ABSTRACT OF THE DISCUSSION OF PAPERS READ AT THE PREVIOUS MEETING

STATE OLD AGE PENSIONS IN THE UNITED STATES—
W. RULON WILLIAMSON
VOLUME XVII, PAGE 10
WRITTEN DISCUSSION

MISS MARGARET A. BURT:

Provision for old age assistance as expressed by our old age pension laws is at the present time probably attracting the most widespread attention of all forms of social legislation. As we approach the close of the 1931 session of the state legislatures, New Jersey, Delaware, Idaho and West Virginia may be added to the list of the states that have adopted old age pension or relief laws, making the total number sixteen. News reaches us that commissions have been appointed to study old age security in Illinois, Maine and Oregon. Bills have either been considered or are being considered by the legislatures of at least nine other states. The subject is constantly being brought before us in the form of investigations and legislative reports as well as in the newspapers and periodicals. While the reports of the investigating commissions are very helpful, there is so much propaganda being published and such a mass of detail and statistics offered that it is difficult to get a clear picture of what the movement means. Consequently, the orderly and unbiased presentation of the subject presented by Mr. Williamson is very welcome.

Mr. Williamson shows that the basis for the movement is not new, since it arises from the responsibility that the public has always endeavored to take in providing for its dependent classes including the aged. Whereas, in the past the aged poor have been taken care of in institutions, the modern viewpoint is that institutional care is not desirable in all cases of dependency and that outdoor relief in the form of regular cash payments is preferable in many cases. Such relief is provided by our old age pension laws.

Mr. Williamson sketches briefly the progress of legislation providing for such old age assistance and describes its usual form. He then lists the arguments which are raised for and against this form of relief. Among the arguments for this form of assistance

is brought forward the fundamental fact of the existence of the class of aged poor, and of the responsibility that rests with the public to make some provision for them. Many of the arguments are general and are not particularly in support of the one form of relief which our laws have taken, but would tend to justify the use of public money in some form of relief which might well take the form of cash instead of institutional care. It is interesting to note that in reference to the argument that our modern life is producing an increasing class of dependent aged, the New York Commission on Old Age Security came to the conclusion that on the basis of its investigation it was unable to state authoritatively that insecurity and need in old age is increasing or decreasing in the State of New York, that while as a whole the people of the state from generation to generation are in a better economic situation, it is difficult to determine the trend in respect to the lowest economic groups.

The arguments opposed to this form of relief minimize the need for it and emphasize the dangerous practices that may form the beginning of widespread socialistic legislation. However, as Mr. Williamson points out, we have apparently definitely embarked on this method of old age relief, and the use that we make of it and the developments that come from it will determine whether the fears of those who see in it something inimical to our national life will materialize or whether it will prove simply an intelligent and helpful method of caring for the dependent aged.

One of the most interesting chapters in the report of the New York Commission on Old Age Security is that regarding the actual experience under the state laws already passed. Although there has been very little experience to date under any of the state laws, a reading of this chapter should tend to allay the fears of the opponents of this form of old age assistance, at least as far as any immediate ill effects of the laws are concerned. As a matter of fact, the operation of the state laws is not as widespread and effective as some of the proponents of the laws would lead us to believe. Where county option has been required, the law has been slow to take effect.

Montana and Wisconsin seem to have had wider experience than any other states. The testimony seems to indicate that the laws have given a cheaper plan of taking care of the aged depend-

ents than the old almshouse. It is probably true, however, that a new class has been added to the group of dependents, the group who would "rather die than go to the poorhouse". However, in both states the experience seems to indicate that only the truly needy have benefited, those whose circumstances were such that they would have qualified for institutional care had it been the only assistance available. In Montana, the same county board administers the law as administers poor relief. In Wisconsin, the administration is under a state board and a definite distinction is made in the administration of the old age assistance law and the poor relief law. However, the experience seems to indicate it to be only a different method of taking care of the needy.

The term "old age pensions" has unfortunately been rather generally used for the form of old age assistance furnished by our state laws. It has caused confusion with European plans and in some instances has led people to believe that a general form of governmental pension was intended, and that pensions might be demanded by the aged as a matter of right. In Wisconsin, the nomenclature of the law has been changed so that it is called the "old age assistance law". The California law is known as an act "to provide protection, welfare and assistance to aged persons in need".

Questions as to the probable effect of the growth of our old age pension laws upon our staff pension funds are sometimes asked. The staff pension fund is usually established as a means of furthering the efficiency of the service which it covers by relieving it of the ill effects of superannuation or disability. It therefore serves a definite and distinct purpose which is largely independent of the purpose for which our old age assistance laws are being established. If the staff pension fund does not save the employer money, it can hardly be justified from a purely business standpoint, and if it does, it will still be profitable in a state having the present typical old age pension law. In my judgment, therefore, there is no reason to believe that the growth of the staff pension fund may be expected to be affected by the growth of the old age pension laws in the form that they have thus far been developed.

The staff pension fund, like any other plan of saving funds for one's old age, tends to relieve the need for old age pensions, but

the old age pension does not relieve the need for staff pensions any more than it relieves the need for increases in salaries, bonuses, profit sharing and other incentives and provisions to promote the efficiency of a staff organization.

As noted by Mr. Williamson, the operation of staff pension funds, together with other means open to industry for lessening poverty such as increasing the stability of employment and the encouragement of thrift, will tend to reduce the need for state relief. Naturally a country whose aged population are living on the result of their own earnings thus obtained will be healthier financially and morally than one which finds it necessary to extend relief to the improvident and dependent, thereby placing them in a special class of society.

MISS OLIVE E. OUTWATER:

It is difficult for one interested primarily in insurance and in industrial problems as connected with insurance, to discuss Mr. Williamson's comprehensive analysis of his subject and not digress extensively into the field of industrial old age pensions. A review of the provisions of present old age pension laws in the United States shows that they are only intended to provide a method of caring for those who have already arrived at an advanced age without means of supplying the necessities of life, and do not attempt to establish any system for the prevention of such conditions. In other words, state governments, thus far, have merely substituted a new and presumably better method of caring for their old age dependents and have not taken any steps to prevent that dependency. The arguments for and against such a method of meeting the problem are so completely set forth in Mr. Williamson's paper that any discussion of the value of any particular arguments or any conclusion drawn therefrom would add nothing to the information set before the reader.

One would like to forecast the future of such pension plans, but when the relation of their development to industrial and private pensions or annuities is considered and the close relationship of all three with an unprecedented unemployment situation and an economic order that is undoubtedly at a turning point in history, not only does any such attempt seem like mere specula-

tion but the future of such plans becomes important only as a small part of the solution of the whole question of poverty which is engaging the attention of the best minds in America today. Most of us feel that the attempts of Europe to solve these problems through pensions, doles, or communism, have not yet met with enough success to make any appeal for their extensive trial in this country. Many feel that even though such methods prove helpful there, it is no indication that they would prove helpful here with our different conditions and standards of life.

Popular education regarding industrial pensions and individual old age annuities is increasing as fast or faster than information concerning, or interest in, state pensions. After all, the individual is primarily interested in his own problem and probably only a very few of our present population under 45 or 50 years of age would look forward with any degree of pleasure to an old age supported by a meager pension granted by the state. Human nature is naturally optimistic and does not face unpleasant problems until forced to do so. The present economic crisis, whatever its evils, has taught the public lessons which should prove profitable to many who are in a position to profit thereby, and it would seem that economic recovery will be accompanied by a large increase in provision against the contingencies of unemployment and old age on the part of both individuals and employers. Such provision would automatically decrease the importance of state old age pensions as in effect today unless all three agencies merge their efforts and present state laws are made the nucleus of an elaborate system designed to care for all dependency, whatever the cause.

In the meantime insurance companies who do not believe in "government in business" have an unexcelled opportunity to prove that their organizations can solve the problem better than government. Insurance men are or should be more familiar with the problems involved than are politicians. There never has been a time when the public had more confidence in insurance companies than at present. They have a personnel trained to deal scientifically with such problems. Taxes have already become a burden in most communities and there will be determined opposition to any scheme which greatly increases that burden and puts added powers and opportunity of waste into the hands of those

who have so generally abused the powers they had. It would seem to be an opportunity such as is seldom offered for the companies to initiate an added service to the public, the development of which they are peculiarly fitted to undertake.

