEA	

President Perkins read his presidential address.

The minutes of the meeting held November 19, 1926, were approved as printed in the *Proceedings*.

The Secretary-Treasurer read the report of the Council and upon motion, it was adopted by the Society. CHARLES V. R. MARSH and JOHN W. PIPER had been enrolled as Associates without examination.

The Council selected the following and recommended to the Society that he be admitted as a Fellow without examination under the terms of Article III of the Constitution:

A. Duncan Reid, President and General Manager, Globe Indemnity Company, Newark, N. J.

After ballot this nominee was declared a duly elected Fellow.

The reports of the Librarian (Mr. Breiby), and of the Educational Committee (Mr. Kopf, Chairman), were accepted.

The papers printed in this Number were read or presented.

Recess was taken until 2:15 P. M.

By invitation of the Committee on Program, Mr. William M. Greve, President of the Prudence Company of New York, addressed the Society on "Guaranteeing First Mortgage Real Estate Bonds", and Mr. Louis J. Hunter, Vice President of the National Shawmut Bank of Boston, addressed the Society on "Automobile Financing".

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

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

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CASUALTY ACTUARIAL SOCIETY

1927 YEAR BOOK

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List of Ex-Presidents and Ex-Vice-Presidents

List of Deceased Members

List of Students

Constitution and By-Laws

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1926 Examination Questions

(Corrected to February 1, 1927)

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L. W. LAWRENCE
38 LIBERTY STREET
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No. 6

CASUALTY ACTUARIAL SOCIETY

NOVEMBER 19, 1926

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**Terms expire at the annual meeting in November, 1927.*

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

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MEMBERSHIP OF THE SOCIETY, NOVEMBER 19, 1926.

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	
†	Amerinc, W. M., Assistant Secretary, Georgia Casualty Co., Brown Building, Atlanta, Ga.
May 23, 1924	Bailey, William B., Economist, Travelers Insurance Co., Hartford, Conn.
*Nov. 20, 1924	Barber, Harmon T., Travelers Insurance Co., Hartford, Conn.
†	Benjamin, Roland, Treasurer, Fidelity & Deposit Co., Baltimore, Md.
†	Black, S. Bruce, President, Liberty Mutual Insurance Co., Park Square Building, Boston, Mass.
Apr. 20, 1917	Blanchard, Ralph H., Associate Professor of Insurance, School of Business, Columbia University, New York.
May 24, 1921	Bond, Edward J., First Vice-President, Maryland Casualty Co., Baltimore, Md.
May 19, 1915	Bradshaw, Thomas, General Manager, Massey-Harris Co., Ltd., 915 King St., Toronto, Canada.
†	Breiby, William, Consulting Actuary, Fackler & Breiby, 50 Broad St., New York.
Oct. 22, 1915	Brown, Herbert D., Chief of U. S. Efficiency Bureau, Washington, D. C.
Oct. 22, 1915	Brown, William H., Second Vice-President and Secretary, Columbian National Life Insurance Co., Boston, Mass.
June 5, 1925	Brosmith, William, Vice-President and General Counsel, Travelers Insurance Co., Hartford, Conn.
†	Buck, George B., Consulting Actuary for Pension Funds, 25 Spruce Street, New York.
May 26, 1916	Bucklin, Walter S., President, National Shawmut Bank, 40 Water Street, Boston, Mass.
†	Budlong, W. A., Superintendent of Claims, Commercial Travelers Mutual Accident Association, Utica, N. Y.
Apr. 20, 1917	Burhop, W. H., Assistant Manager, Employers Mutual Liability Insurance Co., Wausau, Wis.
Feb. 19, 1915	Burns, F. Highlands, President, Maryland Casualty Co., Baltimore, Md.
†	Cammack, Edmund E., Vice-President and Actuary, Aetna Life Insurance Co., Hartford, Conn.
†	Carpenter, Raymond V., Actuary, Metropolitan Life Insurance Co., 1 Madison Ave., New York.

FELLOWS.

Date Admitted	
*Nov. 15, 1918	Coates, Barrett N., Consulting Actuary, 354 Pine St., San Francisco, Calif.
*Nov. 17, 1922	Coates, Clarence S., Federal Mutual Liability Insurance Co., Mills Building, San Francisco, Calif.
Oct. 27, 1916	Cogswell, Edmund S., Director of Research, Study of Old Age Dependency, National Civic Federation, 1 Madison Ave., New York.
Feb. 19, 1915	Collins, Henry, Assistant Manager, Ocean Accident & Guarantee Corporation, 1 Park Avenue, New York.
	† Copeland, John A., Consulting Actuary, Southeastern Trust Building, Atlanta, Ga.
*Nov. 18, 1925	Corcoran, William M., Actuary, Connecticut Insurance Department, Hartford, Conn.
	† Cowles, Walter G., Vice-President, Travelers Insurance Co., Hartford, Conn.
	† Craig, James D., Actuary, Metropolitan Life Insurance Co., 1 Madison Ave., New York.
*Nov. 19, 1926	Crane, Howard, G., National Council on Compensation Insurance, 151 Fifth Avenue, New York.
*Nov. 20, 1924	Darkow, Angela C., Independence Indemnity Co., Independence Bldg., Philadelphia, Pa.
	† Dawson, Alfred B., Miles M. Dawson & Son, 36 W. 44th St., New York.
	† Dawson, Miles M., Consulting Actuary and Counsellor at Law, 36 W. 44th St., New York.
	† De Kay, Eckford C., President, De Kay and Co., Insurance Brokers, 51 Maiden Lane, New York.
	† Dearth, Elmer H., Secretary-Treasurer, Patch & Co., Insurance Counselors, 85 Mt. Vernon Ave., Detroit, Mich.
May 19, 1915	Deutschberger, Samuel, Actuary, New York Insurance Department, 165 Broadway, New York.
*Nov. 17, 1920	Dorweiler, Paul, Aetna Life Insurance Co., Hartford, Conn.
	† Dublin, Louis I., Statistician, Metropolitan Life Insurance Co., 1 Madison Ave., New York.
May 19, 1915	Dunlap, Earl O., Assistant Actuary, Metropolitan Life Insurance Co., 1 Madison Ave., New York.
	† Egbert, Lester D., Director, Brown, Crosby & Co., Inc., Insurance Brokers, 96 Wall St., New York.
*Nov. 17, 1922	Elston, James S., Assistant Actuary, Life Department, Travelers Insurance Co., Hartford, Connecticut.
	† Epstein, Saul R., Denver National Bank, Denver, Colo.
	† Fackler, Edward B., Consulting Actuary, Fackler & Breiby, 50 Broad St., New York.
	† Fallow, Everett S., Actuary, Accident Department, Travelers Insurance Co., Hartford, Conn.
	† Farrer, Henry, Assistant Secretary, Independence Indemnity Co., Independence Building, Philadelphia, Pa.
Feb. 19, 1915	Fellows, C. W., President, Associated Industries Insurance Corporation, Wells Fargo Bldg., San Francisco, Calif.
Feb. 19, 1915	Flanigan, James E., Agency Manager, Bankers Life Co., 220 Broadway, New York.

FELLOWS.

Date Admitted	
	† Flynn, Benedict D., Secretary, Travelers Insurance Co., Hartford, Conn.
Feb. 19, 1915	Fondiller, Richard, Woodward, Fondiller & Ryan, Consulting Actuaries, 75 Fulton St., New York.
	† Forbes, Charles S., Treasurer, Smyth, Sanford and Gerard, Inc., Insurance Brokers, 68 William St., New York.
May 26, 1916	Frankel, Lee K., Second Vice-President, Metropolitan Life Insurance Co., 1 Madison Ave., New York.
	† Franklin, Charles H., Assistant to Vice-President, Compensation and Liability Department, Continental Casualty Co., 910 South Michigan Ave., Chicago, Ill.
Feb. 25, 1916	Froggatt, Joseph, President, Joseph Froggatt & Co., Insurance Accountants, 25 Church St., New York.
	† Furze, Harry, Treasurer, Globe Indemnity Co., Washington Park, Newark, N. J.
Feb. 19, 1915	Garrison, Fred S., Assistant Secretary, Travelers Indemnity Co., Hartford, Conn.
*Nov. 20, 1924	Ginsburgh, Harold J., American Mutual Liability Insurance Co., 142 Berkeley St., Boston, Mass.
May 19, 1915	Glover, James W., Professor of Mathematics and Insurance University of Michigan, 620 Oxford Road, Ann Arbor, Mich.
	† Goodwin, Edward S., Goodwin-Beach & Co., Bankers, 720 Main St., Hartford, Conn.
	† Gould, William H., Consulting Actuary, 75 Fulton St., New York.
*Nov. 19, 1926	Graham, Charles M., Assistant Actuary, State Insurance Fund, 432 Fourth Ave., New York.
Oct. 22, 1915	Graham, George, Vice-President, Central States Life Insurance Co., St. Louis, Mo.
Oct. 22, 1915	Graham, Thompson B., Assistant Secretary, Metropolitan Life Insurance Co., 1 Madison Ave., New York.
	† Graham, William J., Second Vice-President, Equitable Life Assurance Society, 393 Seventh Ave., New York.
May 25, 1923	Granville, William A., Director of Publications, Washington Fidelity National Insurance Co., 513 Aldine Ave., Chicago, Ill.
	† Greene, Winfield W., Actuary and Comptroller, General Re-Insurance Corporation, 80 Maiden Lane, New York.
	† Hamilton, Robert C. L., Comptroller, Hartford Accident & Indemnity Co., Hartford, Conn.
	† Hammond, H. Pierson, Assistant Actuary, Life Department, Travelers Ins. Co., Hartford, Conn.
	† Hansen, Carl M., Vice-President and General Manager, General Re-Insurance Corporation, 80 Maiden Lane, New York.
Oct. 27, 1916	Hardy, Edward R., Assistant Manager, New York Fire Insurance Exchange, 85 John St., New York.
Oct. 22, 1915	Hatch, Leonard W., Director, Bureau of Statistics and Information, State Department of Labor, 124 East 28th St., New York.
*Nov. 19, 1926	Haugh, Charles J., Jr., Assistant Actuary, National Bureau of Casualty & Surety Underwriters, 120 West 42nd St., New York.

