

VOLUME XXXIII

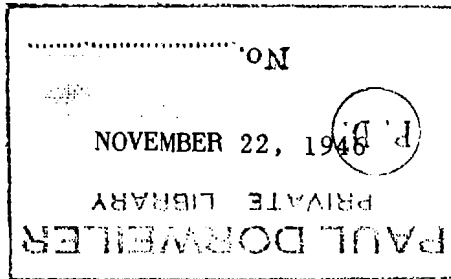
NUMBER 63

PROCEEDINGS

OF THE

Casualty Actuarial Society

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NOTICE

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

"The lightning spark of Thought, generated or say rather heaven-kindled, in the solitary mind, awakens its express likeness in another mind, in a thousand other minds, and all blaze up together in combined fire."

Thomas Carlyle

P R O C E E D I N G S

NOVEMBER 22, 1946

SOME PENDING PROBLEMS

PRESIDENTIAL ADDRESS BY CHARLES J. HAUGH

Since opinions expressed at meetings of the Society are the personal views of the individual members and not necessarily those of the organizations with which the members are affiliated, the Society affords each of us opportunity to express his views unhampered by questions of company or organization policy. In the fervent hope that this statement is, in fact, true, I should like to urge upon the membership of this body serious consideration of a few problems which call for early solution and which, perhaps, might most readily be solved after uninhibited discussion. I do not expect them to be discussed today (I presume any discussion of a presidential address would be in the nature of high treason) but I do urge serious consideration of these problems and would welcome a free discussion of them after opportunity has been afforded for careful consideration of all that is involved.

One of the most serious problems confronting casualty insurance companies arises out of the growing trend toward the adoption of programs of compulsory non-occupational disability, medical, and hospitalization benefits. In the coming year when the Congress and the legislatures of 44 states will be in session, it may be anticipated that some such program will be among the subjects under consideration in a number of these legislative bodies. There may be a variety of schemes suggested and I presume all of them will be labeled "insurance" regardless of whether they are in fact to be established on a sound insurance basis. Up to the present time many of the advocates of this type of legislation appear to have assumed that only governmental bodies are willing or should be permitted to write such insurance, even though many of them recognize the tremendous amount of coverage already in effect today on a voluntary basis through group plans, hospitalization plans, and individual policies.

Where do the established insurance companies fit in this picture? Consideration of this question immediately raises another - will established insurance companies write this form of insurance? A categorical answer to this cannot be given offhand. The writing of such insurance presents some very difficult problems for which solutions are not readily apparent. I recognize that cas-

ualty insurance has been confronted with difficult problems in the past and has solved them. The time has arrived to repeat that performance. The problems are there - it's up to us to recognize and solve them.

When workmen's compensation insurance was first introduced into the United States, there were those in the insurance business who looked upon its introduction with dismay and who doubted the feasibility of its being written by private carriers. Dismay is abroad again and similar doubts are expressed today with respect to compulsory medical, hospital, and disability insurance. Before we succumb to this attitude, let us be sure we have not been overawed by the magnitude of the problem. If, after careful consideration, it is concluded that private carriers cannot write this business, that conclusion should be accepted with the realization that the carriers not only may be eliminating themselves from this field, but are establishing a pattern whereby they may be eliminated from the writing of group insurance and, what is far more important to the casualty companies, ultimately may be eliminating themselves from the writing of workmen's compensation insurance. By way of emphasizing this other horn of the dilemma which confronts us, it should be noted that private carriers now write workmen's compensation premiums in the amount of approximately 500 million dollars a year; hospitalization plans develop annual premiums conservatively estimated at 150 million dollars; and group accident and health premiums amount to approximately 200 million dollars a year.

Like many other businesses, casualty insurance is faced with increased costs of operation. Wage levels are substantially higher than at any time in the past and it may be anticipated that there will be no decrease in that level in the near future. An acute shortage of clerical help still exists, but the amount of detail to be handled increases necessitating overtime work at increased rates of pay. During the war lack of personnel forced the carriers to curtail the keeping of statistics. Expansion of that curtailed statistical program has greatly increased the volume of work, but the necessary increase in personnel has not been realized.