Mr. Williamson effectively points out the responsibility of the actuary to use and interpret correctly the statistics that are available, and thereby to furnish the public with clear facts and unbiased information. May I add to this, that the actuary, as a citizen possessing unusual information concerning which the public at large is almost entirely ignorant, has a certain responsibility for presenting to the public such facts as will enable it to combat misinformation, and for devising practical and helpful solutions for a problem in which the world is becoming very much interested.

AUTHOR'S REVIEW OF DISCUSSIONS

MR. W. RULON WILLIAMSON:

Both Miss Burt and Miss Outwater refer to the field of industrial old age pensions and both point out so far the methods suggested in the United States for state pensions have not made staff pensions inadvisable.

We are indebted to Miss Burt for bringing up-to-date the story of the states which have established plans through her addition of New Jersey, Delaware, Idaho and West Virginia to the list quoted by me last fall.

Miss Outwater also recognizes the essential interrelation of all social insurances and the large responsibility of insurance companies and actuaries for scientific, sane, non-political treatment.

THE THEORY OF THE DISTRIBUTION OF THE EXPENSES OF CASUALTY INSURANCE—F. S. PERRYMAN

VOLUME XVII, PAGE 22

WRITTEN DISCUSSION

MR. H. O. VAN TUYL:

Mr. Perryman has performed a real service for casualty insurance in outlining the principles which must underlie a scientific analysis and distribution of expenses. He has approached the

study from a fresh viewpoint unhampered by adherence to what is merely the usual conception or the customary practice, and has succeeded in clearly setting forth the fundamental considerations to be kept in mind in all expense analysis.

The paper discusses at considerable length the ways in which solutions may be found to the two problems:—

1. What is the actual incidence of expenses?
2. What are the correct methods of charging the expenses back to the assured?

and the ideas expressed should certainly prove stimulating to anyone who is seeking either to adopt the best methods of expense analysis to comply with present statistical requirements or who is endeavoring to establish new or more refined methods of determining expense loadings.

An attempt to develop the precise relationship of each isolated element of expense to the individual policies affected would result in prohibitive labor. The problem is not simple, even when the expenses of a company transacting a single line of insurance in a single state is considered, to say nothing of the added complications brought in when a company does a countrywide business for all casualty lines, issues policies giving combination coverages and, possibly, is a member of a fleet of companies transacting life and fire insurance as well as casualty. Nevertheless by assembling expenses into homogeneous groups it is entirely possible to make allocations which will produce dependably accurate results. Such analyses do unquestionably require careful study.

Counterbalancing the theoretical discussion of the search for the actual incidence of expense, the author lists five limitations which need to be kept in mind in considering any change in expense loading and emphasizes the desirability from various standpoints of adopting as simple a procedure as possible.

Mr. Perryman mentions the recent developments in connection with compensation expense loadings and the adoption of expense constants and suggests that further refinements in the determination of loadings may be found advisable. Indeed it would seem that future studies in connection with expense analysis will fall into two groups, one of which would consist of original studies to determine what differences in policies or groups of policies within a single line give rise to differences in expense and then

to measure the effect of such differences. The most obvious respect in which policies differ is in size and doubtless prior consideration will be given to analysis of costs by size of risk. However, as Mr. Perryman well points out, there is room for improvement in the methods followed by the companies in distributing expenses as between lines and between broad groups based on purpose, and studies on the part of individual companies to perfect these distributions are of great practical importance.

Since the distribution of expenses by line and group as reported by companies in the New York Casualty Experience Exhibit is largely used at the present time as a basis for expense loadings in various casualty lines, it would seem attention should first be directed toward obtaining accurate analysis of each company's expenses to the end that the combined results shall produce indications that are thoroughly reliable. The suggestions made in this paper should prove helpful in making such analysis on a proper basis.

Merely as an incidental matter, I would like to suggest that while "agents' balances charged off" is an element of cost that should properly be provided for in the premium, it is not strictly an expense item and therefore should not be included with underwriting expenses. I believe it would be a real improvement in the New York Casualty Experience Exhibit if provision were made for reporting allocated and unallocated loss expenses separately. Still further, I believe many companies do consider the disbursement item in the annual statement blank, "Salaries, Traveling, and all other expenses of branch office employees and agents not paid by commission" as though it read "All acquisition and field supervision expenses other than commission". In other words many companies confine the expenses reported in the above statement item to those expenses which are reported in the "Exhibit" as acquisition and field supervision expenses.

In general, I find myself in such agreement with the propositions set forth by the author that my discussion is mostly a review of what he has written. While the paper discusses some of the practical problems arising in connection with casualty insurance expenses, there is a possible danger that the careful distinctions made and precise scientific discussion may give the impression on cursory reading that the whole problem of correct expense distri-

bution is more mysterious and difficult than it actually is. It is encouraging to realize that the problem of correct expense distribution is largely confined to general administration, inspection and payroll audit expenses, if for the moment we forget the vexed problem of acquisition expenses other than commission. However, I take it that this paper was not intended to be a cost accountant's guide but rather an attempt to set forth the principles which should underlie the practical work of cost accounting.

MR. FRANK R. MULLANEY:

It is probably true that, in the past, underwriters and actuaries have given more attention and study, in the establishment of rate-making procedures, to the element of loss costs, than to the expense portion of the rate; but considering the complexity of the problems which have arisen in connection with the determination of proper loss costs and the difficulties of keeping pace with rapidly changing conditions it is not to be wondered that efforts have been expended mainly in that direction. Furthermore, in certain lines of insurance, particularly workmen's compensation, the basis of loss cost has been frequently, and in some cases radically, changed by enactment of laws providing not only for increased scales of benefits but also revisions in procedure; all of which have been difficult of measurement but requiring immediate acceptance and payment by the companies. In addition, such lines of insurance, as automobile liability, have undergone changes affecting losses, especially during recent years, brought about by enactment of legislation as well as from other conditions. It might well be said, therefore, that the loss situation, of necessity, has occupied the major portion of the thought and attention of the insurance rate-makers as well as the executives of the companies. However, attention should be given to the expense portion of the rate from its scientific as well as practical aspects and Mr. Perryman in his paper has presented his subject in a very interesting manner.

One of the difficulties encountered in a study of expense loadings or charges is the lack of dependable statistical data in sufficient detail to permit of proper analysis. The annual statement report in its present form does not fulfill the requirements of a

statistical study; for an examination of its exhibits indicates that arrangement of the various schedules and items has been made for the purpose, principally, of determining the financial condition of a company as of a given date and calendar year operating results *in the aggregate.* One has but to look over the disbursement page to find that (using Mr. Perryman's terms) "nature", "purpose" and "allocation to types of policy" are all shown therein but not applicable to all of the items. It will be frankly admitted that in drawing up the annual statement blank considerable weight was given to the necessity for accounting controls and that its use as a statistical report was a secondary consideration. We must, therefore, look to other sources for information necessary for any scientific investigation.

The New York Casualty Experience Exhibit attempts to furnish a more detailed analysis of the annual statement data, but even such a report is limited in its scope and does not guarantee that accurate results or satisfactory conclusions can be obtained therefrom. True, it exhibits a division of expenses by lines of insurance and by "purpose", but there is no uniformity in the method of distribution of such total expenses from one company to another nor is any such uniform method prescribed. Furthermore, the New York Casualty Experience Exhibit is so constructed as to follow mainly the annual statement and therefore carries with it such deficiencies as may exist in the annual statement form so far as they relate to an analysis of expenses.

The proper exercise of administrative functions by company executives requires a more detailed analysis of expenses than is contained in official reports; and therefore in all well-managed companies considerable time and effort is expended in compiling information as to the costs of operating and to furnish a control for any budgetary system of apportioning disbursements for expenses.

As Mr. Perryman points out, the fundamental purpose of insurance, i.e., averaging costs, must not be lost sight of and while any study of the problem may lead to a multiplicity of divisions and refinements which may be justified from a scientific point of view, the practical aspects must be given proper weight in arriving at any satisfactory conclusion.