FELLOWS.

Date Admitted	
Nov. 17, 1920	Heath, Charles E., Chief Examiner of Casualty Companies, New York Insurance Department, 165 Broadway, New York.
Nov. 21, 1919	Henderson, Robert, Second Vice-President and Actuary, Equitable Life Assurance Society, 393 Seventh Ave., New York.
May 17, 1922	Heron, David, Secretary & Chief Statistician, London Guarantee & Accident Co., Ltd., 20 Lincoln's Inn Fields, London, W. C. 2, England.
Oct. 22, 1915	Hess, Herbert, Herbert Hess & Co., Public Insurance Accountants and Auditors, 120 Broadway, New York.
†	Hillas, Robert J., President, Fidelity & Casualty Co., 92 Liberty St., New York.
Nov. 15, 1918	Hinsdale, Frank W., Secretary, Workmen's Compensation Board, Vancouver, B. C., Canada.
May 23, 1924	Hobbs, Clarence W., Special Representative of the National Convention of Insurance Commissioners, National Council on Compensation Insurance, 151 Fifth Ave., New York.
Nov. 19, 1926	Hodges, Charles E., President, American Mutual Liability Insurance Co., Boston, Mass.
Oct. 22, 1915	Hodgkins, Lemuel G., Secretary, Massachusetts Protective Association, Worcester, Mass.
†	Hoffman, Frederick L., Consulting Statistician, Prudential Insurance Co.; Research Consultant, Babson Institute, Wellesley Hills, Mass.
Oct. 22, 1915	Holland, Charles H., President, Independence Indemnity Co., Independence Bldg., Philadelphia, Pa.
†	Hughes, Charles, Auditor and Actuary, New York Insurance Department, 165 Broadway, New York.
†	Hunt, Burritt A., Assistant Secretary, Accident & Liability Department, Aetna Life Insurance Co., Hartford, Conn.
†	Hunter, Arthur, Third Vice-President and Chief Actuary, New York Life Insurance Co., 346 Broadway, New York.
Nov. 18, 1921	Hutcheson, William A., Second Vice-President and Actuary, Mutual Life Insurance Co., 32 Nassau St., New York.
Feb. 25, 1916	Jackson, Charles W., Actuary, Postal Life Insurance Co., 511 Fifth Ave., New York.
May 19, 1915	Johnson, William C., Vice-President, Massachusetts Protective Association, Worcester, Mass.
*Nov. 18, 1921	Kearney, Thomas P., Manager, State Compensation Insurance Fund, Denver, Colo.
*Nov. 19, 1926	Kelton, William H., Assistant Actuary, Life Department, Travelers Insurance Co., Hartford, Conn.
†	King, Walter I., Secretary, Connecticut General Life Insurance Co., Hartford, Conn.
*Nov. 21, 1919	Kirkpatrick, A. L., Secretary and Treasurer, Casualty Information Clearing House, 208 So. La Salle St., Chicago, Ill.
†	Kopf, Edwin W., Assistant Statistician, Metropolitan Life Insurance Co., 1 Madison Ave., New York.
Feb. 19, 1915	Laird, John M., Vice-President, Connecticut General Life Insurance Co., Hartford, Conn.

FELLOWS.

Date Admitted	
Feb. 19, 1915	Landis, Abb, Consulting Actuary, 1107-1110 Independent Life Building, Nashville, Tenn.
Nov. 17, 1922	Lawrence, Arnette R., Special Deputy Commissioner of Banking and Insurance, 1203 Military Park Building, 60 Park Place, Newark, New Jersey.
†	Leal, James R., Secretary & Actuary, Interstate Life and Accident Co., Chattanooga, Tenn.
†	Leslie, William, General Manager, National Council on Compensation Insurance, 151 Fifth Ave., New York.
*Nov. 20, 1924	Linder, Joseph, Office of Woodward, Fondiller & Ryan, Consulting Actuaries, 75 Fulton St., New York.
Nov. 18, 1921	Little, James F., Associate Actuary, Prudential Insurance Co., Newark, N. J.
Feb. 19, 1915	Maddrill, James D., Vice-President—General Manager, Union Labor Life Insurance Co., 1701 Connecticut Ave., N. W., Washington, D. C.
†	Magoun, William N., General Manager, Massachusetts Rating & Inspection Bureau, 80 Broad St., Boston, Mass.
*Nov. 19, 1926	Matthews, Arthur N., Travelers Insurance Co., Hartford, Conn.
May 19, 1915	Maycrink, Emma C., Examiner, New York Insurance Department, 165 Broadway, New York.
*Nov. 16, 1923	McClurg, D. Ralph, Secretary and Treasurer, National Equity Life Insurance Co., Little Rock, Ark.
May 23, 1919	McDougald, Alfred, Ellerslie, Beddington Gardens, Wallington Surrey, England.
*Oct. 31, 1917	McManus, Robert J., Assistant Statistician, Compensation and Liability Department, Travelers Insurance Co., Hartford, Conn.
Feb. 19, 1915	Mead, Franklin B., Vice-President, Lincoln National Life Insurance Co., Fort Wayne, Ind.
Apr. 20, 1917	Meltzer, Marcus, Statistician, National Bureau of Casualty & Surety Underwriters, 120 W. 42nd St., New York.
†	Michelbacher, G. F., Vice-President and Secretary, Great American Indemnity Co., 1 Liberty St., New York City.
†	Miller, David W., Assistant Treasurer, S. W. Straus & Co., Investment Bonds, 565 Fifth Ave., New York.
†	Milligan, Samuel, Third Vice-President, Metropolitan Life Insurance Co., 1 Madison Ave., New York.
†	Mitchell, James F., First Assistant U. S. Manager, General Accident Fire and Life Assurance Corporation, 421 Walnut St., Philadelphia, Pa.
†	Moir, Henry, President, United States Life Insurance Co., 105 Fifth Ave., New York.
*Nov. 18, 1921	Montgomery, Victor, Secretary, Pacific Employers Insurance Co., 621 So. Hope St., Los Angeles, Calif.
Nov. 19, 1926	Mooney, William L., Vice-President, Aetna Life Insurance Co., Hartford, Conn.
†	Moore, George D., Assistant Secretary and Actuary, Royal Indemnity Co., 84 William St., New York.
May 19, 1915	Morris, Edward B., Actuary, Life Department, Travelers Insurance Co., Hartford, Conn.

FELLOWS.