In order to meet these conditions, the business must review operating methods and procedures, not only within the companies, but within rating organizations and must eliminate that which is not essential. I do not for a moment mean that we should lose sight of the primary objective of ratemaking which is to establish a premium which as closely as possible reflects conditions existing in the individual risk. I do mean that we should eliminate the recording and compilation of data which may be interesting, but are inessential, and that we should review rating and ratemaking procedures with the purpose of simplifying them wherever possible and of eliminating any unnecessary refinements.

I have no desire to decry accuracy in the compilation of data or in the development of rates, but I do urge that in considering

ratemaking and rating procedures, we pause to weigh the cost of the several steps in our procedures against the results obtained. It may be that some of our efforts to attain perfection may cost far more than the loss arising from any error which the process is designed to eliminate.

In theory, one can make a very good case for establishing a statistical procedure under which separate experience is to be recorded and compiled for every separate classification in every line of business. After that has been done, there then arises the very difficult task of attempting to interpret the results of a tremendous number of pieces of business each too small, in itself, to be given any credence. The work of separately recording and compiling this mass of data ultimately may be found to have created the additional task of putting the data together again.

Ratemaking and the statistics leading up to the development of rates are not the only aspects of the business to which some simplification must be applied. The voluminous reports which insurance companies must make to various governmental bodies, rating organizations, et cetera, are staggering. I do not for one moment contend that the reporting of data to all of these organizations is inessential, but I do say that careful investigation very probably would indicate that some of it could be eliminated and a lot of the rest could be simplified. The status quo is a sacred cow in many businesses and ours is no exception. However, if enough of us will interest ourselves in seeking to eliminate inessentials, we may find our efforts richly rewarded.

Upon rare occasions in the past this organization has coyly glanced in the direction of fidelity and surety, but these advances have met with no encouragement. The extension of regulation may open the gates of this cloistered commune and it is inevitable that the passage of time will bring about some more formal procedure for the determination of rates. In making this statement, I am not unaware of the differences which exist between suretyship and insurance and am fully cognizant of its traditions. I recognize that in surety losses are quite unexpected, but I do hope I am not going to be expected to register surprise every time one occurs.

Some years ago a paper was submitted to the Society on the subject of surety ratemaking. At that same meeting it was the topic of informal discussion. I would like to urge upon the membership further serious consideration of it, for it is inevitable that this is going to be a subject confronting the business and we should be prepared to discuss it intelligently.

The extension of rate regulation to all lines of casualty insurance accentuates the importance of interstate rating. Interstate rating is in effect today to a substantial extent in all lines of casualty insurance in many states. However, it is not universal and some of the large industrial states are among the exceptions, especially with respect to workmen's compensation in-

urance. The purchasers of insurance operating interstate are not hampered by state lines in the conduct of their business and can see neither reason nor justification for variation in rating on opposite sides of a state boundary. They are interested in securing insurance on a basis which recognizes the hazards of their risks regardless of state boundaries. Insistence that every assured be fitted into a rating procedure rigidly restricted to state boundaries benefits neither assureds nor carriers. One way or another assureds will defeat this Procrustean method of rating, the net effect of which is economic waste due to unnecessary detail and duplication of effort. It is to the interest of the insuring public and the carriers to make interstate rating available generally.

One could go on for hours discussing the many problems with which casualty insurance is faced. To enumerate all of them would be distressing and I have no thought of attempting to do so. I have sought only to call attention to a few of the more pressing and, in many ways, more interesting ones. However, in closing, I would like to urge upon all of you the importance of an early conquest of an impediment which has hampered progress in our business on all too many occasions. I refer to that baffling statement with which almost any proposal is assailed when all other efforts to maintain the status quo have failed - that irrefutable statement - "This is not the time." I can offer little advice to the intrepid soul who is willing to attack this problem. However, it is only proper to call attention to the, as yet, unproved allegation that the indiscriminate use of the expression may be a symptom of an innocuous form of logorrhea. This possibility of a psychiatric aspect to the problem may bear looking into. No one appears to have any knowledge as to how to determine the precise moment for action. But opponents of any proposal have no hesitancy in qualifying themselves as experts at determining that that particular occasion is clearly not the proper time for action. If there should be forthcoming at any reasonably early date a solution to any of the other problems discussed, the introduction of such solution will be eased immeasurably if there is available concurrently an horological factor with which to relegate to oblivion that melancholic cry - "This is not the time."