It would seem desirable in any study that may be undertaken

that there be a clear understanding regarding the treatment of the various items comprising what is known by the all inclusive term "expenses". Examination of the annual statements filed by the companies will disclose a difference of opinion as to the assignment of expenditures to the various divisions and probably the requirements of the statement form itself may be partly accountable for this condition. If, therefore, difficulties arise in the compilation and proper distribution of various items for the present official report forms, it becomes even more important that definitions or standard terminology be constructed and adopted before attempting any exhaustive investigation or study of the subject to determine the best method of allocation and the treatment of this important subject.

AUTHOR'S REVIEW OF DISCUSSIONS

MR. F. S. PERRYMAN:

Both Mr. Van Tuyl and Mr. Mullaney have made such kind and sympathetic comments upon my paper that there is very little for me to review. I note with much interest that both of the discussions call attention to a point which I also regard as of great importance. This is the necessity of continuing the effort, which has been made by many people and many authorities, to obtain uniform and correct distribution of expenses in the now existing public returns which a casualty company has to make, namely, the Annual Statement and the Casualty Experience Exhibit. Mr. Van Tuyl, Mr. Mullaney and myself, along with many other persons who have had occasion to go into this matter, realize the imperfections and inconsistencies of the present forms of exhibit and realize that it is important, because of the present tendency to produce misleading results and inferences, to correct the utter lack of uniformity with which the returns are compiled, not only between different types of companies but also between companies whose organizations and businesses are very similar. As mentioned above, many persons and many organizations are doing all they can to remedy the situation, and any progress made in this direction will be a great step forward towards laying a solid foundation upon which can be erected the more detailed and more accurate expense analyses which will undoubtedly have to be undertaken.

A METHOD OF TESTING LOSS RESERVES—W. P. COMSTOCK
VOLUME XVII, PAGE 42

WRITTEN DISCUSSION

MR. NELLAS C. BLACK:

After reading Mr. Comstock's paper on testing loss reserves, it strikes me that possibly we are worrying ourselves unnecessarily over the problems of the actuary. Current loss reserves are the product of a continuous whirlpool of transactions involving: First, setting up the original estimates; second, changes in estimates as facts develop; then reduction of the amounts by subsequent payments; and lastly, the elimination of settled items. Each step in the evolution of the total is a distinct operation, and the companies' reserves will be accurate only to the extent that the individual system provides for a prompt and efficient completion of these operations. Notwithstanding this continuous movement throughout the entire set-up, the trend of the totals is generally consistent with the surface indications; but the figures always carry with them the general feeling that, as it is easier to be liberal than cautious, and as putting up reserves is a more direct operation than taking them down, the final figure contains more than ample margin of safety.

However, the question of ample reserve is a complex one, and to be treated fairly should be viewed from three angles:

1st—Reserves for statement purposes.

2nd—Reserves for individual risk and agency experience.

3rd—Reserves for rate making purposes.

For all three of these functions Mr. Comstock ably argues for individual case estimates, especially if his views are to apply to only the compensation and liability lines. For statement purposes an average reserve may be permissible, and probably would be more indicative on property damage claims; but for individual risk experience and rate-making data, individual case estimates only can withstand critical inspection.

First, let us look at reserves from the standpoint of representing the total outstanding liability. The schedule "P" lines are practically eliminated at the start. On compensation claims, the only judgment required is in estimating how long disability will last in temporary total cases; and certainly some degree of balance can be expected of adjusters who report on these cases day

after day, and whose estimates are reviewed by experienced examiners in the home office. The liability for incurred but not reported claims can be considered as offset by the unknown asset in undisclosed additional premiums.

The schedule "P" formula more than provides for any inadequacy in the liability reserves; but are they inadequate? Under the payroll adjustment lines there is some safeguard in undisclosed premiums; but take the automobile liability reserve. You will note from exhibit A-1 that by tabulating the reserve of one company for six consecutive months, distributing each monthly reserve by month of claim, on an average only 55.5 per cent. of cases put into reserve as of the end of the first month, are still open at the end of the third month. This reflects the uncertain state of new claims. The change is not so rapid as the claims develop, which will sustain the fact that when there is a substantial amount of accumulated reserve, the total is not materially disturbed by this continuous turnover.

Against each month's reserve, observe what happened in the routine of correcting and taking down original estimates. The reserve at the end of January was $3,698,841. During February new cases were added amounting to $530,424, and the payments totalled $240,864, indicating that if all the figures were exact and no other factors were involved, the total reserve should have increased to $3,988,401, or by the difference between the new reserves and payments. Instead of this figure, the run-off showed the total of $3,678,672, developing the fact that revaluations and take-outs amounted to $309,729. The recurrence of this figure month after month—the average for six months being $309,601—certainly justifies the assumption that there is continually a floating excess included in the total for which allowance can be made, and that such excess will be interchanged evenly as developments are recorded, if the reserve system is kept running smoothly by experienced clerks. Any breakdown in the recording system will tend to increase this excess.

Getting away from the schedule "P" reserves, look at the same analysis of automobile property damage reserves as scheduled in exhibit A-2. The total at the end of January was $616,939. During February new cases were added amounting to $109,733, and the payments totalled $81,557, indicating that the total re-

serve should increase to $645,115. The actual total for February is $599,771, showing that corrections and take-outs amounted to $45,344. This does not deviate greatly from the six months' average of $52,849, indicating again that there is a fairly even interchange of reserve excess. It will be noted, however, that in property damage outstandings there is a much more rapid turnover of recent claims, as only 38.3 per cent. of the cases put into reserve as of the end of the first month are still open at the end of the third month. 43.1 per cent. were closed during the second month.

Mr. Comstock's method would develop what part of the net excesses is chargeable to inaccurate estimates as recorded as of a certain set date, but it would not show the currently interchanging excesses or inadequacies, as the case may be, on the recent claims, which, for statement purposes, is equally important. The two factors are combined in the results indicated by these exhibits, and for all practical purposes the net results are all that are required.

That the current turnover should be considered in testing the total is shown by comparing the changes which take place during a month, by month of claim. Taking the month of February again these are as follows:

	Auto. Liability				Auto. Property Damage			
	No. Cls.	Amt.	No. Cls.	Amt.	No. Cls.	Amt.	No. Cls.	Amt.
Jan. Res.			8112	3,698,841			8524	616,939
New Claims			1317	530,424			2236	109,733
Decrease Jan. Cls.	379	149,617			1087	49,093		
" Dec. "	295	100,685			418	20,835		
" Nov. "	155	62,795			257	9,955		
" Oct. "	123	43,385			189	9,916		
" Sept. "	97	32,159			120	7,650		
" Aug. "	52	38,900			75	4,020		
" July "	37	13,615			43	4,580		
" June "	32	13,325			29	3,066		
" May "	30	13,452			17	3,493		
" Apr. "	15	8,375			16	1,976		
" Mar. "	25	7,695			12	1,157		
" Prior "	169	66,590	1409	550,593	96	11,160	2359	126,901
February Res.			1020	3,678,672			8401	599,771

Here it is shown that the greater part of this under surface movement is contained in the turnover on claims of the last three

months; and while it would be interesting to tabulate the February payments by month of claim to learn how the excess was distributed by month of claim, this knowledge would not have sufficient practical value to justify the effort.

It is admitted that in addition to individual case reserves, there is a hidden liability in the incurred but not reported claims; but unlike fidelity and surety undisclosed claims, those for the casualty lines consist almost entirely of belated reports and the average value of each is reasonably constant. Mr. Comstock correctly assumes that this liability can be ascertained without a great amount of difficulty shortly after the reserve period by the use of punch cards. By reason of the fact, however, that this reserve must be considered before time allowance can be made for the receipt of these delayed cases, some thought must be given as to how such reserve shall be computed.

This reserve should be viewed as a fixed liability, only to be adjusted from time to time as it is liable to change; and because of the very nature of the cases so provided for, any change will be influenced by an increasing or decreasing general loss trend. With this as a basis, a simple and sufficiently accurate formula for the computation of this reserve, so that changes in trend will be projected automatically, is employed by using a figure arrived at by applying to the latest known reserve, that percentage which the unknown reserve bears to the known reserve, as has been ascertained from past or periodical studies of this unknown quantity. There is a definite relationship between cases in reserve and those not reported, and after the average approximate degree of this relationship is once established, no further investigation is really necessary.