Date Admitted	
	† Morrison, James, Secretary-Treasurer, Independence Indemnity Co., Independence Building, Philadelphia, Pa.
	† Mowbray, Albert H., Consulting Actuary, 1012 Colusa Ave., Berkeley, Calif.; Associate Professor of Insurance, University of California, Berkeley, Calif.
May 20, 1918	Mudgett, Bruce D., Professor of Economics, University of Minnesota, Minneapolis, Minn.
*Nov. 17, 1920	Mueller, Louis H., Secretary and Treasurer, Associated Industries Insurance Corporation, 85 Second St., San Francisco, Calif.
	† Mullaney, Frank R., Actuary and Assistant Secretary, American Mutual Liability Insurance Co., 142 Berkeley St., Boston, Mass.
May 28, 1920	Murphy, Ray D., Second Vice-President and Associate Actuary, Equitable Life Assurance Society, 393 Seventh Ave., New York.
	† Nicholas, Lewis A., Assistant Secretary, Fidelity & Casualty Co., 92 Liberty St., New York.
	† Olifiers, Edward, Consulting Actuary, P. O. Box 1817, Rio-de-Janeiro, Brazil.
	† Orr, Robert K., President, Michigan Employers Casualty Co., Lansing, Mich.
	† Otis, Stanley L., Counsellor at Law, 110 William St., New York.
*Nov. 21, 1919	Outwater, Olive E., Actuary, The Maccabees, Detroit, Mich.
Nov. 19, 1926	Page, Bertrand A., Vice-President, The Travelers Insurance Co., Hartford, Conn.
	† Pallay, Julius J., Special Agent, Equitable Life Assurance Society, 1328 Broadway, New York City.
May 26, 1916	Parker, John M., Jr., Secretary, Accident and Liability Department, Aetna Life Insurance Co., Hartford, Conn.
*Nov. 18, 1921	Perkins, Sanford B., Assistant Secretary, Travelers Insurance Co., Hartford, Conn.
Nov. 15, 1918	Perry, W. T., Assistant Manager, Ocean Accident and Guarantee Corporation, 36 Moorgate, London, E. C. 2, England.
Nov. 19, 1926	Phillips, Jesse S., President, Great American Indemnity Co., New York.
*Nov. 17, 1922	Pinney, Sydney D., Actuary, Compensation and Liability Department, Travelers Insurance Co., Hartford, Conn.
	† Remington, Charles H., Insurance Counselor and Advisor, Room 846, Hotel Roosevelt, New York City.
May 23, 1919	Richardson, Frederick, U. S. Manager, General Accident Fire and Life Assurance Corporation, 414 Walnut St., Philadelphia, Pa.
*Nov. 19, 1926	Richter, Otto C., American Telephone & Telegraph Co., 195 Broadway, New York.
May 24, 1921	Riegel, Robert, Professor of Insurance, University of Pennsylvania, Philadelphia, Pa.
*Nov. 16, 1923	Roeber, William F., Actuary, National Council on Compensation Insurance, 151 Fifth Avenue, New York.

FELLOWS

Date Admitted	
†	Rubinow, Isaac M., Executive Director, Jewish Welfare Society, 330 South Ninth St., Philadelphia, Pa.; Consulting Statistician and Actuary.
†	Ryan, Harwood E., Woodward, Fondiller & Ryan, Consulting Actuaries, 75 Fulton St., New York.
†	Scheitlin, E., Assistant Treasurer, Globe Indemnity Co., Washington Park, Newark, N. J.
†	Senior, Leon S., Manager and Secretary, Compensation Inspection Rating Board, 370 Seventh Ave., New York.
Apr. 20, 1917	Smith, Charles G., Manager, State Insurance Fund, 432 Fourth Avenue, New York.
Feb. 25, 1916	Strong, Wendell M., Associate Actuary, Mutual Life Insurance Co., 32 Nassau St., New York.
Oct. 22, 1915	Strong, William Richard, No. 4 "Sheringham," Cotham Road, Kew, Victoria, Australia.
†	Sullivan, Robert J., Vice-President, Travelers Indemnity Co., Hartford, Conn.
*Nov. 17, 1920	Tarbell, Thomas F., Actuary, Accident and Liability Department, Aetna Life Insurance Co., Hartford, Conn.
†	Thompson, John S., Actuary, Mutual Benefit Life Insurance Co., 750 Broad St., Newark, N. J.
Nov. 18, 1921	Toja, Guido, Royal Commissioner, Government Institute of Insurance, Rome, Italy.
†	Train, John L., Secretary and General Manager, Utica Mutual Insurance Co., 185 Genesee St., Utica, New York.
Nov. 17, 1922	Traversi, Antonio T., Amritsar Street, Khandallah, Wellington, New Zealand.
*Nov. 21, 1919	Van Tuyl, Hiram O., Actuary, Constitution Indemnity Company of Philadelphia, 407 Walnut St., Philadelphia, Pa.
*Nov. 17, 1920	Waite, Alan W., Aetna Life Insurance Co., Hartford, Conn.
*Nov. 18, 1925	Warren, Lloyd A. H., Assistant Professor of Mathematics, University of Manitoba, Winnipeg, Manitoba, Canada.
May 23, 1919	Welch, Archibald A., President, Phoenix Mutual Life Insurance Co., Hartford, Conn.
Nov. 19, 1926	Wheeler, Roy A., Vice-President and Actuary, Liberty Mutual Insurance Co., Boston, Mass.
†	Whitney, Albert W., Associate General Manager and Actuary, National Bureau of Casualty & Surety Underwriters, 120 West 42nd St., New York.
†	Wolfe, Lee J., Consulting Actuary, 165 Broadway, New York.
†	Wolfe, S. Herbert, Consulting Actuary, 165 Broadway, New York.
May 24, 1921	Wood, Arthur B., Vice-President and Actuary, Sun Life Assurance Co., Montreal, Canada.
†	Woodward, Joseph H., Woodward, Fondiller & Ryan, Consulting Actuaries, 75 Fulton St., New York.
*Nov. 17, 1920	Young, Charles N., Manager, Safety Engineering Department, Constitution Indemnity Company of Philadelphia, 407 Walnut St., Philadelphia, Pa.
†	Young, William, Actuary, New York Life Insurance Co., 346 Broadway, New York.

ASSOCIATES

Those marked (*) have been enrolled as Associates upon examination by the Society.

Those marked (1) or (2) have passed Part I or Part II of the Fellowship Examination.

Date Enrolled	
May 23, 1924	Acker, Milton, Manager, Compensation and Liability Department, National Bureau of Casualty and Surety Underwriters, 120 West 42nd St., New York.
*Nov. 15, 1918	Ackerman, Saul B., Assistant Professor of Insurance, New York University, 32 Waverly Place, New York.
*Nov. 15, 1918	Ankers, Robert E., Secretary and Treasurer, Continental Life Insurance Co., District National Bank Building, Washington, D. C.
(1)*Nov.16,1923	Ault, Gilbert E., Office of Woodward, Fondiller & Ryan, Consulting Actuaries, 75 Fulton St., New York.
*Nov. 17, 1922	Barter, John L., Superintendent Casualty Department, Pacific Department, Hartford Accident & Indemnity Co., 720 California St., San Francisco, Calif.
*Nov. 19, 1926	Batho, Elgin R., Bankers Life Company, Des Moines, Iowa.
*Nov. 18, 1925	Bittel, W. Harold, Peoria Life Insurance Co., 410 Main St., Peoria, Ill.
Nov. 17, 1920	Black, Nellas C., Superintendent Statistical Division, Maryland Casualty Co., Baltimore, Md.
*Oct. 22, 1916	Brann, Ralph M., Superintendent Accident Department, London & Lancashire Indemnity Company of America, 20 Trinity St., Hartford, Conn.
Nov. 15, 1918	Brooks, LeRoy, Statistician, U. S. Fidelity & Guaranty Co., Baltimore, Md.
Nov. 20, 1924	Broughton, Thomas W., Zurich General Accident and Liability Co., 175 W. Jackson Boulevard, Chicago, Ill.
*Nov. 19, 1926	Brown, F. Stuart, Statistician, Norwich Union Indemnity Co., New York City.
*Nov. 15, 1918	Brunnquell, Helmuth G., Actuary, Wisconsin Insurance Department, Madison, Wis.
*Oct. 22, 1915	Buffer, Louis, District Manager, Utica Mutual Insurance Co., 225 West 34th St., New York.
*Nov. 20, 1924	Bugbee, James M., Secretary-Treasurer, The Associated Companies, Hartford, Conn.
Mar. 31, 1920	Burt, Margaret A., Office of George B. Buck, Consulting Actuary, 25 Spruce Street, New York.
Nov. 17, 1922	Cavanaugh, Leo D., Vice-President and Actuary, Federal Life Insurance Co., 166 N. Michigan Boulevard, Chicago, Ill.
*Nov. 20, 1924	Colyer, Victoria Shaw, 1749 Collingwood Avenue, Detroit, Mich.
(2)*Nov.17,1920	Comstock, W. Phillips, Statistician, London Guarantee and Accident Co., Ltd., 55 Fifth Ave., New York.
*Nov. 18, 1921	Constable, William J., Secretary, Massachusetts Automobile Rating and Accident Prevention Bureau, 80 Broad St., Boston, Mass.
*Nov. 19, 1926	Davies, E. Alfred, Budget Supervisor, Liberty Mutual Insurance Co., Boston, Mass.

ASSOCIATES.

