ABSTRACT OF THE DISCUSSION OF PAPERS READ AT THE PREVIOUS MEETING

THE FUNCTION OF ADMINISTRATIVE STATISTICS IN CASUALTY INSURANCE—ROBERT S. HULL

VOLUME XVII, PAGE 179

WRITTEN DISCUSSION

MR. W. W. GREENE:

Mr. Hull's interesting and timely paper deals with the very core of the work of this Society; for it should be the chief object of the Society to train men competent to discharge the duties described by Mr. Hull, or at least the more important of them.

Mr. Hull's outline of the duties of "administrative statistician" seems, if anything, too broad. Doesn't his paper discuss two jobs rather than one?

In a large company there probably is need for the "efficiency expert" or "budget director" as such. The function of this factotum is to delve into any and all details of the expense ratio. Reduced to the absurd, his mission is to make sure that not even a new lead pencil is issued except upon a requisition, describing not only the contemplated use of the new pencil, but also what became of the old pencil, and why.

Admitting that such a job and such a viewpoint has a proper place in a sizeable organization, this is not the job nor the viewpoint of the "comptroller", as the present writer prefers to call him. A small company can worry along, and some undoubtedly prosper, without a budget director. On the other hand, no company, I believe, can safely do without a capable comptroller, or someone who exercises his functions with capability, under whatever name.

The comptroller is that member of the company's official family whose particular aim is to maintain as much *control* as is humanly possible over the company's results as measured in terms of gain or loss. In respect of profits, his mental attitude is reflected in the formula: "If not, why not; if so, why?" He should expose the reasons for profit or loss but not rest content with mere analysis of past results. Rather, in the light of such

results he should formulate and recommend, nay, urge a corrective and constructive program as to future company policy.

Normally, the comptroller reports to the chief executive officer of the company rather than to the board of directors. To the chief executive the comptroller presents not only the facts which he has collected but also his analyses and recommendations. It is the prerogative of the active head of the company to determine the extent to which such facts, analyses and recommendations shall be presented to the board.

As for the facts periodically developed by the comptroller, they should at least include the following:

1. Monthly gain and loss account (underwriting and investment exhibit).—This exhibit will be most helpful if it does not follow the form of the official underwriting and investment exhibit, but rather shows the result of the company's "actual" operations together with a reconciliation of such actual result with the change in surplus indicated by the official exhibit.

"Actual" underwriting results embody the following points of difference as compared with the statement basis:

A—Reinsurance is taken into account whether admitted or non-admitted.

B—Earned commissions, rather than written commissions, are considered.

C—Reserves for liability and compensation business are taken on basis of the company's estimates rather than at the statement figure.

Undoubtedly there is room for difference of opinion as to the specific form of the suggested gain and loss account. This is particularly true as respects the treatment of certain investment items. Probably it will be generally conceded that changes in the difference existing between the book value and the market value of investments should not be treated as part of actual results. The situation is not quite so clear with respect to gains or losses realized upon sale or maturity of investments. From one viewpoint, such gains or losses are "actual", but from another, this might not be regarded as the truest interpretation of the facts, since cash derived from the sale or maturity of invest-

ments is normally re-invested and the asset thus created continues to be subject to the effect of market price fluctuations in either direction.

If the company's results are shown under the following main headings, the position will be made entirely clear without having to resolve the dubious point just discussed.

1—"Actual" underwriting results.

2—Earned interest and dividend income (net of investment expense).

3—Gain or loss upon sale or maturity of investments.

4—Change in difference between book and market value of securities.

5—Statement charges and credits (underwriting only).

The definition of "actual underwriting results" given in the preceding paragraph implies that the following, in our analytical exhibit, will be treated as statement charges (or credits) in respect of underwriting.

A—Change in the commission equity in the unearned premium reserve.

B—Change in premium and loss reserves relating to non-admitted reinsurance.

C—Change in the Schedule P equity, i. e., in the difference between the company's estimated outstanding losses on the Schedule P lines and the reserve as required by Schedule P.

If the company's collection experience warrants such a course, some portion of the change in the amount of premiums (less commissions) more than ninety days old, may also be treated as a statement charge (or credit). For that matter, there may be other items not mentioned above which in the case of a given company may properly be treated as statement charges (or credits), rather than reflected in actual results. An example of this would be a balance due from a financially responsible but unlicensed reinsurer.

It should be added that in the suggested type of gain and loss

account, it is desirable to display the underwriting results under the following headings:

Direct business
Incoming reinsurance
Outgoing reinsurance
Total business (net of reinsurance).

2. At least quarterly (preferably, each month), that portion of the analytical gain and loss account above described which deals with underwriting should be supported by figures showing the results for each kind of insurance. This supporting information should be shown separately for direct business, incoming reinsurance, outgoing reinsurance, and net total business. The following displays, in principle, the column headings for the supporting exhibit relating to the actual results on direct business:

Kind of Insurance	(1) Premiums Written	(2) Premiums Earned	(3) Actual Loss and Loss Expense Incurred (net of Salvage)	(4) Loss Ratio (3) ÷ (2)
(5) Commission Ratio	(6) Commissions Earned (2) × (5)	(7) Overhead and Taxes Incurred	(8) Actual Underwriting Gain {(2) — [(3) + (6) + (7)]}	

Similar exhibits should be presented reflecting actual results on incoming reinsurance, outgoing reinsurance, and net total business. In addition to the presentation of actual results, there should be shown a reconciliation between such actual results for net total business and the corresponding statement results. The following illustrates the column headings which would be required for this purpose:

Kind of Insurance	(1) Actual Underwriting Gain	(2) Increase in Schedule "P" Equity	(3) Increase in Commission Equity
(4) Increase in Premium and Loss Reserves for Non-Admitted Reinsurance	(5) Total Statement Charges (2) + (3) + (4)	(6) Statement Underwriting Gain (1) — (5)	

A thorough discussion of how to treat overhead expense in the various underwriting exhibits would necessarily be lengthy. In

the monthly gain and loss account proper, i. e., that dealing with the company's total results, it may be justifiable to show overhead expense only in respect of net total business, since such a treatment clarifies the comparison between results on direct business, incoming reinsurance, and outgoing reinsurance, respectively. Such a handling of the overhead expense element would be misleading in case of the supporting exhibits relating to underwriting results by kind of insurance. Where the company accepts very little reinsurance, it may be desirable to charge the entire overhead for any given kind of insurance to direct business. On the other hand, if the company accepts a considerable volume of reinsurance, an appropriate amount of overhead should be charged thereto.

3. At least quarterly there should be presented a statement of the underwriting results of each producing unit (agent or broker). In the task of improving the company's underwriting, the study of the individual producer's experience is the most important factor, since under present conditions, the company in great measure is obliged to underwrite the producer rather than the individual risk or manual classification. It should be unnecessary to state that the experience of the producer is meaningless unless incurred losses are compared with earned premiums and proper allowance is made for the overhead and tax ratios. In addition to the general periodic survey of underwriting results by producer, the comptroller should devise an adequate plan whereby the producer's record is brought to his attention immediately when loss payments or reported claims, as compared with premium writings, mount rapidly.

As already stated, the comptroller's primary interest as respects the company's operations is in the total result. By this, it is not implied that he is not interested in the expense ratio, but rather that he will more effectively serve the company if he consistently views the expense element as a factor in the total result, and does not devote an undue portion of his efforts to minute analyses of the various phases of expenses, which latter field is more properly that of the budget director.

The main hope for profit on the part of casualty companies lies in improving the loss ratio. Frequently such improvement cannot be had without spending money, and perhaps a great deal

of it, in directions which assure skillful selection of business, prevention of avoidable losses, and effective handling of claims. The comptroller, therefore, will not "view with alarm" properly directed expenditures tending to promote a loss ratio so low as to produce a black figure at the bottom of the column under normal business conditions.

Mr. Hull states, by implication, that generally in the American casualty business the actuarial viewpoint has not been accorded the weight which it deserves. This, we think, is quite true, but in the writer's opinion, the fault lies partly with his actuaries.

To serve his company adequately, the actuary must not only be technically qualified, but he must have courage, sane judgment, and the selling ability requisite to secure the acceptance of his views, in a reasonable degree.

Among British insurance companies, a goodly proportion of the executives, including chief executives, are members of a recognized actuarial society. The majority of the British companies transacting casualty business conduct a life insurance business as well, and, in large measure, the influence of the life insurance viewpoint accounts for the fact that executives are drawn from the actuarial ranks. Nevertheless, in the British field, there are a number of men with the actuarial background who occupy high positions with duties entirely concerned with the casualty and fire lines. These cases are living demonstrations of the value of technical training when combined with general ability.

It should be the aim of this Society to develop men who are competent to rear a structure of sound executive ability upon a secure foundation of actuarial principle.

MR. R. A. WHEELER:

Mr. Hull's paper presents to us in a timely, forceful, concise statement the undisputable need for scientific control in the field of casualty insurance. In fact, the need for such control is greater than in any other field of insurance for in addition to meeting the hazard of insurance *per se*, casualty insurance is also subject to all the hazards incidental to the rapid changes in our economic life into which its coverages are so inextricably interwoven. Although the need for scientific control is generally

recognized in the field of life insurance not only by the companies but also by statute, this cannot be said to be generally true of casualty insurance. In fact, there is a definite resistance upon the part of some casualty insurance companies to actuarial or administrative statistical control over their operations, accompanied with a blind faith that in some mysterious manner profits ensue from the mere writing of the business.

This resistance is due partly to the prevalent feeling that certain overhead expenses are a necessary evil, partly to the skepticism that results would not be those that are claimed, and partly to a misunderstanding as to the nature of the expense now required to maintain a statistical department. I doubt whether it is generally understood that probably 90 per cent. of the expenses of maintaining a statistical department is a direct consequence of legal and statutory requirements. Here is a substantial investment over which the individual company has no control except in the economies of efficient administration. Why should not this investment be capitalized by the additional expenditure necessary to harness the available information for analyzing the companies' various sources of profit and loss, thus permitting a greater degree of scientific control. This additional expenditure for concentration and thought upon statistics already available risks little in comparison with its potential returns.

There are one or two other thoughts which have been prompted by Mr. Hull's paper. Under the head of "operating control" should we not in addition to the various corrections necessary to differentiate between the statutory statement and the internal operating statement introduce a reserve for expenses incurred but not paid, thus placing the company's expenses on an incurred basis in the same manner and for the same reasons that the company's losses are placed on an incurred basis. The distortion during the present business depression between work units and expense allowed out of current premiums to handle these units has no doubt impressed the companies with the fact that much of the current work done today is on business placed on the books one, two, three, five years ago during the period of prosperity. The existence and need for such a reserve for claim expenses is obvious and in fact has been recommended by the Society's reserve committee. I believe that a similar reserve

is required not only for claim expenses but also for underwriting, statistical, and accounting expenses. As a budgeting control, the placing of expenses on an incurred basis has the advantage of putting on the brakes during a period of expansion and of effecting a closer correlation between work units and available expenses during a period of depression. The present system of paid expenses encourages extravagance when attention should be focused on the economies necessary to absorb an expanding volume of business and at the same time forces undeserved economies during the depression which may result in the sacrifice of service.