The individual company knows in a general way the status of its reserves, and reflects in this figure its degree of conservatism. The estimates will be either close or liberal according to the inclinations of the company; but whether close or liberal, as time progresses and the same practices are applied in valuing new cases as were applied in those eliminated, the deficit or excess in the total remains comparatively constant and the consistency of the incurred loss is not disturbed to any appreciable extent. And after all is said and done, even in a calendar year exhibit, the trend of the incurred loss is the feature to be watched.

Now just a few words about reserves as they affect individual risk and agency experience.

For individual risk experience only individual claim estimates of known cases can be used effectively. Serious errors in valuing claims could and probably do place a risk in an unfair light; but these errors must be exceptional and are generally excusable. There is no way by which an occasional mistake of this kind can be detected or corrected through the knowledge of just how much the average reserve deviates from the developed loss. The factor would be too small to have any deciding effect upon the individual item. It must not be overlooked also that in passing upon a risk, the question is not generally decided upon loss experience alone. Losses are expected to indicate a physical or moral condition which in the great majority of instances must be analyzed through a review of the claims before the question as to the acceptability or continuance of the risk can be decided. Even for the large risks where loss experience could be the deciding factor, a review of the claims is advisable.

Agency experience is dependable only when adjusted to the earned premium and loss incurred basis. Even on this basis, however, one calendar period should not be considered alone. Because of the comparatively small amount of premium volume in the individual account, the record of one year may be adversely affected by an unusual loss, or even by a mistaken estimate; whereas, by comparing years and by computing an average loss ratio for a series of years it may be found that the experience generally is very favorable. By coupling periods together in this way the computation of the earned premium is reduced to a simple 50 per cent. calculation of each of the overlapping years' writings, while the accumulating incurred losses smooth out inaccuracies in original valuations of claims. No general adjustment of the outstanding losses at the beginning and end of each experience period would have any appreciable affect upon the total incurred loss.

The really important phase of this discussion is how reserves can be tested and corrected so that properly developed data will be used in establishing rates. Each company is seriously concerned over this question and regardless of what statistical tests and corrections may be made, the actuaries will still have this problem with which to contend.

Policy year reserve development is not nearly so complex as the current wave of loss activity. By blocking the losses off into policy year divisions, each division is allowed to mature gradually, and with the progression of the time of maturity the individual item becomes a more dependable quantity. Many reserves originally estimated upon remote facts become known amounts through payment, while others are changed to a closer ultimate cost as the facts come to light through growing familiarity with all the conditions surrounding the claim. But notwithstanding this, there is always some discrepancy between the total policy year reserve at one period and the developed figure at a later period.

As stated before, the only judgment required in putting up reserves on compensation claims is in estimating the probable loss of time in temporary total cases. Most of these cases are of short duration and are promptly eliminated by final payments. A small proportion continues unsettled longer than originally expected, requiring periodical increases in reserve; and there is always a scattering few which develop into major injuries, when they are changed from the temporary total type to a major type. After the full seriousness of the injury is known, the ultimate cost is definitely fixed by the compensation act of the particular state in which the injury occurred, and the exact amount is put into reserve by a comparatively simple mathematical calculation. Proper consideration to the setting up of these reserves is guaranteed by putting in a check-up on cases where payments continue after the estimate has been used up, and those which are settled with a large overestimation.

As the various acts prescribe the amount that shall be paid in each instance, and as the statistical procedure for filing experience data requires the filing of individual case reports for each serious injury, the individual company has no option as to whether or not each reserve can be increased to include an established average underestimation. However, it is not difficult to determine from total figures just what the deviation may be and it is the responsibility of the rate-making authorities to inject any factor which may be found necessary to put the combined experience of all companies on the correct level.

Exhibit B-1 is appended hereto to indicate how the reserve test can be made on compensation business from the total figures by

policy years, through loss ratio comparisons. Obviously, an increasing incurred cost with correspondingly increasing loss ratios will indicate underestimations, and the amount and rate of increase will show the extent of the lack of reserve.

A similar exhibit—B-2 is appended to give the same picture of automobile liability and property damage reserves. Here is a very definite problem for the company statisticians as well as the bureau actuaries. There is no mathematical rule for the valuation of a matured liability or property damage case; but it will be seen from exhibits A-1 and A-2 that the average value of each claim varies with age, and therefore an average reserve would be grossly inadequate. Exhibit B-2 is based upon carefully estimated individual case reserves, and discloses the fact that for liability claims the reserves were inadequate, while for property damage claims the reserves were overestimated.

However, this exhibit is satisfactory for the reserve test. The degree of deviation from year to year is known, and it is only a matter of co-operation between the company and the bureau to see that proper allowances are made.

The purpose of this discussion is to develop the best way to compare the outcome of an intricate reserve system with the ultimate loss figure. Much is dependent upon the individual system with its many correcting safeguards; but the details of an ideal system is a complete study in itself. The comparison is accomplished by the method proposed by Mr. Comstock; but, while each step is plainly set forth, it cannot be considered that the clerical work in listing the reserves and posting developments on thousands of claims is either economical or simple of accomplishment. The entire test as outlined by him could be operated mechanically by means of punch card tabulations on printed tabulators, which, in fact, is now being done by some companies.

The test by totals is herein suggested as an alternative method. While the figures in the accompanying exhibits are not intended as a guide for other companies, the method of comparison is recommended as the most direct way of pointing out material inconsistencies immediately upon their occurrence. By thus establishing the exact point at which the figures are out of line, the cause can very readily be traced, and the necessary remedial measures can be applied.

EXHIBIT A-1

AUTOMOBILE LIABILITY—DISTRIBUTION OF MONTHLY RESERVE BY MONTH OF CLAIM
COVERING TWELVE MONTHS AND PRIOR AT END OF MONTH INDICATED

	SEPTEMBER — 1930			OCTOBER — 1930			NOVEMBER — 1930			DECEMBER — 1930			JANUARY — 1931			FEBRUARY — 1931			Average % of Total		Average Amt. of Reserve
Month of Development	Mo. of Claim	No. of Claims	Reserve	Mo. of Claim	No. of Claims	Reserve	Mo. of Claim	No. of Claims	Reserve	Mo. of Claim	No. of Claims	Reserve	Mo. of Claim	No. of Claims	Reserve	Mo. of Claim	No. of Claims	Reserve	No. of Claims	Reserve	
1st	Sept. '30	1585	580,591	Oct. '30	1530	6[illegible],844	Nov. '30	1479	611,699	Dec. '30	1711	675,023	Jan. '31	1334	613,623	Feb. '31	1317	530,424	18.0	16.3	407.79
2nd	Aug.	1005	427,820	Sept.	1059	4[illegible],460	Oct.	1137	518,838	Nov.	999	401,128	Dec. '30	1201	486,438	Jan.	955	464,006	12.8	12.0	425.06
3rd	July	886	353,618	Aug.	729	3[illegible],043	Sept.	803	323,700	Oct.	876	393,008	Nov.	774	317,853	Dec. '30	906	385,753	10.0	9.3	420.78
4th	June	744	400,554	July	679	293,031	Aug.	580	272,425	Sept.	623	249,180	Oct.	667	322,529	Nov.	619	255,058	7.7	8.0	458.28
5th	May	535	320,947	June	594	315,674	July	513	226,370	Aug.	461	236,493	Sept.	502	198,025	Oct.	544	279,144	6.3	7.0	500.68
6th	April	423	274,231	May	442	288,640	June	494	263,689	July	404	177,650	Aug.	401	210,983	Sept.	405	165,866	5.2	6.2	537.59
7th	March	338	155,848	April	333	238,003	May	364	250,502	June	406	231,068	July	346	151,250	Aug.	349	172,083	4.3	5.3	561.21
8th	Feb.	298	146,937	March	274	136,513	April	283	209,023	May	319	232,227	June	349	203,613	July	309	137,635	3.7	5.2	625.52
9th	Jan.	327	125,680	Feb.	247	137,565	March	226	115,073	April	243	178,998	May	278	180,937	June	317	190,288	3.3	4.1	566.87
10th	Dec. '29	242	85,751	Jan.	286	109,605	Feb.	209	118,030	March	191	102,973	April	202	147,683	May	248	167,485	2.8	2.9	472.80
11th	Nov.	238	88,605	Dec. '29	207	79,881	Jan.	248	85,950	Feb.	183	96,880	March	168	79,173	April	187	139,308	2.5	2.5	462.87
12th	Oct.	205	95,010	Nov.	192	70,855	Dec. '29	186	68,556	Jan.	217	80,075	Feb.	170	83,995	March	143	71,478	2.2	2.1	422.25
Prior		1814	702,499		1823	730,054		1773	729,576		1703	688,450		1720	702,739		1721	720,144	21.2	19.1	404.91
		8640	3,758,091		8395	3,763,168		8295	3,793,428		8336	3,743,153		8112	3,698,841		8020	3,678,672	100.0	100.0	
Average Reserve			434.96			448.26			457.32			449.03			455.97			458.69			450.53
																				Average	
Prior Mo's Reserve			3,626,658			3,758,091			3,763,168			3,793,428			3,743,153			3,698,841		3,730,556	
New Reserves			580,951			640,844			611,696			675,023			613,623			530,424		608,760	
			4,207,609			4,398,935			4,374,864			4,468,451			4,356,776			4,229,265		4,339,316	
Pyts. for Mo.			200,199			285,641			299,656			371,287			345,297			240,864		290,491	
Indicated Res.			4,007,410			4,113,294			4,075,208			4,097,164			4,011,479			3,988,401		4,048,825	
Actual Res.			3,758,091			3,763,168			3,793,428			3,743,153			3,698,841			3,678,672		3,739,224	
Surplus Res. Dropped			249,319			350,126			281,780			354,011			312,638			309,729		309,601	