Date Enrolled	
(*)Nov.16,1923	Davis, Evelyn M., Office of Woodward, Fondiller & Ryan, Consulting Actuaries, 75 Fulton St., New York.
*Nov. 18, 1925	Davis, Malvin E., Metropolitan Life Insurance Co., 1 Madison Ave., New York.
May 25, 1923	Economidy, Harilaus E., Treasurer, American Indemnity Co., Galveston, Texas.
June 5, 1925	Eger, Frank A., Secretary and Comptroller, Indemnity Insurance Company of North America, Philadelphia, Pa.
Nov. 15, 1918	Egli, W. H., Statistician, Zurich General Accident & Liability Insurance Co., 431 Insurance Exchange, Chicago, Ill.
*Nov. 16, 1923	Fitz, L. Leroy, Assistant Actuary, Acacia Mutual Life Association, 601 13th St., Washington, D. C.
*Nov. 16, 1923	Fleming, Frank A., Actuary, American Mutual Alliance, 730 5th Ave., New York.
May 23, 1919	Fletcher, Nicholas, Assistant to Commissioner and Secretary, Workmen's Compensation Board, Winnipeg, Manitoba, Canada.
(*)Nov.18,1925	Fredrickson, Carl H., Statistician, Canadian Casualty Underwriters Association, 330 Bay St., Toronto, Canada.
Nov. 20, 1924	Froberg, John, Superintendent, California Inspection Rating Bureau, San Francisco, Calif.
*Nov. 19, 1926	Fuller, G. V., Assistant Secretary, National Council on Compensation Insurance, New York City.
*Nov. 17, 1922	Gibson, Joseph P., Jr., Actuary, Security Mutual Casualty Co., 3236 So. Michigan Ave., Chicago, Ill.
*Nov. 16, 1923	Gildea, James F., Travelers Insurance Co., Hartford, Conn.
*Nov. 18, 1921	Haggard, Robert E., Superintendent, Permanent Disability Rating Department Industrial Accident Commission, State Building, Civic Center, San Francisco, Calif.
*Nov. 19, 1926	Hall, Grace G., American Telephone & Telegraph Co., New York City.
*Nov. 17, 1922	Hall, Hartwell L., Assistant Actuary, Connecticut Insurance Department, Hartford, Conn.
Nov. 20, 1924	Hall, Leslie L., Secretary, Rating Department, National Council on Compensation Insurance, 151 Fifth Avenue, New York.
(*)Nov.18,1925	Hall, William D., Western Automobile Insurance Co., Fort Scott, Kas.
(1)Mar.25, 1924	Hart, Ward Van Buren, Assistant Actuary, Connecticut General Life Insurance Co., Hartford, Conn.
Nov. 21, 1919	Haydon, George F., General Manager, Wisconsin Compensation Rating & Inspection Bureau, 481 Broadway, Milwaukee, Wis.
Nov. 18, 1921	Hull, Robert S., Travelers Insurance Co., Hartford, Conn.
*Oct. 31, 1917	Jackson, Edward T., Statistician, General Accident Fire & Life Assurance Corporation, 421 Walnut St., Philadelphia, Pa.
*Nov. 19, 1926	Jackson, Henry H., Associate Actuary, National Life Insurance Co., Montpelier, Vt.
(*)Nov.18,1921	Jensen, Edward S., Assistant Actuary, Great Republic Life Insurance Co., Los Angeles, Calif.
*Nov. 21, 1919	Jones, Loring D., Claim Auditor, State Insurance Fund, 432 Fourth Ave., New York.

ASSOCIATES.

Date Enrolled	
*Nov. 17, 1922	Kirk, Carl L., Assistant Statistician, Zurich General Accident & Liability Insurance Co., 431 Insurance Exchange, Chicago, Ill.
*Nov. 19, 1926	Kormes, Mark, National Bureau of Casualty and Surety Underwriters, New York City.
*Nov. 18, 1925	Li, Shou-Kun, U. S. Life Insurance Co., 105 Fifth Ave., New York.
*Nov. 18, 1925	Malmuth, Jacob, Examiner, New York Insurance Department, 165 Broadway, New York.
*Nov. 19, 1926	Marshall, R. M., National Council on Compensation Insurance, New York City.
*Nov. 19, 1926	Masterson, Norton, E., Statistician, Hardware Mutual Casualty Co., Stevens Point, Wisconsin.
(*)Oct.27, 1916	McClure, Laurence H., Assistant Sales Manager, Electrical Division, Colt's Patent Fire Arms Manufacturing Co., Hartford, Conn.
*Nov. 17, 1922	McIver, Roswell A., Actuary, Washington Fidelity National Insurance Co., 1607 Howard St., Chicago, Ill.
(*)Nov.17,1922	Michener, Samuel M., Assistant Actuary, Columbus Mutual Life Insurance Co., 580 East Broad St., Columbus, Ohio.
*Nov. 19, 1926	Milne, John L., Assistant Actuary, Presbyterian Ministers' Fund, Philadelphia, Pa.
Nov. 17, 1922	Montgomery, John C., Assistant Treasurer, Utilities Mutual Insurance Co., 225 West 34th St., New York.
May 25, 1923	Moore, Joseph P., Vice-President, North American Accident Insurance Co., 275 Craig St., W., Montreal, Canada.
(*)Nov.21,1919	Mothersill, Roland V., Anchor Casualty Co., 360 Robert St., St. Paul, Minn.
(*)Oct.27,1916	Newell, William, Assistant Secretary, Sun Indemnity Co., 55 Fifth Ave., New York.
*Nov. 18, 1925	Nicholson, Earl H., Actuarial Department, Lincoln National Life Insurance Co., Ft. Wayne, Ind.
May 23, 1919	Otto, Walter E., Secretary and Treasurer, Michigan Mutual Liability Co., Park Avenue Building, Detroit, Mich.
*Nov. 19, 1926	Overholser, Donald M., A. M. Best Co., 75 Fulton St., New York City.
Nov. 20, 1924	Pennock, Richard M., Actuary, Pennsylvania Manufacturers Association Casualty Insurance Co., Finance Building, Philadelphia, Pa.
*Nov. 17, 1920	Pike, Morris, Actuary, Judea Life Insurance Co., 44 East 23rd St., New York.
(*)Nov.17,1922	Poorman, William F., Actuary, Central Life Assurance Society, Fifth and Grand Avenues, Des Moines, Iowa.
(*)Nov.17,1922	Powell, John M., Actuary, Columbian National Life Insurance Co., 77 Franklin St., Boston, Mass.
*Nov. 18, 1925	Prenner, Myron R., Actuary, Department of Insurance, Bismarck, North Dakota.
*Nov. 15, 1918	Raywid, Joseph, President, Underwriters Statistical Bureau, Inc., 81 Fulton St., New York.
*Nov. 21, 1919	Robbins, Rainard B., Vice-President—Actuary, Union Labor Life Insurance Co., 1701 Connecticut Ave., N. W., Washington, D. C.
Nov. 16, 1923	Sawyer, Arthur, Actuary, London Guarantee & Accident Co., 55 Fifth Ave., New York.

ASSOCIATES.

Date Enrolled	
(1)*Nov.20,1924	Sheppard, Norris E., Lecturer in Mathematics, University of Toronto, Toronto, Canada.
Nov. 15, 1918	Sibley, John L., Statistician, United States Casualty Co., 80 Maiden Lane, New York.
*Nov. 18, 1925	Skelding, Albert Z., National Council on Compensation Insurance, 151 Fifth Avenue, New York.
*Nov. 19, 1926	Skillings, E. S., Statistician, Utilities Mutual Insurance Co., New York City.
*Nov. 18, 1921	Smith, Arthur G., Actuary & Auditor, Compensation Inspection Rating Board, 370 Seventh Ave., New York.
*Nov. 19, 1926	Somerville, W. F., Anchor Casualty Co., St. Paul, Minn.
*Nov. 18, 1925	Sommer, Armand, Manager, Accident and Health Dept., Chicago Branch Office, Standard Accident Insurance Co., 175 West Jackson Blvd., Chicago, Ill.
*Nov. 15, 1918	Spencer, Harold S., Aetna Life Insurance Co., Hartford, Conn.
Nov. 20, 1924	Stellwagen, Herbert P., Secretary-Treasurer, National Bureau of Casualty and Surety Underwriters, 120 West 42nd St., New York.
*Nov. 16, 1923	Stoke, Kendrick, National Council on Compensation Insurance, 151 Fifth Ave., New York.
Nov. 15, 1918	Sullivan, Oscar M., Director of Re-education, State Department of Education, St. Paul, Minn.
*Nov. 18, 1925	Tao, Sheng-Han, University of Michigan, 203 South Thayer St., Ann Arbor, Mich.
Mar. 23, 1921	Thompson, Arthur E., Chief Statistician, Globe Indemnity Co., Washington Park, Newark, N. J.
(1)*Nov.21,1919	Trench, Frederick H., Manager, Underwriting Department, Utica Mutual Insurance Co., 239 Genesee St., Utica, New York.
*Nov. 20, 1924	Uhl, M. E., National Bureau of Casualty & Surety Underwriters, 120 West 42nd St., New York.
May 25, 1923	Vinter, Joseph M., Standard Accident Insurance Co., 640 Temple Ave., Detroit, Mich.
*Nov. 21, 1919	Voogt, Walter G., Actuary, State Insurance Fund, 432 Fourth Ave., New York.
(1)*Oct.27,1916	Waite, Harry V., Statistician, Compensation & Liability Department, Travelers Insurance Co., Hartford, Conn.
May 23, 1919	Warren, Charles S., Chief Statistician, Ocean Accident & Guarantee Corporation, Ltd., 1 Park Ave., New York.
Nov. 18, 1925	Washburn, James H., Consulting Actuary, 165 Broadway, New York.
(1)*Nov.18,1921	Waters, Leland L., Secretary-Treasurer, National Accident Insurance Co., Lincoln, Neb.
Nov. 17, 1920	Watson, James J., Assistant Secretary and Business Administrator, Michigan Mutual Liability Co., Detroit, Mich.
*Nov. 19, 1926	Welch, George P., Statistician, Goodwin-Beach & Co., Hartford, Conn.
*Nov. 18, 1921	Welch, Eugene R., Associated Industries Insurance Corporation, Wells Fargo Bldg., San Francisco, Calif.
*Nov. 18, 1925	Wellman, Alexander C., Actuary, Alabama National Life Insurance Co., Birmingham, Ala.
*Nov. 16, 1923	Wetherald, Dorothy, 4631 Sansom St., Philadelphia, Pa.