Further, should we not also give attention to the probable need in the casualty insurance business for a cyclical reserve for losses over and above the present statutory reserve to take care of the inflationary effect of periods of depression upon the outstanding loss of the various casualty lines of insurance? An attempt has been made to recognize this in the fidelity and surety fields, but I believe it should be given recognition in other lines as well.

MR. H. J. GINSBURGH:

It is difficult to take issue with the content of a paper of the type so well prepared by Mr. Hull, or to add to it. We may feel that the practical needs of organization might not give to one individual the hypothetical administrative statistician, all the duties allotted to him in this paper; for example, budget administration and expense control are usually a separate function. But such distinctions are relatively unimportant in the broad view Mr. Hull has taken of the possibilities of statistical analysis as a guide to administration.

The problem of internal operating statements is of prime importance to administrative statisticians, particularly those in companies with a considerable volume of lines in which the true premium income is known only retrospectively, and in which the true loss liability is not determined for long into the future. Mr. Hull has indicated several elements which must be considered in arriving at the actual results of a given period soon after its close. Another factor, not mentioned by him, is the extent of change in loss reserves due solely to under or over estimate of previous years. The degree of distortion given by this factor to the oper-

ating statement for a given period can, however, be greatly minimized by the work of the statistician along another line, namely, the testing of claim reserves. On the premium side it is to be hoped that the Society will have before it more explicit information on the item "estimates of earned premium accruing on policies subject to audit." Good results in this connection have been obtained in the correlation of reported accidents and earned premiums.

Mr. Hull devotes roughly a third of his paper to a discussion of statistical possibilities in the study of acquisition cost and of branch office and agency results. This is unquestionably an important, even vital matter, but some of the items mentioned should be considered in the light of what is later brought out by Mr. Hull, that "it should be the administrative statistician's responsibility to see that the cost of the record does not exceed its value." This responsibility is extremely difficult to carry out, since it is often impossible to determine the value of a record before the statistics are obtained. Nevertheless, it exists, and applies not only to the matter in connection with which it is brought out here, but to all the work of the administrative statistician.

The foregoing emphasis on the consideration of cost should not be inconsistent with the last point to be made in this discussion. It is a point implied in Mr. Hull's paper, and here made more explicit. Casualty companies are compelled to maintain statistical organizations of some nature, and at a definite and appreciable cost, in order to supply the statistical information required by states and bureaus. Compared with this cost, and with the results to be obtained, the additional cost is small by which the companies may make use for themselves, in problems of management, of the organization and material made necessary by external requirements. Mr. Hull has reported an excellent survey of the field.

AUTHOR'S REVIEW OF DISCUSSIONS

MR. ROBERT S. HULL:

The discussions by Messrs. Greene, Wheeler and Ginsburgh are so far in accord with the intent of the original paper as to call for no particular reply from the author. Each of the gentlemen

has made valuable additions to the necessarily broad generalizations of the paper and it only remains for the author to express his thanks to them for their contributions to the subject. The past months have emphasized still further, if that were possible, the need for thorough going analysis of the results of current operations and of the causes that have brought about these results. It is to be hoped that other members of the Society may be moved to contribute the results of their thoughts and experience on the numerous phases of this very vital and timely topic.

THE NEW YORK UNIT STATISTICAL PLAN; A METHOD OF PREPARING AND REPORTING DATA AND ANALYZING THE CARRIER'S BUSINESS—CHARLES M. GRAHAM

VOLUME XVII, PAGE 190

WRITTEN DISCUSSION

MR. W. N. MAGOUN:

Mr. Graham's paper first outlines, in complete detail, the thorough method installed and developed by the State Insurance Fund of New York to meet the requirements of the New York Unit Statistical Plan pertaining to workmen's compensation experience.

It is not possible to read Part II of his analytical discussion without being impressed by the fact that an enormous amount of detail work is involved, and that extraordinary precautions have been taken to secure accuracy in the preparation of material. There are to be found here descriptions of so many steps in the process of originally recording and subsequently verifying the data for submission to the Compensation Insurance Rating Board, that Mr. Graham's paper should prove of value to the employees of any insurance company who have found difficulty in producing absolutely accurate results.

In Part III Mr. Graham points out a secondary value of the Unit Statistical Plan over and above its primary purpose, whereby the labor expended in the carrier's office may be turned to good account, at practically negligible additional cost, through producing facts of value in the conduct of the carrier's business, which facts would not have been available had it not been necessary to prepare the data to serve its primary purpose.

In his concluding paragraph Mr. Graham offers the suggestion that the operation of the Unit Statistical Plan might properly be discussed from the viewpoint of a central rating organization.

The Massachusetts Rating and Inspection Bureau has recently completed the tabulation of Schedule Z for policy year 1929, the first such tabulation undertaken by the Bureau. Like a new automobile, the machinery did not run quite so smoothly for "the first 500 miles." All obstacles were overcome, adjustments and "truing up" accomplished and the Schedule Z placed in the hands of the Commissioner of Insurance at practically the same time as in previous years the Insurance Department had been accustomed to finish its verification and tabulation of the reports submitted individually by the carriers.

The Bureau furnished the Massachusetts Insurance Department with the following:

(1) For each company
    Classification sheets
    Individual case reports

(2) For each classification
    Combined company reports

(3) Summary by companies and grand total
    (Earned premiums shown both with and without loss constants)

In the carrying out of Mr. Graham's suggestion, the same natural division takes place in any comments which may be made by a representative of a central rating organization. Namely, discussion of methods followed to achieve the primary purpose of the Unit Statistical Plan, and the secondary benefits to be derived from further utilization of the data thus secured.

I am not prepared at this time to forecast the various uses which may be made of the Unit Statistical Plan data now available. Rather than discuss future possibilities in advance, I prefer to reserve comments until actual uses have been found and tested, and their value demonstrated.

I believe, however, that the method of "control" in the Bureau's office, to assure accuracy in the completion of Schedule Z from the unit data submitted by the carriers, may be of interest as

a supplement to Part II of Mr. Graham's paper dealing with his methods of securing accuracy in the first instance.

The Bureau receives from each carrier—

(1) Copy of policy declaration
    Cancellation notice
    Reinstatement notice
(2) Individual risk form
    Transmittal letter
    (Each calendar month separately)
(3) Individual case reports

The Bureau receives, through the Industrial Accident Board and the Massachusetts Insurance Department, copies of

(1) Agreement in regard to compensation.
(2) Agreement for redeeming liability by payment of lump sum.
(3) Application for discontinuance of compensation payments.
(4) Employees agreement to discontinuance of compensation.
(5) Abstracts of "findings" by Industrial Accident Board or individual member thereof.

The Bureau prepares in its own office—

(1) Individual risk index card
(2) Company control card
(3) Punch cards
    (a) Risk card (b) Premium card (c) Loss card
(4) Classification control sheet

Individual Risk Index Card

On the individual risk index card details of each policy declaration are listed, with subsequent record of cancellation or reinstatement, if any. The receipt of each individual risk form is also recorded, and failure to file is followed up.

Company Control Card

Each individual risk form received from the insurance company bears a serial number which is of great value for identifica-

tion purposes, especially in keeping the records of shipments received, and in correspondence pertaining thereto.

On receipt of a transmittal letter from the company, with its accompanying individual risk forms, the Bureau records the serial numbers and corresponding items of payroll, premiums and losses, which are totaled to check the totals reported by the company in its transmittal letter.

Such original totals for each shipment are then entered on the company control card—designated as "transmitted amounts".

The Bureau then audits the respective individual risk forms by checking the rates, loss constants, premiums and losses, and by comparing the loss data with the Industrial Accident Board forms and the individual case reports.

Any discrepancies found are immediately taken up with the company, and after adjustment a new set of final totals for each shipment is entered on the company control card—designated "verified amounts".

Each company is advised of the total of the verified amounts, according to each shipment, so that by retaining these individual verified totals, the company at the end of the year, by adding them up, has a record of the accumulated year's experience exactly corresponding to the Bureau's final records.

Punch Cards

The punch cards are prepared from the individual risk forms, after audit by the Bureau, and are sorted and tabulated by company. The total payrolls, premiums and losses derived from the punch cards are compared with the "verified amounts" entered on the company control card, and must agree therewith. (If any variation is found, the cause thereof is investigated and correction made.)

Classification Control Sheet

A classification control sheet, which is cumulative monthly, has been adopted.

The premium and loss cards (after comparison with the "verified amounts" on the company control cards, as above described) are sorted by classification, without regard to companies, and the

total for each classification is entered on the classification control sheet.

The premium and loss cards are then further broken down by companies, within each classification, to provide an individual company classification sheet for Schedule Z.

The totals for each month of all of the individual company verified totals, taken from the company control cards, must agree with the classification control sheet for that month. If any discrepancy is found, it is investigated and rectified.

At the completion of the year the twelve monthly totals for all companies combined, derived from the company control cards, must agree with the accumulated totals on the classification control sheet.

MR. R. A. WHEELER:

Mr. Graham's very thorough and complete description of the actual handling of the New York Unit Statistical Plan within a carrier's office and its potential utility in the analysis of the carrier's business is a valuable contribution. The Unit system has passed through the initial stage of experimentation and may become the generally accepted statistical plan for workmen's compensation insurance. Its weakness, if such it may be called, lies in the probable underestimation of reserves which may result in the close identification between individual risks and manual classification rating. This underestimation of reserves, however, merely directs attention to an inherent defect in the statistical base for the three above-mentioned phases of rate making procedure and presents a problem requiring solution irrespective of whether we operate under the Unit system or under the old Schedule Z system.

There also remains the question whether the individual carrier should continue to duplicate the punching and tabulation work of the central board for its internal uses or whether we shall accept the possible economy of having this work done once by the central board which in turn could supply the individual company with tabulations for its internal use. This is now being done by the Massachusetts Bureau which tabulates the individual carrier's Schedule Z simultaneously with the original Schedule Z and supplies each carrier with a copy of its own Schedule Z.

In this connection Mr. Graham has apparently effected an internal economy by substituting for the various tabulating premium and loss cards of a risk usually employed for Schedule Z a single risk card as the basis of all required internal tabulations. A tabulation of risk experience to governing classification thereby takes the place of the old Schedule Z. So far as the internal uses are concerned, this tabulation to governing classification would appear to be more useful than the more accurate and refined separation accomplished under the old Schedule Z.

With respect to the internal uses of the unit reporting system, we have found that the mere listing of risks by loss ratio groups for various exposure groups has an inspirational value to the underwriting and engineering departments by bringing into panoramic review the year's results obtained by these departments. We are also planning to break down our experience for a given policy year by the year in which the business originally came to the company. This will offer information as to the character of the selection of business in the first instance and thereafter to the improvement under the company's underwriting and engineering supervision during succeeding years.

MR. A. Z. SKELDING:

Mr. Graham states that the two main purposes of his paper are "to outline first, the method adopted by the carrier with which the writer is connected to meet the requirements of the Plan, and second, the additional analysis work carried on to furnish the management of the carrier with statistics designed to facilitate the analysis and control of its business."

As Mr. Graham has adequately covered these objectives in a clear and interesting manner, and in extended detail, his paper will be read with particular interest by those directly engaged, in company offices, with the preparation and filing of compensation experience for those states where the Unit Statistical Plan is already in effect. Although Mr. Graham's paper is confined to the New York plan, any procedure designed to cover the reporting of experience under the New York plan will be equally applicable with, perhaps, some minor modifications, to the reporting of data for those other states which have adopted the Unit plan.