EXHIBIT A-2

AUTOMOBILE PROPERTY DAMAGE—DISTRIBUTION OF MONTHLY RESERVE BY MONTH OF CLAIM
COVERING TWELVE MONTHS AND PRIOR AT END OF MONTH INDICATED

	SEPTEMBER — 1930			OCTOBER — 1930			NOVEMBER — 1930			DECEMBER — 1930			JANUARY — 1931			FEBRUARY — 1931			Average % of Total		Average Amt. of Reserve
Month of Development	Mo. of Claim	No. of Claims	Reserve	Mo. of Claim	No. of Claims	Reserve	Mo. of Claim	No. of Claims	Reserve	Mo. of Claim	No. of Claims	Reserve	Mo. of Claim	No. of Claims	Reserve	Mo. of Claim	No. of Claims	Reserve	No. of Claims	Reserve	
1st	Sept. '30	2652	142,630	Oct. '30	2666	135,319	Nov. '30	2521	122,328	Dec. '30	2767	140,360	Jan. '31	2567	13[illegible]36	Feb. '31	2236	109,733	29.9	21.0	50.78
2nd	Aug.	1306	78,532	Sept.	1444	90,430	Oct.	1580	93,050	Nov.	1441	77,242	Dec. '30	1520	8[illegible]36	Jan.	1480	83,043	17.0	13.6	58.10
3rd	July	980	65,453	Aug.	803	53,052	Sept.	1017	70,034	Oct.	1053	66,945	Nov.	951	55,460	Dec. '30	1102	66,451	11.4	10.1	63.90
4th	June	761	50,364	July	652	48,891	Aug.	562	40,120	Sept.	687	52,785	Oct.	741	52,404	Nov.	694	45,505	7.9	7.8	70.80
5th	May	495	40,647	June	535	39,063	July	457	38,051	Aug.	402	30,239	Sept.	494	43,255	Oct.	552	42,488	5.7	6.3	79.64
6th	April	426	34,351	May	368	31,879	June	398	31,989	July	333	31,003	Aug.	293	24,618	Sept.	374	35,605	4.2	5.1	86.43
7th	March	312	29,672	April	247	23,671	May	253	27,102	June	285	25,534	July	243	26,484	Aug.	218	20,598	3.0	4.1	98.24
8th	Feb.	247	19,879	March	218	22,932	April	192	20,745	May	189	22,871	June	238	22,592	July	200	21,904	2.5	3.5	101.96
9th	Jan.	259	28,112	Feb.	183	16,527	March	176	20,805	April	151	18,272	May	159	19,178	June	209	19,526	2.2	3.3	107.67
10th	Dec. '29	176	15,749	Jan.	193	25,010	Feb.	150	15,281	March	142	16,674	April	128	16,299	May	142	15,685	1.8	2.8	112.46
11th	Nov.	146	15,317	Dec. '29	137	13,283	Jan.	153	22,112	Feb.	123	12,466	March	123	14,132	April	112	14,323	1.5	2.5	115.41
12th	Oct.	131	12,560	Nov.	119	13,872	Dec. '29	111	12,012	Jan.	138	21,162	Feb.	110	11,160	March	111	12,975	1.4	2.2	116.31
Prior		1013	109,873		1027	111,393		984	110,687		950	104,850		957	111,935		971	1,935	11.5	17.7	111.94
		8904	643,139		8592	625,322		8554	624,316		8661	620,403		8524	616,939		8401	599,771	100.0	100.0	
Average Reserve			72.23			72.78			72.99			71.63			72.38			71.39			72.23
Prior Mo's Reserve			627,706			643,139			625,322			624,316			620,403			616,939		3,757,825	626,304
New Reserves			142,630			135,319			122,328			140,360			132,136			109,733		782,506	130,418
			770,336			778,458			747,650			764,676			752,539			726,672		4,540,331	756,722
Pyts. for Month			73,493			80,328			70,136			93,803			94,029			81,557		493,346	82,224
Indicated Reserve			696,843			698,130			677,514			670,873			658,510			645,115		4,046,985	674,498
Actual Reserve			643,139			625,322			624,316			620,403			616,939			599,771		3,729,890	621,649
Surplus Res. Dropped			53,704			72,808			53,198			50,470			41,571			45,344		317,095	52,849

EXHIBIT B-1

SCHEDULE OF COMPENSATION LOSSES AND MEDICAL INCURRED BY POLICY YEARS SHOWING CALENDAR YEAR DEVELOPMENTS

LOSSES INCURRED

Year of Development	1923		1924		1925		1926		1927		1928		1929		1930	
	Losses Inc.	L. R.	Losses Inc.	L. R.	Losses Inc.	L. R.	Losses Inc.	L. R.	Losses Inc.	L. R.	Losses Inc.	L. R.	Losses Inc.	L. R.	Losses Inc.	L. R.
1st	1,951,034		1,917,446	59.4	1,970,208	50.3	1,892,286	43.6	1,961,181	37.8	1,971,859	35.8	2,094,180	36.0	1,858,772	34.1
2nd	3,135,429	56.1	3,520,566	57.0	3,391,412	48.0	3,678,528	50.7	3,578,616	45.9	3,883,011	46.1	4,102,105	47.0	—	—
3rd	3,174,278	54.5	3,537,748	54.5	3,427,986	47.1	3,586,128	47.9	3,696,404	46.0	4,134,221	47.9	—	—	—	—
4th	3,185,620	54.7	3,557,122	54.9	3,402,959	46.9	3,575,479	47.8	3,727,020	46.4	—	—	—	—	—	—
5th	3,156,283	54.2	3,528,284	54.4	3,378,217	46.6	3,606,290	48.2	—	—	—	—	—	—	—	—