ASSOCIATES.

Date Enrolled	
Nov. 15, 1918	Wilkinson, Albert E., Statistician, Standard Accident Insurance Co., Detroit, Mich.
Sept. 17, 1919	Williams, John F., Vice-President, Illinois Life Insurance Co., 1212 Lake Shore Drive, Chicago, Ill.
*Oct. 22, 1915	Williamson, William R., Assistant Actuary, Life Department, Travelers Insurance Co., Hartford, Conn.
*Oct. 22, 1915	Wood, Donald M., Childs & Wood, General Agents, Independence Indemnity Co., 175 W. Jackson Blvd., Chicago, Ill.
*Oct. 22, 1915	Woodman, Charles E., Comptroller, Ocean Accident & Guarantee Corporation, 1 Park Ave., New York.
*Nov. 18, 1925	Woolery, James M., Assistant Actuary, Inter-Southern Life Insurance Co., Louisville, Ky.
*Nov. 17, 1922	Young, Floyd E., Associate Actuary, Western Union Life Insurance Co., 1023 Riverside Avenue, Spokane, Washington.

SCHEDULE OF MEMBERSHIP, NOVEMBER 19, 1926.

	Fellows	Associates	Total
Membership, November 18, 1925.....	157	99	256
Deductions:			
By resignation.....	4	—	4
By withdrawal.....	—	2	2
By death.....	—	—	—
	153	97	250
Additions:			
By election, Nov. 19, 1926.....	5	—	5
By 1926 examinations.....	6	14	20
	164	111	275
Transfers from Associate to Fellow	—	7	7
Membership, November 18, 1925.....	164	104	268

EX-PRESIDENTS AND EX-VICE-PRESIDENTS

EX-PRESIDENTS

	Term
I. M. RUBINOW.....	1914-1916
JAMES D. CRAIG.....	1916-1918
JOSEPH H. WOODWARD.....	1918-1919
BENEDICT D. FLYNN.....	1919-1920
ALBERT H. MOWBRAY.....	1920-1922
HARWOOD E. RYAN.....	1922-1923
WILLIAM LESLIE.....	1923-1924
G. F. MICHELbacher.....	1924-1926

EX-VICE-PRESIDENTS

	Term
GEORGE D. MOORE.....	1918-1920
LEON S. SENIOR.....	1920-1922
EDMUND E. CAMMACK	1922-1924
SANFORD B. PERKINS.....	1924-1926
RALPH H. BLANCHARD.....	1924-1926

DECEASED MEMBERS

All of the following were Fellows with the exception of those marked * who were Associates.

Date of Death	
Feb. 10, 1920	*Baxter, Don. A., Deputy Insurance Commissioner, Michigan Insurance Department, Lansing, Michigan.
Feb. 4, 1920	Case, Gordon, Office of F. J. Haight, Consulting Actuary, Indianapolis, Ind.
July 23, 1921	Conway, Charles T., Vice-President, Liberty Mutual Insurance Co., Boston, Mass.
Jan. 20, 1922	Craig, James McIntosh, Actuary, Metropolitan Life Insurance Co., New York.
Sept. 2, 1921	Crum, Frederick S., Assistant Statistician, Prudential Insurance Co., Newark, N. J.
July 9, 1922	Downey, Ezekiel Hinton, Compensation Actuary, Pennsylvania Insurance Department, Harrisburg, Pa.
Oct. 30, 1924	Fackler, David Parks, Consulting Actuary, New York.
Aug. 22, 1925	Gaty, Theodore E., Vice-President and Secretary, Fidelity & Casualty Co., New York.
Mar. 10, 1924	Hookstadt, Carl, Expert, U. S. Bureau of Labor Statistics, Washington, D. C.
Oct. 15, 1918	Kime, Virgil Morrison, Actuary, Casualty Departments, Travelers Insurance Co., Hartford, Conn.
Dec. 20, 1920	Lubin, Harry, Assistant Actuary, State Industrial Commission, New York.
Aug. 20, 1915	Montgomery, William J., State Actuary, Boston, Mass.
July 24, 1915	Phelps, Edward B., Editor, The American Underwriter, New York.
July 30, 1921	Reiter, Charles Grant, Assistant Actuary, Metropolitan Life Insurance Co., New York.
Feb. 26, 1921	Saxton, Arthur F., Chief Examiner of Casualty Companies, New York Insurance Department, New York.
May 9, 1920	Stone, John T., President, Maryland Casualty Co., Baltimore, Md.

STUDENTS

The following candidates for the grade of Associate have passed one of the two parts of the examination, during the last three years:

Part I only

- ARNDT, RAYMOND A., Secretary-Assistant Treasurer, Bankers National Life Insurance Company of Florida, Herkimer Building, Jacksonville, Fla.
- BATEMAN, A. E., Liberty Mutual Insurance Co., Park Square Bldg., Boston, Mass.
- CHEN, S. T., 500 Riverside Drive, New York City.
- CONROD, S. F., Great-West Life Insurance Co., Winnipeg, Canada.
- HONDORP, P., Assistant Actuary, Central Life Assurance Society, Des Moines, Ia.
- IRWIN, J. C. W., Guardian Life Insurance Co., 50 Union Square, New York City.
- LOUIS, P. H., 811 Catherine St., Ann Arbor, Mich.
- MILLER, H. C., Comptroller, State Compensation Insurance Fund, State Building, San Francisco, Cal.
- NEWHALL, K., Travelers Insurance Co., Hartford, Conn.
- RAIFORD, T. E., Instructor in Mathematics, University of Michigan, 1512 Granger Ave., Ann Arbor, Mich.
- SHAPIRO, ISRAEL, c/o Woodward, Fondiller & Ryan, 75 Fulton St., New York.
- VALERIUS, N. M., Aetna Life Insurance Co., Hartford, Conn.

Part II only

- CARTER, R. B. (Miss), State Compensation Insurance Fund, State Building, San Francisco, Cal.
- CHRISTENSEN, J., Examiner, New York Insurance Dept., 165 Broadway, New York.
- SCHLIER, C. L., Travelers Insurance Co., Hartford, Conn.
- URE, A. G., Hartford Accident & Indemnity Co., 720 California St., San Francisco, Cal.

CONSTITUTION

(As AMENDED JUNE 5, 1925.)

ARTICLE I.—*Name.*

This organization shall be called the CASUALTY ACTUARIAL SOCIETY.

ARTICLE II.—*Object.*

The object of the Society shall be the promotion of actuarial and statistical science as applied to the problems of casualty and social insurance by means of personal intercourse, the presentation and discussion of appropriate papers, the collection of a library and such other means as may be found desirable.

The Society shall take no partisan attitude, by resolution or otherwise, upon any question relating to casualty or social insurance.

ARTICLE III.—*Membership.*

The membership of the Society shall be composed of two classes, Fellows and Associates. Fellows only shall be eligible to office or have the right to vote.

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

Any person may, upon nomination to the Council by two Fellows of the Society and approval by the Council of such nomination with not more than one negative vote, become enrolled as an Associate of the Society provided that he shall pass such examination as the Council may prescribe. Such examination may be waived in the case of a candidate who for a period of not less than two years has been in responsible charge of the statistical or actuarial department of a casualty insurance organization or has had such other practical experience in casualty or social insurance as in the opinion of the Council renders him qualified for Associateship.

ARTICLE IV.—*Officers and Council.*

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

CONSTITUTION.

ARTICLE V.—*Election of Officers and Council.*

The 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 Editor and the Librarian shall be elected annually by the Council at the Council meeting preceding the annual meeting of the Society. They shall be subject to confirmation by majority ballot of the Society at the annual meeting.