While Mr. Graham's paper should be of primary interest to company men, it must also appeal to those in the central organizations charged with the duty of receiving and compiling the experience of all carriers. An appreciation of the various steps required to accumulate the data in the company offices and of the various checks made by the company to insure accuracy is certainly of considerable value to the people who are engaged in the scrutiny and auditing of the data to eliminate, as far as possible, any residual errors or discrepancies.

That part of Mr. Graham's paper which makes the strongest appeal to the writer is the discussion of the numerous checks and counter-checks made by the company to guarantee that the data as filed are correct as far as is humanly possible. Apparently the procedure outlined suffices.

Off-hand it would appear that, under the procedure described by Mr. Graham, there might be some chance of all losses not being reported, due to the possibility of the actuarial department failing to prepare an employer's card where required. Also, would it not be possible for one of these cards to be mislaid or to go astray while being routed between departments? It is true, that with the system of checks outlined, these possibilities do not appear likely and perhaps the writer has overlooked that part of Mr. Graham's paper which outlines the procedure to guard against this occurrence. In view of the fact that a check up on the experience for the first eight months of operation disclosed that employer's cards had been made out in all cases where required and in view of the many checks at different phases of the procedure, perhaps it was felt that the remote contingency of the failure to make up an employer's card did not justify the expense and labor involved in this final check.

There are two points connected with the data punched on the company's Hollerith card which the writer believes warrant some discussion. Undoubtedly these points were considered when the Hollerith card was designed and there were very good reasons for the procedure adopted.

Instead of merely punching the industry group (i.e., manufacturing, contracting, or all other) as is done in column 44, we might consider the desirability of punching the industry schedule. If the schedule were punched, the cards could be easily

sorted to the manufacturing, contracting or all other groups as at present. If at some future date the industry groupings were changed for instance, by erecting another industry group, then a tabulation could be easily made according to the revised groupings. It does not appear that this would be possible under the present procedure. It is probably true that the posting of the industry schedule instead of the industry group by the coding clerks would be a somewhat slower process at the start, but experience and practice would provide the remedy.

A second point is that under the present method of preparing a risk Hollerith card by governing classification, it does not appear possible to take off experience by manual classification. The procedure adopted, of course, has its advantages. It has been necessary in the past, however, under authorization by the carriers and under certain unavoidable circumstances, for the Compensation Board or the National Council to issue a special call for experience on a particular manual classification.

We do not believe such data could be obtained from the card described by Mr. Graham. It is not always practicable, if the central organization is engaged in tabulating the experiences for all classifications, to break in on this tabulation in order to take off the data for a particular classification. This condition, however, is of such rare occurrence that, by itself, it does not offer sufficient justification for deciding that punching by manual classification is preferable to the procedure adopted.

However, it would also appear that if a rate revision were contemplated each carrier would be interested in its own experience by classification. It is realized that this information, by classification, may be obtained from other sources. Presumably, the central organization could furnish each company with its experience by classification. It does not seem feasible to design a practicable 45-column card which would enable the carrier to tabulate from its own punch cards both classification and risk experience. However, it might be advisable to consider the possibility of making provision on the punch card for determining the results of merit rating.

As previously stated, Mr. Graham's paper is concerned with the actual procedure inaugurated by one carrier for compiling compensation experience under the requirements of the New

York plan. As the writer is not engaged directly in this work, the above remarks must be considered not in the light of suggestions but rather as the remarks of a layman seeking information.

The sustained interest which obtains in a reading of Mr. Graham's paper is due to the conscientiousness and thoroughness with which the paper has been prepared. The writer would welcome a similar discussion on the part of someone connected with a multiple-line casualty company doing business in many states. Such discussion would, perhaps, bring out certain features of the procedure which are perfectly logical and efficient in the case of Mr. Graham's company, but would require modification in the case of a multiple-line nationally writing company.

AUTHOR'S REVIEW OF DISCUSSIONS

MR. CHARLES M. GRAHAM:

Messrs. Magoun, Wheeler and Skelding have made such kind and considerate comments upon my paper, that there are few points for me to discuss. I believe the Society is very much indebted to Mr. Magoun for his outline of the central office procedure of the Massachusetts Rating and Inspection Bureau, which I believe should really be offered as a paper rather than as a review.

In Mr. Wheeler's discussion, he comments on the "probable underestimation of reserves which may result from the close identification between individual risks and manual classificating rating." Realizing that this criticism might apply with considerably more force now that individual risk experience is used for both risk rating and classification rating than when risk data and classification data were filed separately, the writer has prepared some rough figures comparing the Fund's first report of 1928 policy year with the present status of the same data as corrected by the third report for the months of January to May, inclusive, and the second report for the months of June to December, inclusive. The total incurred losses reported to the Rating Board by the State Insurance Fund for the first report were about one-tenth of one percent. in excess of the current figures. A comparison of the first report of the first five months

of 1929 policy year with the second report for the same five months, indicates practically identical figures. The writer recognizes, of course, that these figures are the experience of but one carrier. The system outlined in the paper referred to, has been constructed so that open claims are reviewed before submission to the Rating Board, not only as to the reasonableness of the estimates, but also as to their adequacy.

At the time the State Fund system was set up, the question of depending upon the central rating organization for summary tabulations of the individual carrier's experience, was considered. It was felt that the Fund would be in a better position to make current tabulations of its own experience, than the central rating organization. Also, additional information not required by the Board is recorded on the office copy of the experience card. These data are punched on the Fund's Hollerith cards, and furnish information not otherwise available. This additional detail would be of considerable value to any carrier, and, I believe, justifies the work of preparing Hollerith cards which in addition, serve as a balancing medium for the experience cards before transmittal to the central office.

The Fund is now working on tabulations which will segregate the experience of the various policy years according to the year in which each risk was originally written.

In Mr. Skelding's paper, he points out that there is some chance of an employer's card being missed and the experience report to the Board reflecting no losses on the risk instead of the true loss experience. In making a general check-up of our files, we found that on the entire experience of policy years 1928 and 1929, but two cards were so missed. This was due not to an inherent fault in the system, but to failure to observe office regulations by one employee of the actuarial department. This situation has now been corrected, but it is felt that an error on two cases in over 50,000, hardly indicates a flaw in the general system.

Mr. Skelding also points out how desirable it would be to punch the industry schedule rather than merely the industry group. The writer agrees that this would be desirable, but at the present time, it is not feasible since all forty-five columns of the punch card have been utilized. It is evident that the punch-

ing of the industry schedule would require two columns of the punch card, whereas the industry group code requires but one. We are considering the adoption of an eighty column card for this work and it is quite possible that when such a card is adopted, the industry schedule will be punched in full instead of merely recording the industry group.

At the time that the Fund's punch cards were designed, separate exposure and loss cards were in use for the preparation of Schedule Z. These were discontinued on the theory that for internal purposes, the preparation of experience by governing classification was more significant than experience by manual classification with the possible exception of experience on contracting business covered by Schedules 26 and 27. It was felt further that the tremendous amount of additional work occasioned by punching experience by manual classification was not warranted by the rather nebulous value of such information on a single carrier's business. His suggestion of recording the results of merit rating on the punch card is not feasible at the present time due to the limited capacity of the card, but might well be considered for adoption concurrently with the change to the eighty column card.

The writer feels deeply indebted to his reviewers for their careful criticism of the paper under discussion. This is particularly true of Mr. Skelding's discussion in which he has pointed out at least two items which should be recorded on the carrier's punch card at the earliest possible time and which would be utilized immediately were it not for the limited capacity of the card at present in use.

A SUGGESTED MODIFICATION IN THE POLICY YEAR METHOD OF COMPILING EXPERIENCE DATA FOR THE MAKING OF AUTOMOBILE INSURANCE RATES—JOSEPH LINDER

VOLUME XVII, PAGE 225

WRITTEN DISCUSSION

MR. J. M. CAHILL:

Although it is controversial whether the advantages of the plan advocated by Mr. Linder for compiling automobile statistics on an accident year basis would outweigh the disadvantages result-

ing from such a plan, it is not the writer's intention to go into this phase of the subject but rather to confine himself to a discussion of the statistical difficulties and additional expense which would result if this plan were introduced. Mr. Linder's paper does not go into detail regarding this angle of the subject, but instead is largely concerned with outlining the plan itself and the advantages which would be derived from a rate making standpoint. The plan advocated by Mr. Linder is by no means new. It was used by one large company in recording its automobile experience of policy years 1926 and 1927, but was discarded because of its imperfections and greater cost. The comments which will be given in this discussion of the statistical problems connected with the operation of the proposed plan are based, therefore, on actual experience to some extent and are not entirely of a theoretical nature.

The adoption of the accident year method of compiling automobile statistics would introduce but little additional work in the compilation of the statistics relating to losses, inasmuch as the date of accident is punched on the loss cards at the present time. It should be mentioned, however, that the loss cards constitute only a relatively small proportion of the total number of loss and exposure cards punched.

Considerable additional work and a greater possibility of error would result in applying the proposed plan to the recording of the exposure items. Under the present statistical system the exposure is punched in terms of tenths of a car year. Under the proposed plan it would first be necessary to split the exposure by months in each of the two calendar years and then to punch these two items in separate fields. The added amount of work would vary somewhat with the nature of the exposure item, depending on whether it was an original writing, a suspension, a change, or a cancellation.

In order to assure accuracy in the splitting of the exposure on original writings, it would be necessary to have clerks insert on the cards or other records from which the statistical information is punched, the proper split in months between the two calendar years before the cards are turned over to the punching operators. This coding would also be essential in order not to slow up the punching.

It is a common practice not to record suspensions until an endorsement showing the reinstatement date and the return premium for each suspension is received in the statistical department. At the present time it is necessary to calculate from this information only the period of lay-up expressed in tenths of a year. Under the proposed system, it would also be necessary to convert the lay-up from tenths of a year to number of months and, in addition, to indicate the number of months of minus exposure in each calendar year. In view of the large number of suspensions, it is obvious that this would entail much more work and much greater possibility of error than the present method.

On changes and cancellations, the effective dates would be known and it is probable, therefore, that there would not be much more difficulty in properly recording the exposure than is encountered at the present time. The added work would result again from the necessity of determining a split of the exposure between the two calendar years.

An important point to be kept in mind from the statistical standpoint is that it is not the practice at the present time to verify the punching of all cards, but merely to employ sample verifying to determine whether the punching errors of the individual operators are less than the number which is considered to be inevitable. The complications introduced by the split policy year method would undoubtedly increase the number of errors and it would probably be necessary to increase the amount of sample verifying done in order to check the work of each operator more frequently.

It has been assumed in this discussion that only the exposure would be split between the two calendar years and that the premium for the entire policy year would be recorded as one item. To accomplish the split of the policy year exposure to its two component accident years, the necessary information could be punched on two cards, of course. The objection is the doubled expense, since twice as many cards would be used, considerably more actual punching would be required, and there would be twice as much tabulating. It is evident that if the proposed plan were to be made at all practicable, it would be necessary to record the split exposure items on one punch card. The use of one card would mean that there would be no increase in the

number of cards used or in the tabulating, provided all of the necessary fields could be added at once.

Exhibit 1 shows the punch card which was used by the company mentioned previously in recording its exposure in policy years 1926 and 1927. It will be noted that this card has separate fields for writings and cancellations. The premium items were recorded in total, but the exposure was split into the number of months in the first and second calendar years composing the policy year. As stated previously, this card was discarded because of the additional work and expense incurred by its use.