MEDICAL INCURRED

Year of Development	1923		1924		1925		1926		1927		1928		1929		1930	
	Med. Inc.	L. R.	Med. Inc.	L. R.	Med. Inc.	L. R.	Med. Inc.	L. R.	Med. Inc.	L. R.	Med. Inc.	L. R.	Med. Inc.	L. R.	Med. Inc.	L. R.
1st	631,368	—	709,196	21.9	718,350	18.4	692,952	16.0	870,941	16.8	851,469	15.5	1,020,924	17.5	869,922	15.9
2nd	1,213,671	21.7	1,382,081	22.4	1,441,934	20.4	1,439,451	19.8	1,567,845	20.1	1,698,130	20.2	1,922,289	22.0	—	—
3rd	1,213,670	20.8	1,382,081	21.3	1,441,934	19.8	1,439,451	19.2	1,567,845	19.5	1,730,735	20.0	—	—	—	—
4th	1,209,949	20.8	1,387,210	21.4	1,437,159	19.8	1,447,513	19.3	1,593,316	19.8	—	—	—	—	—	—
5th	1,214,575	20.8	1,383,603	21.4	1,455,709	20.1	1,455,521	19.4	—	—	—	—	—	—	—	—

EXHIBIT B-2

SCHEDULE OF AUTOMOBILE LOSSES INCURRED BY POLICY YEARS SHOWING CALENDAR YEAR DEVELOPMENTS

AUTO. LIABILITY LOSSES INCURRED

Year of Development	1923		1924		1925		1926		1927		1928		1929		1930	
	Losses Inc.	L. R.	Losses Inc.	L. R.	Losses Inc.	L. R.	Losses Inc.	L. R.	Losses Inc.	L. R.	Losses Inc.	L. R.	Losses Inc.	L. R.	Losses Inc.	L. R.
1st	665,979	20.0	753,858	20.4	990,719	21.8	1,270,637	25.5	1,507,943	27.9	1,391,508	23.2	1,506,639	24.7	1,989,070	32.0
2nd	1,491,799	44.1	1,641,267	43.8	2,234,309	49.5	2,527,962	51.7	2,622,187	49.3	2,792,265	46.9	3,227,506	52.0	—	—
3rd	1,555,623	45.8	1,737,227	46.5	2,278,046	50.4	2,551,597	52.1	2,806,659	52.8	3,049,419	51.3	—	—	—	—
4th	1,556,367	45.9	1,704,375	45.6	2,233,183	49.4	2,595,840	53.0	2,838,837	53.4	—	—	—	—	—	—

AUTO. PROPERTY DAMAGE LOSSES INCURRED

Year of Development	1923		1924		1925		1926		1927		1928		1929		1930	
	Losses Inc.	L. R.	Losses Inc.	L. R.	Losses Inc.	L. R.	Losses Inc.	L. R.	Losses Inc.	L. R.	Losses Inc.	L. R.	Losses Inc.	L. R.	Losses Inc.	L. R.
1st	353,967	33.5	362,218	28.2	519,630	29.6	616,323	31.4	595,621	28.4	643,972	29.0	709,865	30.8	719,219	31.2
2nd	600,548	55.8	736,058	56.9	998,096	56.8	956,553	49.5	923,697	44.6	1,023,667	46.2	1,089,565	47.1	—	—
3rd	600,465	55.6	706,265	54.4	945,127	53.6	902,204	46.7	900,785	43.5	985,830	44.5	—	—	—	—
4th	592,753	54.8	700,559	53.9	928,061	52.7	893,459	46.2	888,256	42.9	—	—	—	—	—	—

MR. E. ALFRED DAVIES:

It is an excellent thing that the Society's membership continues to discuss the ways of making and testing loss reserves, and Mr. Comstock makes us indebted to him for a further stirring of the waters in his paper "A Method of Testing Loss Reserves".

As I read Mr. Comstock's article he is satisfied with the present methods of making reserves, and is describing a plan for testing the figures thus set up, proving them as they develop, that is, a sort of post-mortem. He is a little in conflict with himself, in that he feels the individual case estimates, conscientiously set up, have been fairly close, and that errors are compensating. And yet he admits that the outstanding losses have been under-estimated, in the aggregate, which situation could not exist unless some of the companies, making up the aggregate, had been setting up too low reserves.

The author is emphatic in his support of the individual case estimate, and seems a little contemptuous of any "formula" method. It is admitted that the varying factors he lists are serious obstacles in the way of any simple recipe, but constant working with the subject may yet produce a satisfactory procedure for at least a quicker check on the individual estimate method. Even Mr. Comstock surrenders a little, when he uses ratios and per case estimates for the reopened and unreported items! To illustrate the point, there may be cited a recent study of workmen's compensation figures in Massachusetts, using the Schedule Z reports for 1922 to 1927 inclusive. From the loss incurred figures, minus the paid, the reserves were computed at first and second reportings, and these are compared in Table I below. It will be seen that the reserves at first reporting were under-estimated, not only in one year, but in every year. With recently reopened cases affecting these earlier years, the reserve at second reporting has probably been found too low, so that the discrepancy is doubtless even wider than here shown, and probably all these reserves were put up on an individual case basis! It might be argued that Schedule Z is not Schedule P, but nevertheless there is the same principle involved, that is, estimates as to the amount of loss reserves.

TABLE I

Workmen's Compensation Loss Reserves for Massachusetts for all Companies, comparing first and second reportings (Schedule Z data)

Policy Year	Reserve at First Reporting	Reviewed Reserve, as seen one year later	Amount and Per Cent. of increase on loss reserve at Second Reporting	
			Amount	%
1922	1,879,539	2,274,621	395,082	21.00
1923	1,971,124	2,262,982	291,858	14.80
1924	1,879,571	2,170,333	290,762	15.50
1925	2,031,437	2,310,309	278,872	13.70
1926	2,087,961	2,478,101	390,140	18.68
1927	2,167,907	2,778,100	610,193	28.14
Total 6 years	12,017,539	14,274,446	2,256,907	18.70

This same study contrasted the loss ratios as between first and second reportings. Even though the aggregate earned premium increased nearly 1 per cent., the loss ratio increased 4.01 per cent. (of itself), between the two reportings. A group of the larger companies showed a similar story, the loss ratio increase being 3.50 per cent. (of itself). See Table II.

TABLE II

Workmen's Compensation Loss Ratio for Massachusetts Comparing first and second reportings (Schedule Z data)

Policy Year	All Companies			A Group of Larger Companies		
	First Reporting	Second Reporting	The % by which first reporting loss ratio was under-estimated	First Reporting	Second Reporting	The % by which first reporting loss ratio was under-estimated
1922	65.89%	68.98%	4.69%	66.79%	69.84%	4.57%
1923	64.63	66.66	3.14	63.72	65.19	2.31
1924	58.07	59.53	2.51	57.46	58.22	1.32
1925	60.06	61.67	2.68	59.39	60.88	2.51
1926	60.68	63.15	4.07	60.32	62.62	3.81
1927	62.42	66.61	6.71	59.79	63.71	6.56
Total 6 years	61.78%	64.26%	4.01%	61.09%	63.23%	3.50%

The real essential need, I think, is a plan for making as certain as possible that the reserve, when set up, is adequate—methods such as the author has described are excellent for checking back to see what the reserve ought to have been, one, two, or three years ago, but they do not enable the company to know, today, what its loss reserve should be right now, today. The author's illustration is the reserve of December 31, 1929, but there are reserves required at least twice a year, probably quarterly, and

should be available monthly. The financial condition of a company, and of the insurance business as a whole, is a continuing process, a day-by-day development, and is not such that, with a great rush at December 31, we may set up reserves, and then heave a sigh and lean back for the rest of the year!

Nevertheless, such plans as Mr. Comstock has described are necessary for the purpose of a constant proof on the adequacy of reserves, and much value accrues to the explanation of methods which are in use, and which have proven satisfactory. It is interesting to note that the author's scheme is a series of sheets, each sheet with a number of cases, whereas the plan described by Mr. A. N. Matthews ("A System of Preparing Reserves", *Proceedings*, Vol. XIV, page 244) uses individual cards. There is a further difference in the two methods, which is that, whereas, Mr. Comstock starts with the reserve at a certain point, and traces the history of the reserve, Mr. Matthews speaks of an incurred loss cost, from which the reserve can be readily computed. This latter plan seems to have advantages, and is in use, with variations, in other companies.

The forms used by Mr. Comstock are made to include every open case, both large and small. Since a large number of the cases are settled within a few months, it probably results that many of the sheets have but one or two cases open at the end of the year, and then, with the new year's reserve, they doubtless are recopied onto a new set of sheets. The individual card plan would simplify that procedure; another variant might be separate sheets in a looseleaf ledger.