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

ARTICLE VI.—*Duties of Officers and Council.*

The duties of the officers shall be such as usually appertain to their respective offices or may be specified in the by-laws. The duties of the Council shall be to pass upon candidates for membership, to decide upon papers offered for reading at the meetings, to supervise the examination of candidates and prescribe fees therefor, to call meetings, and, in general, through the appointment of committees and otherwise, to manage the affairs of the Society.

ARTICLE VII.—*Meetings.*

There shall be an annual meeting of the Society on such date in the month of November as may be fixed by the Council in each year, but other meetings may be called by the Council from time to time and shall be called by the President at any time upon the written request of ten Fellows. At least two weeks notice of all meetings shall be given by the Secretary.

ARTICLE VIII.—*Quorum.*

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

ARTICLE IX.—*Expulsion or Suspension of Members.*

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

ARTICLE X.—*Amendments.*

This constitution may be amended by an affirmative vote of two-thirds of the Fellows present at any meeting held at least one month after notice of such proposed amendment shall have been sent to each Fellow by the Secretary.

BY-LAWS

(AS AMENDED MAY 21, 1926.)

ARTICLE I.—*Order of Business.*

At a meeting of the Society the following order of business shall be observed unless the Society votes otherwise for the time being:

1. Calling of the roll.
2. Address or remarks by the President.
3. Minutes of the last meeting.
4. Report by the Council on business transacted by it since the last meeting of the Society.
5. New membership
6. Reports of officers and committees.
7. Election of officers and Council (at annual meetings only.)
8. Unfinished business.
9. New business.
10. Reading of papers.
11. Discussion of papers.

ARTICLE II.—*Council Meetings.*

Meetings of the Council shall be called whenever the President or three members of the Council so request, but not without sending notice to each member of the Council seven or more days before the time appointed. Such notice shall state the objects intended to be brought before the meeting, and should other matter be passed upon, any member of the Council shall have the right to re-open the question at the next meeting.

ARTICLE III.—*Duties of Officers.*

The President, or, in his absence, one of the Vice-Presidents, shall preside at meetings of the Society and of the Council. At the Society meetings the presiding officer shall vote only in case of a tie, but at the Council meetings he may vote in all cases.

The Secretary-Treasurer shall keep a full and accurate record of the proceedings at the meetings of the Society and of the Council, send out calls for the said meetings, and, with the approval of the President and Council, carry on the correspondence of the Society. Subject to the direction of the Council, he shall have immediate charge of the office and archives of the Society.

BY-LAWS.

The Secretary-Treasurer shall also send out calls for annual dues and acknowledge receipt of same; pay all bills approved by the President for expenditures authorized by the Council of the Society; keep a detailed account of all receipts and expenditures, and present an abstract of the same at the annual meetings, after it has been audited by a committee of the Council.

The Editor shall, under the general supervision of the Council, have charge of all matters connected with editing and printing the Society's publications. The *Proceedings* shall contain only the proceedings of the meetings, original papers or reviews written by members, discussions on said papers and other matter expressly authorized by the Council.

The Librarian shall, under the general supervision of the Council, have charge of the books, pamphlets, manuscripts and other literary or scientific material collected by the Society.

ARTICLE IV.—*Dues.*

The dues shall be ten dollars for Fellows payable upon entrance and at each annual meeting thereafter, except in the case of Fellows not residing in the United States, Canada, or Mexico, who shall pay five dollars at the time stated. The dues shall be five dollars for Associates payable upon entrance and each annual meeting thereafter until five such payments in all shall have been made; beginning with the sixth annual meeting after the admission of an Associate as such the dues of any Associate heretofore or hereafter admitted shall be the same as those of a Fellow. The payment of dues will be waived in the case of Fellows or Associates who have attained the age of seventy years.

It shall be the duty of the Secretary-Treasurer to notify by mail any Fellow or Associate whose dues may be six months in arrears, and to accompany such notice by a copy of this article. If such Fellow or Associate shall fail to pay his dues within three months from the date of mailing such notice, his name shall be stricken from the rolls, and he shall thereupon cease to be a Fellow or Associate of the Society. He may, however, be reinstated by vote of the Council, and upon payment of arrears of dues.

ARTICLE V.—*Designation by Initials.*

Fellows of the Society are authorized to append to their names the initials F. C. A. S.; and Associates are authorized to append to their names the initials A. C. A. S.

ARTICLE VI.—*Amendments.*

These by-laws may be amended by an affirmative vote of two-thirds of the Fellows present at any meeting held at least one month after notice of the proposed amendment shall have been sent to each Fellow by the Secretary.

SYLLABUS OF EXAMINATIONS

SUBJECTS

ASSOCIATESHIP: (*Part I: Sections 1 to 4; Part II: Sections 5 to 8*)

- Section 1. Advanced algebra*
- Section 2. Compound interest and annuities certain*
- Section 3. Descriptive and analytical statistics*
- Section 4. Elements of accounting, including double-entry bookkeeping*
- Section 5. Finite differences*
- Section 6. Differential and integral calculus*
- Section 7. Probabilities*
- Section 8. Elements of the theory of life contingencies; life annuities; life assurances*

FELLOWSHIP: (*Part I: Sections 9 to 12; Part II: Sections 13 to 16*)

- Section 9. Policy forms and underwriting practice in casualty insurance*
- Section 10. Investments of insurance companies*
- Section 11. Insurance law and legislation*
- Section 12. Economics of insurance*
- Section 13. Calculation of premiums and reserves for casualty (including social) insurance*
- Section 14. Advanced practical problems in casualty (including social) insurance statistics*
- Section 15. Advanced problems and practical methods of casualty insurance accounting*
- Section 16. Advanced problems in underwriting, administrative and service elements of casualty (including social) insurance*

EXAMINATION REQUIREMENTS.

RULES REGARDING EXAMINATIONS FOR
ADMISSION TO THE SOCIETY

(As Amended November 17, 1925)

The Council adopted the following rules providing for the examination system of the Society:

1. Examinations will be held on the first Wednesday and Thursday during the month of May in each year in such cities as will be convenient for three or more candidates.

2. Application for admission to examination should be made on the Society's blank form, which may be obtained from the Secretary-Treasurer. No applications will be considered unless received before the first day of March preceding the dates of examination.

3. A fee of \$5.00 will be charged for admission to examination. This fee is the same whether the candidate sits for one or two parts and is payable for each year in which the candidate presents himself. Examination fees are payable to the Secretary-Treasurer and must be in his hands before the first day of March preceding the dates of examination.

4. The examination for Associateship consists of two parts. No candidate will be permitted to present himself for Part II unless he has previously passed in Part I or takes Parts I and II in the same year. If a candidate takes both parts in the same year and passes in one and fails in the other, he will be given credit for the part passed. Upon the candidate having passed both Parts I and II he will be enrolled as an Associate, provided he presents evidence of at least one year experience in actuarial, accounting or statistical work in casualty insurance offices or in the teaching of casualty insurance science at a recognized college or university, or other evidence of his knowledge of the actuarial, accounting and statistical work of casualty insurance offices as is satisfactory to the Council.

5. In the case of applicants in the following classes, the Council may, upon receipt of satisfactory evidence that applicants are within the terms of this rule, waive the passing of both Parts I and II of the Associateship Examination. Such applicants may become Associates upon passing Part I of the

EXAMINATION REQUIREMENTS.

Fellowship Examination, and may be admitted as Fellows by examination, provided they subsequently pass Part II of the Fellowship Examination.

- (a) Casualty insurance men not less than thirty years of age who have been in the business a number of years and who have attained responsible actuarial, statistical, accounting or semi-executive positions.*
- (b) Fellows and Associates by examination of the Actuarial Society of America or of the American Institute of Actuaries.

6. The examination for Fellowship is divided into two parts. No candidate will be permitted to present himself for Part II unless he has previously passed in Part I or takes Parts I and II in the same year. If a candidate takes both parts in the same year and passes in one and fails in the other, he will be given credit for the part passed.

7. As an alternative to the passing of Part II of the Fellowship examination, a candidate may elect to present an original thesis on an approved subject relating to casualty or social insurance. Candidates electing this alternative should communicate with the Secretary-Treasurer as to the approval of the subject chosen. All theses must be in the hands of the Secretary-Treasurer before the first Thursday in May of the year in which they are to be considered. Where Part I of the Fellowship examination is not taken during the same year, no examination fee will be required in connection with the presentation of a thesis. All theses submitted are, if accepted, to be the property of the Society and may, with the approval of the Council, be printed in the *Proceedings*.

*In support of the candidate's claim that he is within the terms of this rule, he should attach to his application a letter from each of the nominators signing his application. These letters should state the facts of the candidate's experience which appear to entitle the candidate to the benefit of this rule.