Exhibit 2 shows the punch card which is now being used by this company in compiling its automobile exposure on a complete policy year basis. It will be noted that this same card is used for automobile fire, theft, glass, tornado and collision, in addition to automobile liability and property damage. Column 28 is used to indicate whether the item is a writing or a cancellation.

The punch card shown as Exhibit 2 could be modified slightly so as to be satisfactory for the recording of the necessary information on a split policy year basis of compiling experience. The changes which would be necessary in the fields for recording the premium and exposure are shown in Exhibit 3. It would be possible to secure the additional two columns for these fields by making certain minor changes in the statistical coding plan now being used by this company.

Large numbers of cards are punched by each company in recording the automobile exposure of each policy year. It is an expensive matter to sort and tabulate these cards. In view of the large number of cards involved, it is essential from an expense standpoint to avoid, if possible, running the same punch cards through the tabulating machines twice for the compilation of experience statistics. It will be seen from Exhibit 3 that if the automobile liability and property damage exposure items are recorded on the same punch card, it will be necessary to tabulate six fields at once. Three of the fields would furnish the exposure in months in each of the two calendar years and the total premium for public liability coverage, and the other three fields would furnish similar information for property damage. Since the Hollerith machines used in most companies have only five banks for designating or adding, it would be necessary either to

run the cards through the machines twice or to employ split banks for tabulating the exposure items. If the latter method were followed, one bank would undoubtedly be used for designating purposes and two banks would be used for tabulating the public liability and property damage premium fields. A fourth bank would be split in order to wire in the exposure of the two calendar years under public liability, and the last bank would be split in order to tabulate similar data for property damage.

This procedure would have its disadvantages, since there would only be available, on the machines, places for four digit totals for each of the calendar year exposure fields. In the case of territories which develop a large volume of business, there would be grave danger of the totals in the split banks amounting to more than the figure which the tabulating machines could indicate. This danger could be eliminated, of course, by placing a limit on the number of cards to be tabulated at one time. The objection to this restriction is that the placing of such limitations on the tabulating process serves to slow up the rate at which the cards are handled and also introduces additional work in compiling the tabulated results.

If seven bank machines were installed generally, the tabulating difficulties under the proposed plan would be relieved somewhat. Since five of the banks on these machines can be used for adding, it would be necessary to employ a split bank only for tabulating the property damage calendar year exposures. The public liability exposure for the two calendar years could be tabulated in separate banks. This data would serve as a close check on the split of the property damage exposure and any serious error in the latter could be readily detected. The rental cost of seven bank machines is higher than that for five bank machines, however, and it seems probable that most companies woud not want to incur this additional expense in view of the fact that five bank machines are satisfactory for most of their tabulating needs.

In addition to the difficulties introduced in the punching and tabulating, there would be considerably more work involved in summarizing and checking the tabulated results under the proposed plan. It is very important to check the indicated average rate for each division of the experience against the manual rate, since many errors are not discovered prior to this point because,

as stated previously, only a small percentage of the actual punching is verified. To perform this check, it would first be necessary to add together the months of exposure for the two calendar years composing the policy year. It would then be necessary to convert the total number of months of exposure in the policy year to written car years before calculating the average rate. Instead of being a simple calculation as at present, under the proposed plan this check would be quite complicated.

It is obvious from the foregoing discussion that considerable work would be added to the statistical departments of the various companies if the proposed plan were introduced. The amount of work now performed by the Bureau in compiling the results of all companies would be exactly doubled if this system were introduced. The companies now have great difficulty in filing their reports on time. It is six to ten months after the year-end before the reports are filed with the Bureau and it is late fall before these reports can be compiled for review. If revised rates are to be made effective, it is desirable that they be promulgated before the end of the year in order that the renewals of the following year will be written at the revised rates. It seems probable that the proposed plan would slow up the compilation of the required statistics both in the individual companies and in the Bureau to such an extent that the revised rates could not possibly be determined in time to be available for application on the renewal policies written to become effective in the early part of the following year. This would mean that, in effect, a considerable portion of a year would be lost in the application of the revised rates and whatever benefits might result from the use of accident year data would be more than offset by the further lag introduced between the period covered by the experience and the period during which the rates would be effective.

It is the writer's opinion that the present period of unfavorable business conditions is no time in which to experiment. Several years would elapse before sufficient experience on the proposed basis would be available and there is some doubt as to whether this experience would be of greater value than the experience compiled on the present basis. It is not amiss to point out that for calendar year 1930, in spite of an increase in the earned premium for both automobile public liability and property damage,

the administration expense ratio of all companies for each of these lines according to the Casualty Experience Exhibit increased to a figure substantially in excess of the provision in manual rates. The casualty companies are suffering severe underwriting and investment losses during the present period of depression and it would be inadvisable for the companies to introduce any changes in their statistical procedure which would increase their expenses at this time without the definite promise of benefits which would justify the increased expenditure. Whether Mr. Linder's proposal meets this criterion is problematical.

EXHIBIT 1

POL. YR.	KIND OF COV.	1 2 3 POLICY NUMBER	CLASS	LIMITS P.L.	TONNAGE	LOCATION STATE	LOCATION CITY	WRITINGS: LIABILITY PREM. DOLLARS	WRITINGS: LIABILITY CAL. YR. EXPOS. IN MONTHS 1ST	WRITINGS: LIABILITY CAL. YR. EXPOS. IN MONTHS 2ND	WRITINGS: PROPERTY DAMAGE PREM. DOLLARS	WRITINGS: PROPERTY DAMAGE CAL. YR. EXPOS. IN MONTHS 1ST	WRITINGS: PROPERTY DAMAGE CAL. YR. EXPOS. IN MONTHS 2ND	CANCELLATIONS: LIABILITY PREM. DOLLARS	CANCELLATIONS: LIABILITY CAL. YR. EXPOS. IN MONTHS 1ST	CANCELLATIONS: LIABILITY CAL. YR. EXPOS. IN MONTHS 2ND	CANCELLATIONS: PROPERTY DAMAGE PREM. DOLLARS	CANCELLATIONS: PROPERTY DAMAGE CAL. YR. EXPOS. IN MONTHS 1ST	CANCELLATIONS: PROPERTY DAMAGE CAL. YR. EXPOS. IN MONTHS 2ND
0	0	0 0 0 0	0 0 0	0	0	0 0	0 0	0 0 0	0 0	0 0	0 0 0	0 0	0 0	0 0 0	0 0	0 0	0 0	0 0	0 0
1	1	1 1 1 1	1 1 1	1	1	1 1	1 1	1 1 1	1 1	1 1	1 1 1	1 1	1 1	1 1 1	1 1	1 1	1 1	1 1	1 1
2	50 DED P.D.	2 2 2 2	2 2 2	2	2	2 2	2 2	2 2 2	2 2	2 2	2 2 2	2 2	2 2	2 2 2	2 2	2 2	2 2	2 2	2 2
3	3	3 3 3 3	3 3 3	3	3	3 3	3 3	3 3 3	3 3	3 3	3 3 3	3 3	3 3	3 3 3	3 3	3 3	3 3	3 3	3 3

EXHIBIT 2

CAL. EXPOSURE MO.	CAL. EXPOSURE YR.	DATE OF ISSUE MO.	DATE OF ISSUE YR.	POLICY NUMBER	BRANCH	LOCATION STATE	LOCATION CITY	COV.	LIMITS P.L. OR C.L.P.D.	LIMITS P.D. AGE	*CLASS	TONNAGE	MERIT-INST	W.C.	LIAB., FIRE, GLASS, TORNADO, COLLISION PREMIUMS DOLLARS	LIAB., FIRE, GLASS, TORNADO, COLLISION PREMIUMS CENTS	LIAB., FIRE, GLASS, TORNADO, COLLISION CAR YRS. AMT. OF INS IN/10	PROPERTY DAMAGE, THEFT PREMIUMS DOLLARS	PROPERTY DAMAGE, THEFT PREMIUMS CENTS	PROPERTY DAMAGE, THEFT CAR YRS. AMT. OF INS IN/10	OPERATOR
0	0	0	0	0 0 0 0	0 0 0	0 0	0 0	0 0	0	0	0 0 0	0	0	0	0 0 0	0 0	0 0 0	0 0 0	0 0	0 0 0	0
1	1	1	1	1 1 1 1	1 1 1	1 1	1 1	1 1	1	1	1 1 1	1	1	+	1 1 1	1 1	1 1 1	1 1 1	1 1	1 1 1	1
2	2	2	2	2 2 2 2	2 2 2	2 2	2 2	2 2	2	2	2 2 2	2	2	−	2 2 2	2 2	2 2 2	2 2 2	2 2	2 2 2	2
3	3	3	3	3 3 3 3	3 3 3	3 3	3 3	3 3	3	3	3 3 3	3	3	3	3 3 3	3 3	3 3 3	3 3 3	3 3	3 3 3	3

EXHIBIT 3

	W.C.	LIAB., FIRE., GLASS, TORNADO, COLLISION				PROPERTY DAMAGE, THEFT			
		PREMIUMS		CAL. YR. EXPOS. AMT. OF INS.		PREMIUMS		CAL. YR. EXPOS. AMT. OF INS.	
		DOLLARS	CENTS	1 ST.	2 ND.	DOLLARS	CENTS	1 ST.	2 ND.
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	0	0 0 0	0 0	0 0	0 0	0 0 0	0 0	0 0	0 0
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	+	1 1 1	1 1	1 1	1 1	1 1 1	1 1	1 1	1 1
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	-	2 2 2	2 2	2 2	2 2	2 2 2	2 2	2 2	2 2
3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3	3	3 3 3	3 3	3 3	3 3	3 3 3	3 3	3 3	3 3

MR. CARL H. FREDRICKSON:

Mr. Linder's paper is very timely and deals with a matter which gives every casualty executive and rate maker great concern at the present moment—that of fixing rate levels. The deficiency of the present method is that conclusions regarding future rate levels are, to a certain extent, based on an estimate of the past rather than known facts.

The substitution of estimates for facts arises from the inclusion of the last policy year experience valued as of 12 months. The reason why this experience must remain on an estimate basis is that outstanding losses comprise such a large proportion of losses incurred (see Appendix "A"), and the uncertainty of the development factors. It may, of course, be argued that the uncertainties arising from these two factors are not greater than the uncertainties of what the future may bring. Still the period of uncertainty is already past history when the new rates come into effect. And furthermore, I suppose that nobody would argue for the substitution of estimates for facts if the latter were available.

The question is how to get these facts. Mr. Linder proposes a solution by the substitution of accident year for the incomplete policy year. Insofar as I am able to determine the properties for the new method, it eliminates to a certain extent the deficiencies of the incomplete policy year and is undoubtedly a superior method. It does away with the development factors and reduces the proportion of outstanding losses to incurred losses. But it does not bring the experience period closer to the effective date of the new rates based on this experience. Consequently, although the estimates of the past are somewhat reduced to facts, it does not attempt to bridge the gap of uncertainty represented by the 12 months elapsing between the experience period and the new rates. If it were possible to speed up the compilation of experience under the new method, this objection would be overcome. But there is really nothing in the new method to indicate that this could be done. On the contrary, it involves additional work as compared with the present method.