It would be interesting to learn why the author includes the allocated expense as part of his loss reserve? Since the trend is toward treating the expense as a separate matter, and because the expense item is not largely a matter of legal specification, it would seem easier and more accurate to keep the loss reserve, *per se,* distinct. A further subdivision is possible, in that the medical could be separated, and this might be a desirable breakup, in view of the increasing medical cost recognized in the recent trend factor inserted in the making of rates.

Loss data on the reopened cases, and on the incurred but not reported group, are valuable contributions, and these phases of the subject are wisely emphasized in times such as the present,

when the reopened question assumes such an increasing part of the whole matter of loss reserves. Experience of recent years is very necessary, plus experience of ten years ago, and then, doubtless, an added factor for possible aggravation of the problem.

Mr. Comstock gives a number of percentages, to aid in a comparison by other companies, as to what proportions these unknown items constitute of the whole. Additional information of import has probably been built up, by contrasting such losses, when known, against earned premium, losses paid, and losses incurred, as well as comparing the number of cases with the total of all cases reported, both by calendar and policy years. In another discussion of this subject, covering particularly the lines of fidelity and surety, Mr. Nellas C. Black, ("Method for Setting Up Reserve to Cover Incurred but not Reported Loss Liability", *Proceedings,* Vol. XIV, page 9), supports a formulary method for these unknown cases, measuring against premiums in force. Other lines might respond to this same base, or perhaps require another measuring stick, or even a combination.

It would be interesting to know how the individual case estimate method for these unknown items will compare with a formula procedure in this present situation of reopened cases and possible increased malignering. Will Mr. Comstock, in computing reserves for these cases, add to his past experience ratios, because of the new conditions? In making individual estimates, will he urge a larger per case estimate for current cases to care for malingering?

Without doubt, Mr. Comstock's paper has stimulated discussion in other companies, and has probably led to a review of existing methods, to compare with his suggestions, and the Society will anticipate further articles from the same pen.

AUTHOR'S REVIEW OF DISCUSSION

MR. W. P. COMSTOCK:

In Mr. Black's discussion he has made a contribution to the value of the original paper. Mr. Black, as we all know, has been a keen student of reserves for many years and his views command the respect of all members of the Society.

In reply to his remark, "It cannot be considered that the clerical work in listing the reserves and posting the developments on thousands of claims is either economical or simple of accomplishment" I can say from experience that after the reserve book has been made up at the beginning of any year the clerical work for all lines of business has been handled by a single person for a company writing approximately $15,000,000 of casualty business exclusive of fidelity and surety. Furthermore, the results have been available on or before the 20th of the month following the closing of the books for the period under review. Some saving in labor could be effected by making the test quarterly.

Mr. Black further states, "The entire test could be operated mechanically by means of punch card tabulations on printer tabulators." This is a method which I followed for a number of years prior to the adoption of the suggested method. The objection to the mechanical method is that when results are not satisfactory no detail is available. The suggested method makes all detail readily available to executives or state examiners without further tabulations or research, and without any resulting dislocation of office routine.

In Mr. Davies' discussion he calls the suggested method, "a sort of post-mortem." Part of the method is, of course, retrospective but the underlying purpose is to use the past as a guide to the future. The experience of at least two companies of which I have accurate knowledge developed the fact that an average incurred cost of $60.00 per notice under compensation policies would prove adequate in the final analysis. The bulk of the business of the older casualty companies consists of their renewal business. If past experience has shown $60.00 to be the average cost per notice, then that is the figure to use in testing current reserving. I stated that individual companies would probably develop tendencies peculiar to themselves. By this I had in mind the thought that certain companies insuring chiefly the operations of hazardous industries, such as lumbering, might conceivably find a $60.00 notice average altogether inadequate. Each company should know precisely what its own past experience has been in order to make certain that its current reserving is correct.

In all rate-making it is of paramount importance that ultimate loss costs be used. If reserves do not reflect final values until

after such time as the figures have been used for rate-making purposes, rates will be inadequate. The present deplorable inadequacy in compensation and automobile rates is traceable, in part at least, to the undervaluation of incurred loss costs. Such loadings as have been used for under-estimation have usually been too low.

Mr. Davies suggests that I am in conflict with myself in regard to the results obtained from the use of individual case estimates. Reserves of the older and more experienced companies are in the main substantially correct. The aggregate results for all companies combined are vitiated by including the figures of the newer companies.

Mr. Davies also feels that I am "contemptuous" of any formula method. I would describe my state of mind in regard to a formula method as scientific skepticism. When the acceleration of a falling body, the trajectory of a bullet, the expansion of gases under changes of temperature and pressure, and innumerable other physical and chemical phenomena are found by experiment to act in a certain definite manner, and when experimenters working independently in various parts of the world all obtain the same results under the same conditions, it is convenient to describe these phenomena by a formula. I do not think that human behavior under a compensation law, for instance, is a purely mathematical problem which is capable of exact solution. I seriously doubt that human behavior can be reduced to a mathematical formula. I prefer to regard casualty insurance not as an exact science, but as a business.

In the "evolution" of the suggested method, individual cards were used for two years and were discarded for the use of a sheet with a saving of clerical labor of approximately 40 per cent.

Any company using the suggested method would presumably modify the minor details to meet its own requirements. If it preferred to keep a separate record of allocated loss expense or medical, that would require merely the addition of the necessary columns. Trends such as increasing medical costs or increased costs due to malingering would, of course, be taken into account in checking current reserving.

The remarks in the opening paragraph in regard to Mr. Black apply with equal force to Mr. Davies.

THE ACTUARIAL BASIS FOR PREMIUMS AND RESERVES IN PERSONAL ACCIDENT AND HEALTH INSURANCE—JAMES D. CRAIG

VOLUME XVII, PAGE 51

WRITTEN DISCUSSION

MR. HENRY H. JACKSON:

Mr. Craig's paper was expressly prepared as a chapter in a textbook for non-actuarial students, and as such hardly lends itself to formal discussion. Here the student will find the fundamental formulas developed with thoroughness, from first principles. In addition, he will find a wealth of information on the general subject of accident and health problems and practices, and some excellent hints concerning the best available material for further study. That is, the author (who had contributed a technical paper on this subject to the Actuarial Society of America in 1914) has successfully put at the disposal of students without special technical training his exceptionally wide knowledge of an extremely important subject. That the printer has at the foot of page 67 substituted the symbol *a* for the universally accepted a can in the context lead to no misunderstanding, and is mentioned merely that the correction may not escape attention in the contemplated textbook.

It is appropriate that this paper should first appear in the *Proceedings,* in which already the varied phases of this perplexing subject have received extensive treatment in valuable earlier contributions. Mr. Craig's footnotes led me to reread some of these studies. If, therefore, my further comments are on the general subject rather than exclusively on the paper immediately under review, I trust the digression will be pardoned. It must be remembered that Mr. Craig's subject is very broad indeed, since the actuarial bases he develops are fundamental in, and (with appropriate adjustments) applicable to, every phase of sickness benefit, whether granted by means of cancellable or non-cancellable accident and health policies or by disability riders attached to life insurance contracts—with workmen's compensation, and accident insurance, and double indemnity in life insurance included for good measure!

Three lessons seem to me outstandingly prominent in all these papers—that as actuaries we cannot be as exact as we would

wish, but we must be as exact as we can; that in the insurance business, above all other kinds of business, co-operation is incomparably more important than competition; and that we cannot change human nature to fit our theories and contracts and formulas, but must fit these to human nature.

The first lesson is not readily learned by the student. When he finds that the basic data are insufficient or unreliable, and that the loading is plastered on with a trowel, he wonders why we should be at such pains to obtain a theoretically accurate net premium. Mr. Craig's answer, if I correctly interpret his paper, would be that when statistics and stabilized conditions do give us reliable basic rates, and when accounting refinements do permit a more accurate assessment of expenses, we shall not have to seek a new technique if our original one was absolutely sound.