1926 EXAMINATIONS OF THE SOCIETY

EXAMINATION COMMITTEE

JAMES S. ELSTON - - CHAIRMAN

IN CHARGE OF
ASSOCIATESHIP EXAMINATIONS

HARMON T. BARBER, CHAIRMAN
WILLIAM M. CORCORAN
ANGELA C. DARKOW

IN CHARGE OF
FELLOWSHIP EXAMINATIONS

JAMES D. MADDRILL, CHAIRMAN
WILLIAM F. ROEBER
JOSEPH LINDER

EXAMINATION FOR ADMISSION AS ASSOCIATE

PART I

1. (a) The sum of three numbers in Geometrical Progression is 70; if the two extremes be multiplied each by 4, and the mean by 5, the products are in Arithmetical Progression. Find the numbers.
 (b) If $a^{3-x} \cdot b^{5x} = a^{x+5} \cdot b^{3x}$ prove that $x \log \left(\frac{b}{a} \right) = \log a$.
2. (a) A courier leaves the rear of a column of troops 5 miles long, delivers a message at the head of the column and returns to his place in line. He finds on his return that the rear of the column is exactly at the point where the head of the column was at the time he started on his mission. How far did the courier travel?
 (b) Solve: $\sqrt{x^2 + 7} + y = 6$
 $\sqrt{x^4 + 22y^2 + x^2} = 22$.
3. (a) Find the coefficient of x^{13} in the expansion $(2^{10} - 2^7 x)^{13/2}$
 (b) In how many different ways can twelve people be seated at two tables, six persons being seated at each?
4. (a) Examine whether the infinite series $1 + \frac{2^2}{\sqrt{2}} + \frac{3^2}{\sqrt{3}}$
 $+ \frac{4^2}{\sqrt{4}} + \dots$ is convergent or divergent.
 (b) Separate $\frac{1}{x^4 - 16}$ into partial fractions.
5. (a) If A represents the present value of an annuity certain of R per annum, payable for n years, at an effective rate i , derive a formula for n in terms of the other factors.

1926 EXAMINATIONS OF THE SOCIETY

(b) Explain in detail the following formula:

$$a_{\overline{n}|}^{(p)} = \frac{1 - \left(1 + \frac{j}{m}\right)^{-mn}}{p \left[\left(1 + \frac{j}{m}\right)^{\frac{m}{p}} - 1 \right]}$$

State and explain the significance of the form to which this reduces when the conversion interval for interest coincides with the interval of payment for the annuity.

6. Given a 7% bond for \$1,000. issued January 1, 1926, interest payable semi-annually, to be redeemed at par January 1, 1931, and to yield the investor 5%, payable semi-annually. Find the purchase price, and show by means of a schedule the amortization of the premium for the first three years, given that $v^{10} = .7812$ at $2\frac{1}{2}\%$.
7. A city having an assessed valuation of \$30,000,000., votes bonds to the amount of \$200,000. for the erection of a high school building, and arranges to pay principal and interest, at 6%, payable annually, in 20 equal annual installments. How much will the rate of taxation be increased? The value of v^{20} at 6% is .3118.
8. Estimate the yield of a bond whose redemption value is \$135., whose dividends are each \$10., payable annually, and whose purchase price six years before maturity date, is \$147.
9. (a) What is a weighted arithmetic mean? Cite a common illustration of the use of a weighted arithmetic mean.
(b) Express in equation form the approximate relation between the mean, median and mode of an asymmetrical distribution.
10. (a) What is skewness? State a simple comparative measure of skewness.
(b) Explain the sliding average method of smoothing statistical data.
11. (a) What is a logarithmic chart? For what particular purpose is it best adapted?
(b) Describe in words or show graphically the form of a normal curve of a frequency distribution.

1926 EXAMINATIONS OF THE SOCIETY

12. Show that the standard deviation of the first N natural numbers is equivalent to $\sqrt{\frac{N^2 - 1}{12}}$.

13. Find the correlation coefficient and the equations of regression for the following values of X and Y :

<u>X</u>	<u>Y</u>
1	2
2	5
3	3
4	8
5	7

14. Give an outline of the form of cash book you would suggest for the use of a casualty insurance company, and explain how it would coordinate with the ledger.
15. (a) Explain the following terms: Controlling Account, Subsidiary Ledger, Reconciliation of bank account, Closing entries.
- (b) Definite amortization. Outline a system of records for current amortization of bonds owned by an insurance company.
16. From the following trial balance, prepare Profit and Loss Account and Balance Sheet:

Proprietor (Investment).....	\$	\$ 7,500
Bills Payable.....		3,000
Accounts Payable.....		1,600
Bank.....	1,300	
Accounts Receivable.....	2,700	
Bills Receivable.....	3,900	
Merchandise Inventory.....	6,300	
Office Furniture.....	800	
Purchases.....	7,600	
Expense.....	1,400	
Discount on Sales.....	100	
Interest.....		100
Sales.....		12,000
Cash.....	100	
	\$24,200	\$24,200

The inventory at the end of the period is \$6,800.

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PART II

1. (a) Give and prove the formula expressing the relationship between the n th difference of u_x and the terms of the series.
 (b) Supply the terms between u_3 and u_{10} having given $u_0 = 1$, $u_1 = -1$, $u_2 = -6$, $u_3 = -18$, $u_{10} = 206$.
2. Assuming $\Delta^4 u_x = 0$ find the value of $\log 53$, having given

$$\begin{aligned} \log 50 &= 1.6990 \\ \log 52 &= 1.7160 \\ \log 54 &= 1.7324 \\ \log 55 &= 1.7404 \end{aligned}$$
3. Find the n th term and the sum to n terms of the series—
 $-44, -14, 2, 15, 33, 73$.
4. (a) State and prove the theorem for differentiation of a quotient.
 (b) Differentiate $\log \frac{x}{a^x}$
 (c) Given $y = \frac{1+x}{1-x}$ find $\frac{d^3 y}{d x^3}$
5. (a) Examine $f(x) = (x-3)^2(x-2)$ for maximum and minimum values.
 (b) State Taylor's Theorem and derive from it Maclaurin's Series. Using this series, expand $\log(1+x)$ into a power series.
6. (a) Evaluate $\int \frac{x^3 dx}{x^2 - 3x + 2}$
 (b) Evaluate $\int_2^3 \frac{3x dx}{2\sqrt{x^2 - 4}}$
7. (a) If one event (x) can happen in $(a+b)$ ways and fail in $(b+c)$ ways, and another independent event (x') happens in $(a'+b')$ ways and fails in $(b'+c')$ ways, what is the chance that: (1) Both succeed? (2) One or the other fails?

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- (b) A party of n persons sit at a round table. Find the odds against two specified individuals sitting next to each other.
8. A bag contains 3 red and 3 green balls, and a person draws out 3 at random. He then drops 3 blue balls into the bag and again draws out 3 at random. Show that he may give odds of 8 to 3 with advantage to himself against the 3 latter balls being all of different colors.
9. A gambling house offers the following game: a person may place one dollar on any number from 1 to 6. A throw of three dice is made. If the number selected appears on one die, the player wins one dollar; if it appears on two, he wins two dollars, and if it appears on all three, he wins three dollars, the original one dollar is also returned to each winner. Find the expectation of profit for the house.
10. (a) A purse contains five one dollar bills, two five dollar bills, and one ten dollar bill. What are the odds against drawing a sum of money, equivalent to or greater than ten dollars in one draw of two bills?
 (b) What is the probable value of a draw of two bills?
11. (a) What is the probability that a die in five successive throws will show the "4" face exactly once?
 (b) At least once?
12. Given the following data, construct commutation columns for use in valuing life annuities:

x	d_x	n	$(1.035)^{-n}$
90	385	90	.045
91	246	91	.044
92	137	92	.042
93	58	93	.041
94	18	94	.039
95	3	95	.038
96	0	96	.037

1926 EXAMINATIONS OF THE SOCIETY

13. (a) To what events do the following probabilities refer?

(1) ${}_{n-1}p_x - {}_np_x$,

(2) ${}_np_x + {}_np_y - {}_np_{xy}$,

(3) $(1 - {}_{n-1}q_x)(1 - {}_{n-1}q_y)$,

(4) $\frac{{}_np_x \cdot {}_np_{y-1}}{p_{y-1}}$.

- (b) Derive the relationship between C_x and D_x .

14. Derive an approximate expression for the present value of a life annuity payable weekly, first payment at end of week, in terms of an annuity payable annually.
15. Give the sources and characteristics of five mortality tables in use at the present time. Discuss their suitability to the purposes for which they are used.
16. Explain in detail how you would estimate the present value of the incurred cost at date of accident of the following compensation claims.
- (a) The Illinois Compensation Act provides that payments for permanent total disability shall be 50% of average weekly earnings, maximum \$14 weekly, subject to a maximum amount equivalent to four times the average annual earnings or \$3,750. and thereafter annual pension for life of eight percent of total previous payments. The average daily wage of a man becoming permanently and totally disabled was \$5.00 and his age at time of accident was 35.
- (b) A compensation act provides that if death shall result from injury the total dependents of deceased shall receive 50% of average weekly earnings, maximum \$18, for a maximum period of 312 weeks after death. Compensation to widow terminates at death and is then distributed among the remaining dependents. Compensation to a dependent under 18 terminates upon his reaching age of 18. Average annual earnings of deceased were \$2,000. Dependents were a widow aged 30 and a son aged 5.

