SOME RANDOM THOUGHTS CONCERNING FIRE INSURANCE

IS A STATISTICAL BASIS FOR RATING POSSIBLE?

BY

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

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

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

My own definition would be rather more general:

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

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

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

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

So much for the Actuary—now for Science!

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Schedule Rating

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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