The second lesson is implied in Mr. Craig's opening sentence, where reference is made to a recent co-operative report on combined health experience. Nobody should have more respect than an actuary for initiative and personal achievement. But every form of insurance is in essence a co-operative enterprise, and the insuring companies can individually strengthen themselves most successfully by co-operating, through pooled experience, to obtain basic statistics and basic premiums that are sound beyond peradventure.

My third lesson is sustained by almost every sentence in the paragraph on page 71 in which Mr. Craig summarizes certain practical considerations involved in accident and health underwriting. For example: "The sickness rate will be higher for relatively or even actually higher amounts of benefit than where the amounts are low." Disability benefits offered by life insurance companies furnish a costly example of an attempt to disregard this fundamental principle of human nature. A small benefit (premium waiver) was offered at a modest premium—and all went well. Blind competition eventually led companies to disregard the well-known fact that most men work because they are paid for it, and would prefer to loaf at the same or even at a lower wage. The resulting experience was so unfavorable that radical remedies were required to avert disaster—and in the present days of business depression some are wondering whether even these remedies were radical enough!

MR. WARD VAN BUREN HART:

Although the editor's footnote to Mr. Craig's paper states that it was intended for the use of non-actuarial students, it contains much that is interesting to an actuary. In view of the thoroughness with which Mr. Craig has covered the underlying actuarial basis of accident and health insurance, I have taken the liberty of supplementing his paper with some comments on the practical side of the actuary's work in connection with this line of insurance.

The paper is a valuable summary of the actuarial technique which may be employed in accident and health insurance calculations. However, before proceeding to the more technical aspects of the problem, the author shows how rates may be built up on a one year term basis by a process of general reasoning and then takes up the description of the calculation of level premiums and reserves by the commutation column methods which have been generally acceptable as applicable to sickness insurance. The formulas developed are closely analogous to those used in life insurance calculations, but in spite of this analogy the practical problems confronting the actuary when working on life insurance questions differ considerably from those confronting him in connection with accident and health questions. Although broad statements are sometimes dangerous, it is perhaps safe to say that in life insurance to date, the problems of properly employing the fundamental statistics have outweighed in difficulty and complexity the problems of obtaining them, whereas in accident and health insurance, the obtaining of reliable statistics has outweighed the problems of employing them. It is true that a few of the larger accident and health companies have had fairly complete accident and morbidity experience available, but for many companies, the Bureau health report mentioned by Mr. Craig marks the first attempt in the accident and health field to make available a considerable volume of experience by merging the data from several companies.

The casual reader might infer from the amount of space devoted by the author to the formulas necessary to give net premiums for various ages that the age of the insured is perhaps the primary consideration in rate calculation. This is hardly true; in fact, Mr. Craig states that the occupation of the insured is the most

important element in determining accident rates. Although the "manual" classifications are as good as personal judgment and such occupational experience as has been available can make them, they are probably still far from scientific exactitude. Likewise, the cost of the dismemberment, surgical, hospital, medical, nursing and x-ray benefits is not too well known. The "reimbursement" feature embodied in several of the newer accident forms which replaces, as far as medical and allied coverages are concerned, the insurance principle by the indemnification principle, will undoubtedly repay considerable study. The various "frills" providing double coverage for accidents occurring under certain conditions, while contributing a relatively small amount in dollars and cents toward building up the net premium, nevertheless, require as accurate a determination of the net cost of these benefits as possible, since, with the relatively slight margin of profit existing in most current accident and health rates, an error in the evaluation of even a relatively unimportant benefit may spell the difference between a policy written at a loss and one written at a profit.

At present the Bureau contemplates making a study of accident experience similar to the health study mentioned previously. This should be of immense value not only in giving us more accurate net premiums to work with in connection with some of the subsidiary benefits mentioned in the previous paragraph, but also in making us surer of our ground in connection with the fundamental coverages for weekly indemnity and accidental death. Even at best, however, until we reach the stage where the average company can have readily available a reservoir of experience based on homogeneous, reliable and recent data, it will not be surprising if most companies prefer to ignore the refinements exemplified by Mr. Craig's formulas at least as far as cancelable business is concerned.

The company with which Mr. Craig is connected has, by virtue of circumstances largely peculiar to itself, been able to handle accident and health insurance by means of level premiums graded by age. For most companies, however, in the near future at least, the more common method of charging a flat premium for all attained ages up to some specified age, increasing at that age for both new and renewal business, will probably continue to prevail.

As Mr. Craig mentions, there is practical justification for the use of this method.

The strenuous competition in the accident and health field has resulted in rates for the more common policies in the leading companies which are more or less standardized, usually in fairly round numbers. The result is that if the actuary of an accident and health company were to present a report to his company showing that the rate on a certain policy form for certain ages could be reduced from $5.00 to $4.85 while the rate on some other policy form at certain ages should be increased from $5.00 to $5.15, it is fairly certain that it would be unwise under present conditions for the average company to adopt his recommendation. The life insurance companies, although starting from the accumulated experience of combined companies as a basis, have been able to a considerable extent to modify their rate structures upward or downward in the light of the mortality experience, investment earnings, and overhead expenses of the individual company. Casualty lines, other than personal accident and health insurance, have secured uniformity through the use of inter-company rate-making bureaus. The customs of the accident and health business, on the other hand have hitherto deprived the companies of the flexibility of the life insurance business without at the same time giving them the benefits of pooled action in rate-making such as has been employed in certain other casualty lines.

After the publication of the Bureau health report previously mentioned, the rates for health insurance in most companies were put on a much sounder basis than previously. The information derived from the proposed inter-company investigation into accident experience should likewise improve the soundness of accident rates. Until conditions seem to justify it, however, the refinements of Mr. Craig's formulas seem largely academic as far as present conditions are concerned.

AUTHOR'S REVIEW OF DISCUSSION

MR. JAMES D. CRAIG:

I wish to thank Mr. Jackson and Mr. Hart for their valuable supplements to the paper. Mr. Jackson's comments on Dr. Marchand's paper are particularly interesting. The study con-

templated by the Bureau, which Mr. Hart mentions, should considerably add to our knowledge of accident experience.

As Mr. Jackson points out, the symbol a_{x+n} appearing on pages 67 and 68 should read a_{x+n}. I may also point out that the heading in column 4 of the table on page 73

$$H_x^{0/1}$$

reading $v^{x+\frac{1}{2}} l_x$

$$+ \tfrac{1}{2} S_x^{0/1}$$

should read $H_x^{0/1} = v^{x+\frac{1}{2}} l_{x+\frac{1}{2}} S_x^{0/1}$.

DISABILITY INSURANCE IN CONNECTION WITH REGULAR LIFE INSURANCE CONTRACTS IN SWITZERLAND—EMILE MARCHAND

VOLUME XVII, PAGE 74

WRITTEN DISCUSSION

MR. HENRY H. JACKSON:

It was quite by accident, no doubt, that Mr. Craig's paper was followed by Dr. Marchand's description of disability benefits in Swiss life insurance contracts. Yet the two studies make excellent consecutive reading, and Dr. Marchand's account gives so good an example of common sense in disability underwriting that brief comment on it may well be made.

Really, it reads for the most part like a letter from an actuarial Elysium.

There, disability coverage has actually proved profitable to the carrier without (one infers) failing to satisfy the insured! Many reasons are apparent from the paper itself. I wish to direct attention to but a few.

The restriction of the benefits is doubtless by all odds most important. Benefits do not begin until (on the average) six months after total disability is incurred. Disability income is restricted to 5 per cent. per annum of sum insured. All benefits whatever cease at age 65, thus removing the danger of granting superannuation pensions where you intended to grant only total disability benefits.

Utopian, too, are the simple assumptions "that the annual probability of death is the same for active and disabled lives"; that

the probability of becoming disabled doubles for each quinquennium above age 15; and that this probability at the youngest age (with a gradually decreasing proportion as age increases) is among women *four* times that among men. The granting of certain restricted benefits in cases of partial disability furnishes the only jarring note in this Swiss harmony.

Small wonder that the ratio of actual to expected disability claims is but 52 per cent. in Switzerland! Actuaries there have recognized (better than American actuaries, it seems) that very unusual safeguards must be employed in computing rates for a benefit the enjoyment of which does not necessarily conflict very seriously with the desires of the insured.