The losses outstanding at the end of the year, which are taken into account as outstanding on the accident year basis, would eventually be paid and the exact amount of the losses would be

known. It is, therefore, suggested that the experience would have to be re-run as of 24 months and 36 months. On the basis of a comparison of the losses estimated and the losses ultimately paid it *may* be possible to establish either one of two alternatives, namely, (a) a better loss estimate procedure by companies negligent in this regard, or (b) a correction factor for under or over estimates in losses outstanding.

The proposition involves, first, compilation of the exposure and the loss experience for the last accident year, and secondly, correction of the exposure and loss experience of the second and the loss experience of the third previous accident years.

The normal time for compiling automobile experience seems to be some time in April or May. Suppose that the experience were available to the Bureau as of May 1st. It would take about a month, at least, for the Bureau to combine and work up the experience into rate indications, and another month for the Bureau to decide on the rates and confer with state officials sufficiently to get permission to either decrease or increase rates. This takes us down to July 1st approximately. Any time is better than no time to put into effect something that should be, and has not been, but July 1st strikes me as being an unusually unfortunate time for a rate change. The confusion in agents' offices, the possible taking advantage of the rate situation on either side of July 1st on account of the large amount of business going through at this time, the confusion in companies' underwriting and statistical departments, and finally the undesirability of splitting up the year into two separate rate levels, are all considerations which must be given serious thought.

Provided the experience period could be changed to July 1st-June 30th the above objections would be met. The determining point, then, is only whether the compilation of the experience could be accomplished and new rates calculated in time for the following year.

I would suggest that, before any change in method is proposed, study should be given to the possibilities of taking off the incomplete policy year experience as of eighteen months instead of the present twelve months. This involves a comparatively small amount of extra work, as it is chiefly losses and cancellations for a six months' period that are affected.

In Canada we have been trying to at least partially remedy the existing unsatisfactory conditions by taking off the experience of the last policy year on an 18 months basis or as of June 30th. The advantages of this system are that it practically brings us down to 6 months between the new rates and the close of the experience period, that the proportion of outstanding losses to incurred losses is even less than on an accident year basis, that the experience for the incomplete policy year is approximately 92 per cent. complete at this time, that, of all the losses occurring normally during the first six months of the year, about 70 per cent. are taken into account, and that the rates can be made effective as of January 1st of the following year.

The reason we take off an 18 months' experience of the last incomplete policy year instead of making the experience period June 30th to June 30th is twofold. First, we would still have the large proportion of outstandings, and, secondly, so much of our business, 65 per cent., is written before July 1st that the experience would be only about 42 per cent. complete as of June 30th. I do not know exactly how the distribution of writings during the year is in the United States, but I would presume that the business is written more uniformly all through the year than in Canada where the cold winters are neither conducive for car buying nor for driving an automobile. The graphical method in Appendix "B" will illustrate the above points.

One matter that should be mentioned in this connection is that in order to enable us to compile the experience as of 18 months we have found that the only practical method is to collect the experience by way of duplicate punch cards. The method is such that the companies generally punch two sets of cards on an electro key punch at the same time, and one of these sets is transmitted to the Association monthly, while the companies use the other for their own requirements. Tariff and non tariff companies file their experience jointly with the Association under Section 69(a) of the Ontario Insurance Act, which compels adherence to one uniform statistical plan.

However, as statistical methods are more developed in the United States than in Canada, I would say that the Canadian method of collating experience is not necessary for a successful compilation of 18 months' experience in the United States. I think the effort would be worth while trying anyway.

One method, however, which I am in agreement with Mr. Linder would not be worth while trying, is to reduce the incomplete policy year to an earned basis by tabulating the earned fractions of the policy year. I believe that this method is not in any way more accurate, nor would it give any better results, than the present method. It does not reduce any of the present uncertainties and it develops a new one in the form of whether the distribution of the loss experience is in the same ratio as the earned exposure.

APPENDIX "A"

PERCENTAGE OF OUTSTANDING LOSSES TO INCURRED LOSSES
DOMINION OF CANADA

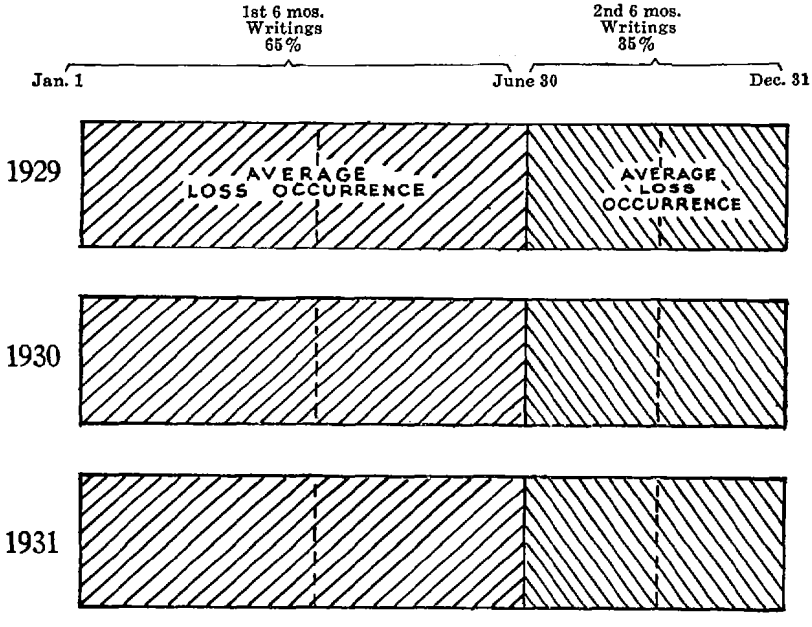
Private Passenger Coverage	1929 POLICY YEAR			Estimated for Accident Year
	12 Months Exposure	18 Months Exposure	24 Months Exposure	
Public Liability....	55.1	29.8	17.5	36.3
Property Damage..	37.2	16.7	7.1	44.3
Collision.....	23.0	8.3	3.0	26.0
Fire	24.3	7.6	1.7	26.0
Theft	26.4	8.8	2.8	29.2

APPENDIX "B"

CALCULATION OF COMPLETENESS OF POLICY YEAR EXPERIENCE

From an analysis of the statistical data it has been found that 62% of the gross premiums or 65% of the net premiums are written during the first six months of the year. This was ascertained on the 1930 calendar year transactions.

The grouping of the premium, therefore, will be in accordance with the following graph illustration:



COMPLETENESS OF EXPERIENCE AT JUNE 30TH, 1930, OF POLICY YEAR JULY 1ST, 1929 TO JUNE 30TH, 1930.

This and also the following calculations are based on the assumption that the losses occur evenly during the experience period. This assumption is verified by an analysis of the losses paid during various months of the year which show an approximately even distribution.

(1) Period	(2) Loss experience as developed up to June 30, 1930	(3) Per Cent. of Total Experience	(4) Per cent. development on 100% volume or on one year writings (2) x (3)
1929 last 6 mos.	¼ during 1929—½ during 1930	35	¾ x 35 = 26.25
1930 first 6 mos.	¼ during 1930	65	¼ x 65 = 16.25
			Total 42.50

COMPLETENESS OF EXPERIENCE AT DECEMBER 31ST, 1930, OF POLICY YEAR 1930 (JANUARY 1ST, 1930—DECEMBER 31ST, 1930)

(1) Period	(2) Loss experience as developed up to June 30, 1930	(3) Per Cent. of Total Experience	(4) Per cent. development on 100% volume or on one year writings (2) x (3)
1930 first six mos.	¼ during first 6 *mos.*		
	— ½ during last 6 mos.	65	¾ x 65 = 48.75
1930 last 6 mos.	¼ during last 6 mos.	35	¼ x 35 = 8.75
			Total 57.50

COMPLETENESS OF EXPERIENCE AT JUNE 30TH, 1931, OF POLICY YEAR 1930 (JANUARY 1ST, 1930—DECEMBER 31ST, 1930)

(1) Period	(2) Loss experience as developed up to June 30, 1930	(3) Per Cent. of Total Experience	(4) Per cent. development on 100% volume or on one year writings (2) x (3)
1930 first 6 mos.	¼ during first 6 mos. 1930		
	— ½ during last 6 mos. 1930		
	— ¼ during first 6 *mos.* 1931	65	1 x 65 = 65.00
1930 last 6 mos.	¼ during last 6 mos. 1930		¾ x 35 = 26.25
	— ½ during first 6 mos. 1931	35	
			Total 91.25

CALCULATION OF PROPORTION OF LOSSES DURING FIRST SIX MONTHS OF 1931 BELONGING TO 1930 AND 1931 POLICY YEARS

(1) Period	(2) Loss experience as developed up to June 30, 1930	(3) Per Cent. of Total Experience	(4) Per cent. development on 100% volume or on one year writings (2) x (3)
1930 first 6 mos.	¼ during first 6 mos. 1931	65	¼ x 65 = 16.25
1930 last 6 mos.	½ during first 6 mos. 1931	35	½ x 35 = 17.50 33.75
1931 first 6 *mos.*	¼ during first 6 *mos.* 1931	65	¼ x 65 16.25
			Total 50.00

In other words, of the losses occurring during the first six months of 1931 — $\frac{33.75}{50}$ or 67.5% have occurred on 1930 policy year business and $\frac{16.25}{50}$ or 32.5% on 1931 policy year business.

MR. THOMAS O. CARLSON:

Mr. Linder's paper presenting an exposition of this modification in the policy year method of compiling automobile experience is a very welcome one at this time. This is one of those proposals relating to the casualty actuarial field which have been discussed widely for years, are comparatively well known and yet have not been presented to the Society in a paper probably because they have not as yet received any widespread trial. It

is desirable that such proposals be submitted to the Society to widen acquaintance with them; out of the broader discussion may well arise valuable practical suggestions.

This proposal is one which comes up perennially for discussion among those engaged in the making of automobile rates. The author of the paper did not affix a name to it: but since it involves the splitting of exposures, and possibly premiums, compiled by policy years into the two component calendar years, and the allocation of policy year losses to the component calendar years of occurrence though at the same time keeping them distinct by policy years, the plan has been designated as the compilation of experience by "policy-calendar" year, and as such I shall refer to it in my discussion.

The advantages of the proposed method as stated by Mr. Linder are twofold: first, there is the accurate measure of earned exposure to increase the accuracy of the determination of relativity between divisions of experience; second, there is the more accurate definition of the loss trend for determination of the rate level.

I am inclined to believe the latter the more important of the two, since under the policy year method, the effect of a trend in a particular twelve-month period is diminished because the experience is halved between two policy years. Reporting of losses by accident year would eliminate this present understatement of trend. Yet, in the long run, the effect would be the same under both plans; the difference would stand out in individual years but not over a period of years. There is an increasing tendency, however, in the automobile lines to pitch the rate level at or near the level of the most recent year, that is the year with a twelve-month development. The criticism of this year for rate level purposes, as Mr. Linder points out, is directed at the inaccuracy of the statement of losses, which are on the average developed only six months. The inclusion of two-thirds again as many immature claims (the claims in the second twelve months of a policy year average in number roughly 40 per cent. of the total) would not increase the accuracy of this experience noticeably. So that despite the advantages the proposed method presents for definition of loss level trend in the earlier years, it is of little aid in determining the loss level of the year in which we are most interested for rate level purposes.