1926 EXAMINATIONS OF THE SOCIETY

EXAMINATION FOR ADMISSION AS FELLOW**PART I**

1. (a) What are the reasons for casualty companies declining to write property damage insurance without the concurrent liability insurance?
(b) What is Protective (Contingent) Liability insurance? What is its purpose? Discuss the moral hazard involved in writing this line in the metropolitan districts.
2. Explain and illustrate each of the following as treated under workmen's compensation insurance:
(a) N. P. D. (b) Remuneration of executive officers
(c) Classifications of drivers, chauffeurs and their helpers. (d) Classifications of additions to, alterations and repairs.
3. (a) What are the general classifications commonly used in underwriting personal accident insurance? Assign illustrative occupations to each classification.
(b) Define conditions in the application that void an accident policy.
4. (a) Discuss heavy investment in mortgages as a policy for an established casualty insurance company. Compare farm mortgages and city mortgages for this purpose.
(b) How are security values fixed by insurance commissioners and why are insurance companies required to employ these values in preparing their annual statements?
5. (a) Discuss reasons for state supervision of insurance.
(b) To what extent is fidelity and surety bonding supervised by the state? What steps must a new company take before it can legally transact this business in the State of New York?
6. (a) What are the salient features common to workmen's compensation laws enacted in this country?
(b) How would vigorous enforcement of anti-compact laws affect the business of insurance?

1926 EXAMINATIONS OF THE SOCIETY

7. Present and discuss five advantages of casualty insurance to society.
8. (a) Discuss the statement that insurance is the antithesis of gambling.
(b) Discuss the statement that "self-insurance is no insurance". What state regulation of self-insurers is necessary for the protection of claimants?
9. In the insuring clause of an accident policy,
 - (a) what is the meaning of the phrase: "against loss resulting directly and independently of all other causes"?
 - (b) which of the following forms of limitation:
 - (1) "solely through accidental injury"
 - (2) "solely through external, violent and accidental means"
 - (3) "solely through accidental means"is most liberal to the assured, and which the least, and why?
10. (a) Two companies of the same size, operating over the same territory, reinsure with each other the first 10/20 over a retention of 5/10. Is this a desirable arrangement? Why?
(b) Consider the issuance of a plate glass policy written at 50% of the standard premium and indemnifying against loss to the amount of the loss less the premium paid. How does this differ from deductible average insurance?
11. (a) Distinguish clearly between burglary, theft, larceny and robbery.
(b) What are the usual provisions in a Residence Burglary policy as to (1) continuous occupancy, (2) notice of loss and (3) proof of loss?
12. A casualty insurance company just starting business desires to incur a minimum of investment expense consistent with sound investment policy. What would you recommend as to (a) kinds of securities, (b) term of securities and (c) salability?

1926 EXAMINATIONS OF THE SOCIETY

13. Outline a method of allocating the investment earnings of a casualty insurance company to its lines written.
14. (a) What effect have (1) recent legislation and (2) recent court decisions had on the benefits payable under various workmen's compensation acts? Give a specific example of each.
(b) Sketch a scale of benefits for an economically "ideal" workmen's compensation law.
15. (a) How would you proceed to adjust a claim involving both personal injury and property damage, where a minor is involved? Discuss particularly with regard to the form of release you would secure.
(b) Discuss the liability of the insuring company to pay damages to the widow of A under his policy insuring against injury or death "in" an automobile, A having sustained fatal injuries by leaping from B's car of which B had lost control.
16. (a) What progress have (1) sickness insurance, (2) unemployment insurance and (3) old age pensions made in the United States?
(b) Discuss the effects of promotion of these social insurance plans on (1) the state, (2) industry and (3) insurance carriers.

PART II.

1. (a) Interpret the standard formula that has been used for a number of years to calculate workmen's compensation minimum premiums. Is this formula in need of revision, and if so, in what respects?
(b) What adjustment is made of minimum premium of a compensation policy upon cancellation (1) by the assured and (2) by the carrier?
2. Outline plans for determining the approximate actual amount of
 - (a) claims incurred but not reported, and
 - (b) outstanding loss expense on claims incurred.

1926 EXAMINATIONS OF THE SOCIETY

3. (a) Discuss the practical possibilities and limitations of punch card analysis at the present time in casualty insurance.
(b) To what extent are manual record methods still advisable in the accounts and statistics?
4. (a) Granting that practically all net premium written is collectible, compare the significance, as administrative guides, of the arithmetic ratios of "losses incurred" to "premiums earned" as derived respectively on
 - (1) the general accounting basis for the calendar year
 - (2) the policy year basis, all the data from (1) of all calendar years being allocated to policy year
 - (3) the accident year basis, all the data from (1) of all calendar years being allocated to the calendar year of occurrence of accident.
(b) Discuss, with explanations, the truth of the assertion that the spread of business and the past experience of an established casualty insurance company enable it in fact to gauge very closely future developments of large allocated aggregates of its business already incurred, and that all three ratios compared in (a) can, by the application of such estimated developments, be materially improved as guides.
5. In the Convention Statement
 - (a) what assets are "not admitted", and why?
 - (b) what control is set up between assets, income and disbursements; what general balance of footings is next established and what item is determined in the process? In the underwriting and investment exhibit, how does the entry of asset and liability items differ from that of income and disbursement items and what final control balance is established?
6. (a) What protection is afforded the insuring public and sound casualty insurance companies by the disallowance of substantial deferred premium assets exactly determinable only by later audits—granting that these deferred premiums can be very closely projected by such companies and that it is out of these deferred premiums that most of the unpaid loss and loss expense payments incurred in the affected lines are to be met?

1926 EXAMINATIONS OF THE SOCIETY

- (b) Discuss the applicability of the Convention Statement method of treatment of commissions to the case of a company going out of business.
7. Usually there are several contributing causes of an accident, the absence of any of which would have avoided the accident. How is the matter of cause determined for statistical purposes, and why? Cite and discuss several illustrations of multiple causes indicating to what cause you would in each example have the accident assigned for statistical purposes.
 8. (a) Discuss rate cutting from the points of view of the insurance carrier and of the public. If it should be avoided, what remedy would you suggest?
(b) What is the value of the waiting period in health policies?
 9. (a) Discuss the considerations that enter into the determination of rates in corporate bonding. To what extent are the considerations mathematical?
(b) To what extent does the state regulate loss reserves in corporate bonding?
 10. Bearing in mind that there are now fifteen years of workmen's compensation experience in this country, outline a method of rate making that should result in more equitable, responsive and stabilized rates, assuming that absolute factors and trends can be statistically determined for all such gradually changing causes, comprehensively, as (a), and for such abrupt causes separately, as (b), following:
 - (a) change of inherent incidence and severity of injury (including occupational disease); change of claim frequency and severity from variations in moral tendency to make claim and exaggerate disability; change in court and industrial commission allowance of claims and rulings as to severity; change in wage scales; development of carriers' policy of shortening disability periods by providing more prompt and complete medical attention; change in scales of fees of doctors and hospitals, coupled with any due or undue tendency on their part to extend periods of treatment; changes in overhead costs all along the line; etc.

1926 EXAMINATIONS OF THE SOCIETY

- (b) changes of benefit by legislation; changes of inherent hazard from abrupt industrial process changes; changes of regime in industrial commissions, courts, etc.
11. (a) What valuable measures of a company's business are obtainable from a properly reported New York Casualty Experience Exhibit?
- (b) What difficulties are encountered in the proper preparation of this exhibit?
12. A company is being organized for the transaction of general casualty insurance lines. What books are required during organization and for record of the company's business after organization?
13. (a) There is a growing tendency among established casualty insurance companies to show as surplus a rounded sum, setting up from the available original excess balances a voluntary contingent reserve usually also rounded, odd excess amounts being thrown into "expenses, bills, accounts, fees, etc., due or accrued". How do they justify this distribution?
- (b) Does dividend, credited to a policyholder on his bill for renewal premium crediting dividend on previous premium, thereupon become a disbursement? Why?
14. (a) Describe briefly three different methods of safeguarding an insurance carrier against sudden heavy losses.
- (b) Mention three casualty lines subject to such shock losses.
- (c) Mention three casualty lines in which the probability of such shock losses is remote.
15. (a) Discuss the moral hazard in the writing of non-cancellable accident and health policies.
- (b) Discuss the relative importance of the moral and the physical hazard in burglary underwriting.
16. What developments have recently required more specific definition and solution of the problem of "field supervision cost"? Discuss fully, offering definitions and suggesting solutions.