MECHANIZED UNIT REPORTING

BY

HARMON T. BARBER

Although fifteen years have elapsed since the Compensation Unit Statistical Plan last served as the subject of a paper presented before this Society*, the historical events of the interval may be summarized in a very few words. The essential features of the original plan have not been modified. Wartime personnel shortages in the offices of the carriers and the statistical agencies and the necessity for practicing economy have trimmed from the plan several items of minor importance and have reduced the number of successive reportings and of individual case reports to a minimum. Whereas some of these changes were inaugurated as temporary re-trenchments, it is not unlikely that they may assume permanence as the ability to get along satisfactorily on the curtailed basis is demonstrated in practice. The territorial scope of the plan has expanded to include additional states until at present the plan is effective in all jurisdictions which make use of the basic workmen's compensation manual. This long record of continuing usefulness, remarkable for an implement of compensation rating and rate making, and its universal adoption by many independent rating bureaus are convincing evidence that the unit report system is performing necessary and useful functions and doing them well.

It is not the purpose of the author to attempt a comprehensive survey of the application of machine methods to the preparation of unit reports nor to imply that mechanization is the reagent which will dissolve a majority of the troubles and worries of an harassed statistician. Rather, this paper will present a case history of the statistical procedures of a single carrier which uses machine methods for the final preparation of the first report of risk experience under the Compensation Unit Statistical Plan. Mechanization in this case has functioned smoothly for a period which extends well beyond the experimental stage and has produced substantial benefits and advantages. The principal value of a description of this nature lies in the possibility of its suggesting to others how certain ideas employed in the subject case can be utilized in improving their own attack on similar problems. This presentation is offered with this thought in mind and not with the purpose of holding up this particular system as a model to be copied in all details.

* Proceedings Vol. XVIII, P. 99 and Vol. XVII, P. 190.

In order to facilitate an understanding of the mechanical method here employed, it seems advisable to first describe in some detail the office procedures which are the source of compensation risk experience and to outline the method which was formerly employed in the preparation by hand of unit reports. This will provide a background for the explanation of the mechanical method currently used. The former system is not necessarily typical of that followed by other carriers, although it is one which could be used by any carrier which elected to do so.

OFFICE PROCEDURES

In the case under review compensation risk experience is prepared directly from original sources as a special undertaking and is not compiled as a by-product of other records, such as those set up for accounting purposes. Exposure data are taken from original payroll audit reports as received from the auditor in the field. These payroll audit reports are initiated in the Home Office by preparing a skeleton form and in advance a face sheet for the file. This is sent to the auditor in the field just prior to expiration of the period to be audited. The auditor makes the audit, inserts earned exposure and premium and returns the file with his working sheets attached. From this report vouchers are prepared for premium billing purposes and the file is routed to the Statistical Department so that the exposure data for unit or class experience may be recorded.

Claim data for experience purposes are taken from claim files or from forms which are in process of becoming a part of the claim file. The claim is initiated in the field by receipt of an original notice of accident. A serially numbered "first" report, which shows an abstract of the coverage afforded by the policy, is prepared in the field office and is given to the investigator or adjuster. After investigation the first report form is completed by the adjuster, including original estimates of indemnity and medical losses. Following a short waiting period, which permits many small claims to be closed, the first reports on cases remaining open are submitted to the Home Office to form the basis of a Home Office claim file. Each claim file has a "backer" with space for the entry in chronological sequence of estimates of incurred cost and of each draft issued in payment of compensation, medical or assigned expense. At intervals the payments are accumulated to date and posted directly under the entry of the latest incurred cost estimate. This backer record of estimates and payments is the official source of loss data for experience purposes.

The claim file contains copies of awards, correspondence, medical bills pertaining to the case and copies of a special report form used in executing changes in the estimates of incurred costs during the life of the claim. When the claim is completely

paid a "final" report form is submitted by the field office to close the file. This final report was partially prepared as respects identification data and record of coverage as a carbon copy of the first report and was held in the field office until its use was required. The final report when completed and submitted shows the actual indemnity and medical costs of the claim. These amounts are posted on the claim file backer and are followed by the final entry of the accumulated paid amounts which, of course, agree with the final estimates.

First reports of claims received in the Home Office are routed through the Statistical Department shortly after their arrival. Also, closed claim files with the backer bearing amounts of incurred costs and containing the final report are similarly sent to the Statistical Department at an early date following termination. Each of these reports are stamped or initialed to indicate that they have passed through the Statistical Department and have been recorded. A continuing review of these notations by the custodians of the open and closed files serves to redirect to the attention of the Statistical Department any stray files which may have escaped from the prescribed path.