So far as the experience of this latest year is concerned, the advantage is more tangible when we consider the earned factor. The present earned factor is based upon a comparison of written pure premiums of previous policy years developed twelve months and twenty-four months, and is therefore a composite of several factors: a factor to convert the experience to an earned basis, a factor to take care of underestimate or overestimate of loss reserves, and a factor to take care of incurred but not reported losses; these factors of course cannot be segregated each from each under the policy year compilation of experience.

The two loss development components need not concern us particularly, since under any system of compilation a company should be able to establish adequate reserves both for reported and incurred but not reported losses from their experience developments of preceding years, but there is a wide margin for debate as to the extent the determination of the earned factor is actually affected by them.

The chief differences and fluctuations observed in earned factors are apparently caused by the varying distribution of exposures by month. A marked deviation, for example, is caused by the introduction of a financial responsibility law in a state, and this must be anticipated by the rate maker in the first year. The factor approximates a value of 50 per cent. in those states where cars are used the year round, while in states where severe climate curtails the use of cars in winter, the factor moves about 50 per cent.; these differences, however, are reflected in the present procedure by the use of different factors for individual states, or for groups of contiguous states where the exposures are limited.

The chief criticism of the earned factor in the past, and also as emphasized by Mr. Linder, has been founded in the deviations from the average of the smaller statistical territories. The factor is very sensitive, a difference of one point producing about 2 per cent. difference in the pure premium, and this constitutes further ground for criticism. The differences between small contiguous territories, however, are primarily due to incorrect estimates of losses or to thinness of exposure, and the indications of the experience would hardly be much more reliable under the proposed method of compilation. To illustrate, let us consider a city in which claim conditions are notoriously bad; a claim man will

tend to put a high valuation on every claim outstanding in such a city; some of these claims will be settled by compromise, and thus the pure premiums at twenty-four months and thirty-six months will be lower than that at twelve months. A pure earned factor would not aid in this situation.

We see, then, that as regards the accurate determination both of relativity between statistical territories and of the indicated rate level, the "policy-calendar" year compilation comes far from solving all our difficulties though in its further refinement of the experience it presents some advantages over the policy year method; it is not as broadly efficacious as might at first sight appear. There are, moreover, certain practical considerations, which cannot be wholly neglected: they include the increased cost of the complete "policy-calendar" year compilation, a cost variously estimated at from 60 per cent. to 100 per cent. greater than the present; the increased opportunity for errors with every further refinement of the statistics, particularly in the splitting of the exposure; and the greater delays necessitated in the compilation of the experience on this large line of business in which promptness of compilation means so much to the companies.

There have been suggestions made from time to time which might partially secure the advantages of having statistics on the "policy-calendar" year basis. One of these is that the company keep a record of exposures or of premiums by month for each state as a whole for the incomplete year, from which record the pure earned factor for each state could be calculated; this would avoid the necessity of splitting each exposure and save considerable labor particularly in the case of the fleet risks written on a "specified car" basis. Such a plan would substitute a statistical for a derived determination of the earned factor and provide an accurate exposure factor for the broader divisions of experience. Another suggestion is that losses be compiled split by accident year, a simple task compared with the complete compilation under the "policy-calendar" year method; the losses could be related to an earned exposure by accident year derived from the policy year compilation, either for the smaller or just for the larger divisions of experience. This latter suggestion is of more doubtful value than the former. There are certainly more suggestions to be stimulated by a consideration of this proposed

method of compilation, and it is possible that some partial application or substitution designed to accomplish either one or both of its two main objects would repay trial more fully than the use of the plan as presented.

MR. HAROLD S. SPENCER:

Mr. Linder does not suggest that this modification is an entirely original thought, for he writes that "an adaptation of the boiler and machinery 'object months exposed' could be utilized so as to furnish the exposure for each accident year". The casualty companies writing boiler and machinery lines are familiar with this method and the suggestion that this be adapted to automobile liability, property damage and collision, three important lines with many casualty companies, naturally creates a certain kind of interest.

At almost any time and certainly during the present period, any suggestion of a major change in experience methods must be subject to challenge. Two important questions are sure to be asked:—"How much additional labor, equipment and expense will be involved in making such a change? Will the value of the results be commensurate with the time and money expended?"

In Mr. Linder's paper he has emphasized that "Instead of recording a single exposure (on the punch card or other medium) as at present, two exposures representing the accident year in which the policy was written and the succeeding accident year, would be recorded (on the *same* punch card or other medium)". It seems probable that the author was considering the possibilities of the eighty-column punch card in making this statement, for it is seemingly impossible for many companies to insert this additional information on the same forty-five column punch card which is still being used by them.

In one large company there is approximately one and one-quarter million premium entries annually on these automobile lines which require punching, filing, sorting and tabulating. Assuming that a new punch card could be prepared for the purpose of showing the object months exposed, the Hollerith exposure analysis work would be doubled and in the same proportion additional filing equipment would have to be procured.

The preparation of the statistical data is no inconsiderable item. Mr. Linder writes that "with more than 75 per cent. of the experience recorded in car-year units, this split could usually be determined by inspection". It is admittedly a comparatively simple matter to make a split of the object months exposed on applications which are written to cover one or two cars for a period of twelve months. A certain amount of confusion arises on policies which are dated in the middle of the month or for short terms. We may also visualize difficulties arising in connection with suspensions, changes and cancellations. Fleet risks and policies which frequently add new automobiles and cancel other cars, bring added difficulties. Mr. Linder does not clearly state whether his suggested plan is limited to private passenger cars or whether it includes commercial, public, dealers and miscellaneous coverage as well.

If his suggested modification is all inclusive, we may foresee added difficulties. Such policies as are based upon payroll, cost of hire, livery earnings and mileage would necessitate not only a division of the original exposure but a split in the audited figures as well. This contemplated modification, therefore, would not only affect the work of the clerks preparing the original statistical data but also the work in those departments engaged in preparing records of changes, suspensions, cancellations and audits.

Let us consider one or two matters in regard to experience compilation and filing, assuming for the moment that the plan has been put into operation, the clerks in the different departments have determined the various splits which are being recorded on the exposure records, a new Hollerith card has been prepared and is being used, additional Hollerith equipment has been furnished to house and handle the analyses and the statistical department is ready to assume the additional work.

The Hollerith department in due season forwards two sets of experience analyses to the statistical department. One analysis is identical with that of former years and provides the usual policy year figures; the second is a supplementary analysis of exposure by object months. The totals of exposures in both analyses should agree. In the posting process of the regular experience, the usual errors are detected and corrected, but now

care must be taken to see that corrections are made on both sets of experience for eventually two analyses must be combined satisfactorily into one experience.

Additional labor does not expedite reporting and it seems probable that the suggested modification would materially delay the filing of the automobile experience.

Mr. Linder admits that the proposed method would not remedy inaccuracies of loss valuation and therefore the loss figures need not be considered in this discussion. He stresses that "the proposed method—furnishes a more accurate measure of exposure for divisions of premium" and it is probable that this might be admitted. But even the most optimistic would probably admit that the experience at the end of the accident year would not be ideal. An examination of journal entries during the first half of any calendar year will disclose a very large number of items which are assignable to the previous accident year and occasionally to the accident year of two years ago. These items theoretically should have been included in the accident year's experience analysis but cancellations and changes cannot be immediately recorded and naturally it requires several months for audited figures to be recorded on the books.

If, then, we are willing to admit that the exposures would be more accurate than at present, there is still a pertinent question as to whether the results would be worth the amount of time, labor and expense involved.

AUTHOR'S REVIEW OF DISCUSSIONS

MR. JOSEPH LINDER:

I am very much gratified at the discussion elicited by my recent paper. Occasionally a paper justifies itself by the criticism it evokes. My paper probably (and properly!) belongs in this category, since I was not aware that the proposed plan had actually been tried out and discarded, as Mr. Cahill informs us. One of my aims in writing the paper was to stimulate discussion and to that extent I feel amply repaid.

Mr. Cahill's discussion is a thorough and competent presentation of the mechanical problems raised by the proposed plan. I am sorry that Mr. Cahill did not present some data giving a comparison of expenses and losses entering into the calculation of

pure premiums under the present and proposed methods. It would seem that sufficient data is already available to assist in determining whether a change in procedure "would justify the increased expenditure." Also, Mr. Cahill's statement that "the amount of work now performed by the Bureau in compiling the results of all companies would be exactly doubled if this system were introduced" is open to question.

Mr. Frederickson makes the suggestion that the incomplete policy year be utilized as of 18 months instead of as of 12 months as at present. As with his suggestion that the policy year run from July 1 to June 30 instead of from January 1 to December 31, Mr. Frederickson notes that probably the only satisfactory method would be by means of a duplicate set of punch cards. This would add a considerable burden onto the central Bureau and would probably not afford the carriers any relief, since the individual company tabulations would in most instances still be desired. The proposal to utilize the incomplete year as of 18 months raises the question of the influence of seasonal variation in both accident frequency and accident severity.

Mr. Carlson, in the latter part of his discussion, gives consideration to a partial adoption of the plan. It would be very interesting to see an exhibit of the results obtained under various methods.

Most actuaries will probably agree that the present policy year method is not entirely satisfactory and can be improved upon. Whether such improvement can be accomplished at a reasonable expense is still an open question.

THE PLACE OF CONSERVATION IN INSURANCE—ALBERT W. WHITNEY

VOLUME XVII, PAGE 231

(WRITTEN DISCUSSION)

MR. WILLIAM BREIBY:

Mr. Whitney in his interesting paper presents a general survey of the underlying reasons for insurance carriers engaging in activities intended to prevent or postpone the happening of the eventuality insured against, and of the logical development of

those activities. He points out that there is necessarily a time-lag between an effected saving in loss before that saving is reflected in a reduced premium charge to the insured; that the carrier profits by the success of those activities only until the saving is absorbed by reductions in the premium charges, that eventually a static condition will develop, when the cost of the activities equal the savings effected and when the cost will have been gradually transferred to the insured, unless interfered with by unwise laws or state action. Mr. Whitney concludes with an implied plea for all the lines of insurance carriers to extend their conservation, or prevention, activities, striking the humanitarian note in conclusion.

In order to make his treatment of the subject fully comprehensive, Mr. Whitney includes life insurance. My discussion shall be more particularly in the way of emphasis of the difference between the logical attitude of the life insurance companies and of all other kinds of insurance companies toward conservation or prevention activities. However, there are one or two other points which I think it well to refer to and possibly indicate a viewpoint different from that of Mr. Whitney.

I do not think the facts justify us in saying that "the saving of life has entered into the consciousness of life insurance underwriters as part of their job," nor that "conservation (as an activity of life insurance companies) has come to play any important part in life insurance." Not that the individuals conducting the life insurance companies do not have the personal consciousness of humanitarian and economic responsibility corresponding with that of the managers of other insurance lines, or of other thinking public-spirited persons, to aid in preventing loss of life and in improving the general health of the people, but that the opportunities and reasons for such activities are not as patent.

With the exception of the Metropolitan Life Insurance Company, and more recently the John Hancock Mutual Life, little, if anything, is done by the life insurance companies in the way of systematic life or health conservation. The activities of these two large industrial life insurance companies are mainly in connection with the industrial policyholders, whose numbers are of course stupendous. These activities consist of free nursing service, cooperation with local health bodies, and distribution of

literature calculated to educate the policyholders in better and more hygienic living. The radio broadcasting of morning "setting up" exercises by the Metropolitan is also of course directed towards conservation of health.

Several of the companies offer some facilities for periodic physical or medical examination of its ordinary policyholders, but few if any of them now conduct any vigorous campaign for the purpose. In fact, the activities of most companies in this respect are less than they were a few years ago. Recently some few companies have deemed it expedient in isolated cases of claims under the—now much discredited—total and permanent disability benefit provisions, to defray the expense of medical, surgical or sanatorium treatment, in hopes of being relieved of continuing disability annuity payments indefinitely. By such aid a life company might also postpone the payment of the death claim, because, as a rule, the life policy continues without payment of premium during the period of disablement. This, however, has not become a general practice and probably will not, now that many companies are either withdrawing from, or curtailing, the disability annuity—or pension—coverage.

Though, no doubt, the Metropolitan with so large a proportion of the population of the country as its policyholders, largely of the class which would not otherwise acquaint itself with the best modes of living nor have the means of providing desirable nursing attention, and realizing that through its extensive agency system it has an *entrée* which no other organization enjoys, even that of the government, feels a certain social responsibility for the welfare of that vast army. Nevertheless, much of that activity is a most potent advertising medium, even if that be not the compelling motive or incentive. The managers of other life companies, with ideals as high and with a sense of public responsibility as deep as those of the managers of the Metropolitan, hold the conviction that it is not the function of their companies to conduct such activities.

That these activities of the Metropolitan have had the effect of prolonging life, especially at infancy, and of extending the average lifetime of its industrial policyholders as well as that of other groups influenced thereby, I think is unquestioned. However, there is no convincing evidence that the Metropolitan has

actually saved money thereby. I am not referring to the immeasurable value and benefit of those services to the community, but to the dollars and cents savings to the Metropolitan over the cost of the activities. There are too many other influences and factors entering in to permit of the accurate valuation. There have been other powerful agencies, entirely independent of the life insurance companies, begun long before the Metropolitan began its activities, which have been operative along those lines. In this connection it is interesting to note that, though the Metropolitan's improvement in industrial mortality since beginning these activities has been greater than that in the general population, the other large industrial life insurance company, the Prudential Insurance Company, which has not undertaken such activities, has experienced an improvement in mortality corresponding in general with that of the Metropolitan. Some of the Prudential's improvement might be the result of the Metropolitan's activities, but it is most unlikely that all of it is.

There is a point of view in connection with the advisability of a large life insurance company, with policyholders numbering upward of one-fifth or one-fourth of the population of the country, engaging in such an extensive way in social welfare activities, which might be considered the responsibility of the state. That is, it might encourage agitation for the state to take over the operation of those large companies, on the grounds that they have already usurped functions of the state though they are not responsive to the public will through the proper channels, namely through the electorate. Though we all accept today as proper state functions many activities which a few years ago we stigmatized as "socialistic," most of us here, I dare say, are not quite ready to concede that our large life insurance companies should be absorbed by the state.

This consideration has probably had little if any weight in the general attitude of the life companies' refraining from entering into conservation in the sense implied by Mr. Whitney. The probable reason is that the practicability or desirability of it from the point of view of saving money has never been present as it has in the other lines of insurance. As suggested by Mr. Whitney, in his reference to the usual long term character of the life insurance coverage as contrasted with the short term

character of the other lines, no activities can prevent eventual death; the best that can be expected is postponement of death. Consequently, speaking most generally—because if all life insurance were term insurance, it would not apply as fully—the effect of such "conservation" on the life insurance companies would merely mean the postponement of the claim loss and not complete relief therefrom. In other lines, the activities are intended to and result in the company not having certain losses which it otherwise would have.

The marked difference between the character of, and the public official attitude toward, life insurance as distinguished from that applying to other lines of insurance, forces a different point of view as to conservation. The public attitude, reflected through the legislatures and state officials, toward life insurance companies, is to require them to charge redundant premiums and to carry reserves on mortality tables which are known to provide for heavier mortality than is normally to be expected. Despite the great improvement in mortality which has taken place over the past generation or two, the states have been reluctant or slow to amend their laws to permit the non-participating life insurance companies to charge lower premium rates which would be more consistent with the demonstrated lower mortality. Witness also the attitude of the insurance commissioners in connection with the total and permanent disability coverage; recently setting forth rules requiring the life companies to restrict the benefits and in effect to charge higher premiums because the companies had been experiencing losses under the old method.

In the case of other lines of insurance, more particularly fire insurance and workmen's compensation—probably because of the greater public consciousness of their need—the attitude has been quite the reverse. There is constant agitation and legislation aimed to reduce the insurance premium rates, even when the companies can demonstrate that they have been suffering "underwriting losses." These other lines are forced to take steps to cut down their losses.

In other lines of insurance, with the possible exception of personal accident and health, the "prevention" measures are applied to individual risks and immediate results can be expected. In life insurance, and in personal accident and health insurance, the

activities would necessarily have to be general. With the possible exception of direct attention to some comparatively few cases of disability claims, it would be impractical to follow the individual risk. It might be that the premium for some of the policies of very large amount would permit of some expense being incurred in an endeavor to guide the individual insured in more careful living. But not only could no coercion be applied, as in other lines, by threat of cancellation or refusal to renew, or by increase in premium, but it would be impolitic, because the individual would resent any such interference with his personal affairs.

Where, therefore, the activities would have to be applied generally, the "returns" in the way of benefit to the individual life company, or to the companies collectively, would be negligible in comparison with the cost, and at best long deferred. It would not pay. It would be like spending money to heat the great outdoors in order to keep your house warm. Some day our ingenious scientists may bring that to us, but it will be through collective or community enterprise, not by the individual householder.

I do not think Mr. Whitney adds anything to his general thesis by his reference to, or instance of, life insurance, beginning on the top of page 233. Even in an academic discussion of insurance principles it is generally objectionable to center attention on a single risk. It leads to confusion. Life insurance, as well as other insurances, is only made practically possible by the inclusion of large numbers, so that the law of averages may be operative. Of course Mr. Whitney instances a single life as representative of the whole, but then makes the rather confusing statement: "If he fails to reach this point (his "insurance expectancy") the loss will have to be made good by the accumulations on the policies of those that have lived longer." But who are those who have lived longer, if their representative, or "average case," has lived short of his "insurance expectancy"? The company does not break even, or make or lose money on a single case. In fact it is not concerned with the single case. Its concern is with the experience of the whole. I think that if it were desirable for completeness sake, to include life insurance in the demonstration, it would have been better to have adhered more closely to the fundamental basis, that is large numbers. To me it would

have been more clearly convincing if the example had read somewhat as follows: "If the life insurance company could by its efforts bring about that a smaller number would die in a given time than otherwise expected, or provided for, a benefit clearly accrues to it." But the reverse would not necessarily be true, because of the make-up of the life insurance premium. A life insurance company does not necessarily "lose" money even if its mortality be somewhat higher than provided for by the basic mortality table. Interest and expense are integral elements in the make-up of the premium. Interest beyond, or expense less than, that provided for in the premium might offset the "mortality loss." This again emphasizes the difference between the life insurance business and that of other insurance lines. In other lines there is a distinction between the "underwriting" and the "investment" operations, so much so that it had almost become the practice among some insurance carriers to accept an "underwriting loss" as inevitable and to rely on "investment" operations for any company profit.

There is also another feature, incident to life insurance, which distinguishes it from other lines. That is, that owing to the policy reserves, an essential feature of level premium life insurance, the amount "at risk" is only the difference between the amount payable as a death claim and that reserve: the reserve being the self insurance provided by the insured.

In life insurance we can hardly refer to a "time-lag" between the effecting of the saving and its reflection in the premium charges—"manual" rates. It has only been by hard struggle that non-participating companies have recently been able to induce some of the states to permit them to base their premium rates on a table of mortality based on the experience in the years 1900 to 1915, though mortality in general has much improved in the intervening years (from 15 to 30 years). And in the other states the companies must charge gross premium equal to or in excess of those called for by a mortality table made up from mortality experience which applied more than seventy years ago. Seventy years is quite a "time-lag."

Mr. Whitney's subject and his general treatment is so interesting and valuable for the desirable, though possibly somewhat abstract, consideration of some of the phases of the insurance

business, that I almost wish that he had left out all reference to life insurance. I think there is little hope that the life insurance companies can be enlisted in any campaign of "prevention" or "conservation" on the grounds of self interest.

In connection with the general subject matter of the paper I would point out that Mr. Whitney has reference throughout more particularly to stock or non-participating companies. The time-lag between reduction of loss and its reflection in the charges to the insured, and the interim gains or profits to the carriers, refer to stock or non-participating companies. In mutual companies, there is no "profit," and reductions in loss, through whatever agency they may have been effected, are passed on to the insured immediately upon being ascertained, through the "dividends" paid or by "reductions" on renewal. This assertion is correct in principle even though the determination of the policyholders' "dividend" or "refund" be not accurate or equitable to the *n*th degree. Of course, even for mutual companies, the "manual" rates will not immediately reflect the savings.

Much of the activities along the lines of prevention and conservation, worthy and necessary as they may be, are activities which an enlightened public mind should require the state to perform efficiently: such as reduction of fire hazards, safeguarding property, safeguards in factories, mines, etc., boiler inspections, elevator inspections and so on. Most of the states have agencies operating along these lines, but the insurance companies do not trust to them completely; they have not been thoroughly efficient nor entirely honest. These company activities have encouraged, if not originated, a public attitude which is wrong, namely that those matters are solely the insurance companies' responsibility. The public sees the benefit, or saving, to the insurance companies, but cannot or will not see the great public benefit, and hence does not fully sense its own responsibility.

Laws taxing the insurance companies specifically for public welfare activities, such as those taxing fire insurance companies for the benefit of exempt firemen, or for some of the expense of fire departments, or along similar lines, are wrong in principle. The public is the direct beneficiary of public welfare activities undertaken by itself or by private agencies. The insurance companies are only incidental beneficiaries. The insurance companies

render a worthwhile service in the distribution of the concentrated loss. They should not be required to perform functions of the state or community. The public already owes much to the insurance companies for the reduction of loss of life, limb and property. Despairing of the Utopian state of a fully awakened public consciousness of its own responsibility, the insurance companies will have to continue their activities for their own protection.

Were it not that it would be merely a "counsel of perfection," and disregardful of the exigencies of the case, I would rather advocate that all lines of insurance carriers should be relieved of the burdens of "conservation," and have the public assume its proper functions; leaving it to the insurance carriers to join the other good citizens, as part of the public, in doing their part in the alleviation and prevention of suffering, distress and waste. "The Mills of the Gods grind slowly." So we will probably have to wait until the static condition matures, to which Mr. Whitney alludes, before we can hope for the public to directly assume its full responsibility, whether it then be conscious of it or not. In the meantime, the stock companies will continue to stress their "conservation" or "prevention" services, and the state funds and mutual companies, their lower costs.

MR. RALPH H. BLANCHARD:

In discussing a paper one usually has the satisfaction of indicating certain errors of fact or theory. In the present case, one can only indicate agreement with the conclusions of Mr. Whitney, and support his emphasis on the increasing importance of conservation in insurance.