UNIT REPORTS BY HAND

The preparation of unit reports before the advent of the mechanical method was a comparatively simple but voluminous operation. The initial step was to prepare the list of risks to be reported, the information being obtained from the policywriting unit generally a full year and a half before the unit report was due to be reported. At the time each policy was written a hectograph impression of the policy information was imposed on the back of a blank risk experience report form (Form 21-38) This information included name and address of risk, policy term, state location, endorsement identification numbers, classification codes and estimated premium. This scratch copy or service copy of the unit report was filed in order by state, policy number and effective date in the Statistical Department and served as a tickler to denote that a risk report was due for compilation 18 months after effective date. If more than one state location was involved, extra cards were prepared and filed in the appropriate state files. Not taken cards were removed as soon as notification of their status was received. These service cards were used to receive entries of exposure and claim data taken from the audit reports or claim forms as they passed through the Statistical Department.

First reports of claims were shunted through a coding unit at which time the state assignment was checked, occupational disease claims and U.S.L. losses were marked and the classification code assigned to the claim. Discrepancies in the occupation of the injured as compared with classifications listed in the policy were

picked out for correction. Occasionally, it became necessary to defer coding of the claim for classification assignment until more information had accumulated in the claim file. From this first report the claim number was entered in pencil on the face of the service card. No other entries relating to this claim were made at the time.

Final reports of claims accompanied by the entire closed claim file and backer were likewise entered on the service card. In order to distinguish closed file entries from first report entries the former were made in ink and the complete information respecting the individual claim was entered, inasmuch as the claim had then attained a final status. Closed file entries were substituted for first report entries in those cases where a first report had been previously processed. If an individual report of the claim was required by the statistical plan this report was prepared from the information appearing in the closed claim file.

Payroll audit reports on annually audited policies were also entered on the service card in their final form. Reports on periodic audit policies were accumulated on a separated slip attached to the service card with a notation as to the period covered. When the last audit report form on such a policy was received the accumulated entries were carried to the face of the service card.

As the valuation date for risk reporting approached, the service card was reviewed to determine if there were open cases, i.e. those showing first report entries in the form of claim numbers in pencil. In such cases the claim files were requested and the estimated cost of the claim as of the valuation date, according to the record appearing on the claim file backer, was taken as the incurred cost to be entered on the risk report. If an individual case report was required on the open case this too was prepared at this time. After the information on open claims was obtained the service card was checked to make certain that all audits had been received and entered. The service card was then referred to the typist who prepared the final copy of the unit report for transmittal to the statistical agency. In the typing operations it was found advantageous to use fan-fold forms with a registering device in order to avoid a time waste in inserting forms and carbons in the typewriter. The use of continuous forms was a helpful factor in developing a mechanical process for the preparation of the unit reports.

After the unit reports had been filed copies were referred to the punch unit for the purpose of recording the experience on punch cards. The tabulation of the carrier's own classification experience from these punch cards in a form similar to old Schedule Z was used for underwriting guidance as the volume of experience was sufficient to produce information of value for this purpose. The procedure just outlined was followed until about three years ago when it was suggested that mechanical steps could be introduced which might result in a considerable saving of clerical

effort. It was reasoned that, if the completed risk experience were eventually to be transferred to punch cards, there was an opportunity for economy in first preparing the punch cards directly from original sources and then using them to build the final report. The problem of designing a report form which resembled the standard form in arrangement, size and content and which was susceptible to mechanical preparation was a difficult one involving as it did the design of punch cards, the development of a proper machine technique and many other details inherent in the mechanical method. The problem was satisfactorily solved through the collaboration of several members of the staff, not including the writer.

MECHANICAL METHOD FORMS

The final risk experience report as prepared by the mechanical method takes the form illustrated in Figure 1 and described in the accompanying text. This is prepared by the printer-tabulator on fan-fold forms which are fed into the machine by a registering device. Perforated strips along the edge of the form required to operate this device are later removed. Each line on the report form is the transcription of a punch card or the summary of a group of homogeneous cards. For example, lines in the heading of the report are each taken from a single card and many of the loss items are single cards. The exposure data for each class may be the summary of several cards each representing the results of one of several periodic audits. The totals of medical only cases by classification may be the summary of a number of cards. The totals of exposure and losses appearing at the bottom of the report are accumulations for the entire report. The punch cards are placed in the printer-tabulator in proper sequence and the machine is controlled by the policy number and state which appears on every card and by other fields, such as coverage and classification code.