But this seems to be an opportune time briefly to discuss certain thoughts which may supplement this altogether excellent paper:

I. Attempts are made in various sorts of insurance to measure the effect of preventive activity. To the extent that credit is given in advance, by means of schedule rating or otherwise, for the expected effect, the insurer does not directly benefit through reduced losses. Here preventive activity, considered narrowly from the point of view of the insurer as a commercial enterprise, is chiefly a competitive weapon.

II. One often hears the proposition advanced, in opposition usually to proposals for new forms of social insurance, that "what we want is prevention, not insurance." This argument comes perhaps most frequently from insurance men. Whatever one may think of a given proposal on other grounds, this attack seems to be fallacious, particularly if it is accompanied, as is often the case, by calculations to show that the insurance will prove enormously expensive.

Insurance develops knowledge of the existence of hazards and indicates their relative importance. It furnishes the best possible basis for approaching the problem of prevention; and, because of the efficacy of prevention in lowering insurance costs, the greatest possible stimulus to preventive work. Further, the effectiveness of the stimulus bears a direct relation to the efficacy of given preventive efforts. In other words, the greater the loss one can prevent by given efforts, the greater the reward in reduced costs, and hence the greater the stimulus to activity.

Not only does the application of insurance to a particular hazard problem tend to develop preventive work and to put it on the most effective basis, but, to the extent that the preventive work is successful, the cost of insurance and the burden of its requirement is lessened.

Prevention and insurance are not mutually exclusive nor alternative methods of approach to a problem of hazard; they are complementary and mutually helpful.

III. During the past two years of depression, the statement has frequently been made, and often by prominent business men, that our present commercial, financial and industrial system is on trial. Some have expressed doubt as to the result of the trial.

With the growth of corporate enterprise, the gathering of individual corporations into groups under common management, and the development of cooperative activity by affiliation for the promotion of common interests, private initiative has created organizations which, in size and importance, outrival many political units. Inevitably the question arises whether these institutions are to continue to furnish the services for which they were organized. There is, and will be, agitation for governmental activity to supplant them in whole or in part. And this is particularly true of the insurance business. In addition, groups

within the insurance business have been formed, based on varying theories of organization and operation.

If insurance, whether private or governmental, is to render the greatest service to the public, it must, as the institution best adapted to it, develop preventive work, both intensively and extensively. And it seems to the present writer that institutions will be judged more and more in the future on the basis of their contribution to public welfare, rather than on the basis of their success in partisan warfare. Even success in partisan warfare might be promoted by greater attention of each party to increasing its own merits, rather than to pointing out the defects of its competitors. Many movements and institutions have been nurtured largely on attacks which have brought public attention and sympathy.

The institution of insurance and its constituent parts can hardly make a more effective plea for public approval than by supporting work which will reduce losses, decrease the cost of insurance, and, by decreasing the hazards in certain directions, pave the way for the extension of insurance in others.

MR. C. A. KULP:

Not only for the public but for those more directly connected with the business of insurance Mr. Whitney has done a service in this brief and lucid critique of the relation between conservation or loss prevention and insurance or loss indemnity. It is the current custom to use the two rather indiscriminately, or at least as if they were only two closely similar phases of the same institution. Mr. Whitney does not say so, but I seem to read between his lines an intimation that this confusion does no good and may even do harm to the cause of prevention. It is too often assumed, by company executives as well as others, that considerable savings from loss prevention activities are a mere matter of emphasis, and that lower loss ratios will be the nearly automatic product of spending more money, printing more placards, holding more pep meetings, and building up larger safety-first organizations.

Mr. Whitney points out very clearly that the question of the feasibility of expansion of loss prevention activities is more fundamental than is comprehended in this simple point of view.

Loss prevention is to be sure a matter of money, and in its early stages, when you can show concretely to the insured the dollars he can save by following this or that recommendation, a relatively simple matter. When, however, the intrinsic risk of the insured, as in workmen's compensation, has increased so greatly as to absorb all the savings of prevention work and this work begins literally to cost someone money over and above its economies, the whole question becomes one of concern for company, insured and public. Mr. Whitney does not stop to do it, but one may raise a number of sub-questions that go to the very basis of the prevention function. What incentives can we devise to encourage a risk to go on doing good beyond the point where good-doing adds to net income? Should we perhaps segregate that part of the premium which is expended for prevention and show the insured graphically that he is paying for two services and getting them? Is it good psychology to make people believe that the mere entry of a risk into an insured group is likely to produce a lower loss cost? Most important of all: what are we going to do with the small risk, to whom we are not able to offer the saving incentive even in the early stages?

I am not able to follow Mr. Whitney in all of his side arguments and *obiter dicta*, though these with one exception are of minor importance. There is, it appears, a bit of special pleading for a more liberal attitude by state insurance commissioners in their policies on expense loading limitations for casualty companies. (The principal criticism by the companies has been, one might observe, not that the total loading is too small but a particular part of it, that for acquisition expense.) But I doubt very much if any advantage would be gained by going back to a policy of *laissez faire* in rate regulation and in view of the pitch of competition between casualty companies, there are possibilities of grave loss. Nor is comment on this section of Mr. Whitney's paper extraneous, for he later on insists on the broad social interest and implications of all prevention work. If in the future the private companies are unable to continue this work without impairing their first and principal purpose, the only logical agency to carry on appears to be the state. The only other alternative would be to have the state subsidize, directly or indirectly, the companies for deficits incurred in their non-

insurance functions. In either event, the casualty insurance business will be in for more social regulation, not less. One cannot logically expect the state to extend its sphere in one direction and narrow it in another.

AUTHOR'S REVIEW OF DISCUSSIONS

MR. ALBERT W. WHITNEY:

I am pleased to find so general an agreement among those who have taken part in the discussion of this paper with regard to the theory and the importance of conservation. This does not leave a "rebutter" much ground in this part of the field. The disagreement appears to be with regard to the scope of its application. Mr. Breiby feels that if lives are to be saved it should be done specifically as life saving and not as insurance. He objects even to have life insurance used as an example. In passing I must insist, however, waiving all other questions, that the statement that he particularly objects to on page 233 is correct actuarially. Insurance is based upon probabilities but the probabilities in insurance are had by ascribing to each single risk, in advance, the qualities of the average risk. It then becomes possible to compare the performance of a particular risk with the performance of the average risk which serves as type.

It was not within the scope of my paper to advocate or even to discuss the practicability of applying conservation to life insurance. The only statement that I made was that a consciousness that life saving was part of the insurance job had struck life underwriters (so far as it had struck them at all) only very recently. However, I should not at all mind having to defend the thesis that conservation in life insurance was desirable both from an economic and from a social point of view. The companies that are doing the business that way seem satisfied that they are doing it on economic grounds. Witness Mr. Craig's paper before the International Congress of Actuaries, June, 1927. There would seem by *a priori* reasoning to be a good deal of margin for such work. If the average lifetime of the assured could be increased one year, for instance through a judicious system of periodical medical examinations, (which it is not at all unreasonable to believe) it would mean, in an ordi-

nary life insurance policy of $10,000 the setting free of a sum of $600 or $700, made up from interest accumulating during the added year and from the payment of an additional premium. A great deal of medical attention can be given with that amount of money when the service is handled in a thoroughly organized way.

If it can be shown that conservational work in a given field produces a saving and if this work can be done with the full approval of the assured then there can certainly be no question of the advisability or even the moral obligation on the part of the company to carry it on, particularly since conservation not only means a saving in money but a saving in some cases, as in life insurance, of values that far exceed those that can be measured in money.

Anyone who knows the most recent tendencies in the economics of medicine will realize how very much to the point it is for underwriters to be thinking about the relationship between insurance and medicine.

Mr. Breiby raises the question of "heating the great outdoors", of time-lag and of the applicability of the argument for conservation to mutual companies.

Even "heating the great outdoors" pays in some cases. Both the Save-A-Life work that I referred to on page 236 and the educational work that the National Bureau is doing are on a perfectly general basis and yet they are absolutely worth doing because of their economic value to the Bureau companies. Similar work in the fire field is being done by the National Board of Fire Underwriters. Where one company cannot afford to undertake work of a general character, it is often feasible to have it done through such a group effort.

In life insurance the time-lag is exactly the time that elapses before the mortality table catches up with the facts, seventy years it may be, so that in life insurance we get the supreme conditions for capitalizing conservational activity.

What I had to say applies equally well to mutual companies as to stock companies. In the case of stock insurance the savings during the time-lag go to the stockholder, in the case of mutual companies to the policyholders. The principle, however, is exactly the same and the economic inducement is the same.

Mr. Blanchard's points are interesting. Merit rating is in

effect a system by which the interest of the assured in prevention is bought through the anticipated sharing of profits, not the profits of the group but the profits that should go to the assured individually. It has a competitive value; that is, it provides a basis upon which competition can operate, but its chief value is in getting the assured himself aroused.

It is interesting that all three reviewers have referred to the effect of conservation upon the question of state insurance. Mr. Breiby feels that the companies by going into conservational work may tempt the state to undertake the work also and perhaps take it away from the companies. My reaction would be exactly the opposite, namely, that the state if it found that the insurance companies were not developing the conservational side of insurance, would turn them out in order that the business might be more effectively developed.

From the standpoint of the companies themselves, the most important aspect of conservation is undoubtedly its effect upon the public. The public has come to a time when it is going to insist that the greatest possible economic and social results shall be had out of the conduct of the world's business. If these can be had through the operation of private business, well and good; then we shall go over into a more socialized period through the orderly development of all the very great possibilities of our existing system. If private business is not so developed as to produce the highest economic and social results, then the public is likely to resort to more extreme measures such as setting up the state in business. The capitalistic system is on trial today as never before, and if insurance desires to avoid being taken over by the state, the best thing it can do is to produce every last ounce of economic and social effect that can be had under the present system. One of the great values of the conservation movement is as a means of demonstrating that private insurance has potency as a social instrument.

Mr. Kulp asks what is to happen after the static condition has been reached, when what is gained through saving is equal to the cost of making the saving. The assured should make no objection to having the conservational cost passed on to him up to this point but he will presumably object to going beyond. In a field in which the values are purely economic, it is hard to

imagine conditions under which prevention should be carried further. In a field in which there are other values, human values which are not readily measured in money, he will be willing to go further only as these values appeal to him. It is doubtful as a matter of fact whether preventive activity can be expected in general to go beyond this point. To the degree to which extra-economic values are potent there will be a tendency to find a way to give such values further economic recognition.

I agree with Mr. Kulp as to the difficulty of the small risk problem; the small risk is the *"enfant terrible"* of the insurance business. "To him that hath shall be given" is true in casualty insurance in the form "To him that hath a sufficient experience shall be given a merit rating that will be an inducement for the exercise of preventive activity and to him that hath a sufficiently large business to make the premiums pay the cost shall be given preventive service". The small risk has however neither experience on which to base a lower rate nor will the possible savings justify the insurance company in incurring the expense that is necessary to bring about the improvement. It seems as though small risks as a matter of necessity must find their salvation therefore on a group basis. Their experience must be combined to produce a dependable average and they can look for lower rates only as the results for the group improve. Until the small risk can emerge from the great mass of other small risks in such a way as to demonstrate its superiority, it would seem as though the conservational action of insurance would have to be exerted on the group.

With regard to the regulation of expense loading, I am not advocating the abolition of all regulation but a discriminating latitude that will let the companies develop their conservational activities to the utmost.