There are two forms of punch cards used in this process. One is designated "Compensation Unit Plan - Name Card" (IBM 739018) and is reproduced in Figure 2. There may be as many as four of these cards required for a single risk in order to supply the information which appears on the first four lines of the finished report.

The second punch card is designated "Compensation Experience" (IBM 739241) and is illustrated in Figure 3. This form is used both for exposure and premium and for losses.

NAME CARDS

Name cards are eventually prepared from a risk service card which is identical with the scratch copy service card of the hand method and which carries a hectograph impression from the master copy used in preparing the policy. The service card is made up

simultaneously with the issuance of the policy. The service card is first sent to the punch unit where a simple punch card is cut showing policy number, period of coverage and state location. These are later used to prepare a tabulator list for each state and month which is used as a check list to make sure that every policy is reported. The service card is then filed in a tub desk in the Statistical Department. During the currency of the policy it is used to register payroll audit reports received by the Statistical Department. A notation is made of each audit report received showing the period covered by the audit and the state location if the risk is an interstate risk. The service card is also used to record special "conditions affecting coverage" which must be noted on the final report. At the time that the payroll audit reports are noted on the service card, the audit reports are coded using a four digit code which indicates the following -

Coverage - such as state, U.S., O.D., etc.

Exposure Code - indicating whether payroll exposure or miscellaneous exposure base is used.

Exposure Kind - for other than payroll bases such as per capita, flying hours, etc.

Rate Change - used to denote whether the premium is derived from the original rates set forth in the policy or by a later series of rates such as might be the result of a rate revision applying to all outstanding policies.

After the audits have been coded for coverage they are sent to the punch unit where exposure and premium punch cards are prepared as described later.

Several weeks before the reporting date the service cards for the month are reviewed and all cards showing a full complement of audits are released to the punch unit for the preparation of name cards. The remaining cards are checked against a list of "no adjustment" risks which has been obtained from the Payroll Audit Department indicating that no audit will be made of the risk and the service cards on any risks in this category are then released to the punch unit with the "no adjustment" notation appearing on the service card. Other risks, where audits are not as yet complete, are checked with the records in the Payroll Audit Department and, if the missing audit is delayed, the proposal for the risk is pulled and estimated figures are noted on the service card by class corresponding to the estimates used as the basis for the advance premium. The service card is marked "estimated amount" and

then submitted to the punch unit for the preparation of the necessary name cards.

There will be several name cards prepared for each risk, each bearing the policy number, state and policy month and year in Columns 2 to 13 for collating purposes. Name card #1 carries the data appearing on the first line of the finished report, such as policy number, policy form, effective date, expiration date and state. Name card #2 shows the name of the risk. The address and location of the risk, if they are required, are punched on succeeding name cards (#3 or #4). The last name card, #3 or #4, is used to record special conditions, such as, excess limits applicable to Paragraph 1b, cancellation date if the policy is cancelled prior to normal expiration and a notation as to the source of the exposure data in the event that it was not taken from a regular payroll audit, such as, "estimated", "statement" or "no adjustment". After the name cards are cut they are held until the corresponding premium and loss cards are ready for tabulating.

PAYROLL AND PREMIUM CARD

As has been mentioned previously, the payroll and premium card is punched directly from the payroll audit report after the proper coverage codes have been applied to the face sheet of the payroll audit file. The premium card carries the policy number, state, policy month and year in Columns 2 to 13 inclusive for the purpose of bringing together in the tabulating process the premium card with name card and loss cards for the same risk. In addition to the four digit coverage code previously described the card carries the classification code number, payroll amount and premium amount and the rate. One card is punched for each item appearing on the payroll audit report. The premium cards are accumulated throughout the year in an accumulation file. The cards are maintained in this file in order by effective month and year.

LOSS CARDS

Loss cards of one type are cut from first reports as these claim papers clear through the Statistical Department. A first report indicates an open claim and is treated differently than a final report. From the first report a "valuation" card (Kind 9) is prepared using Form 739241 but omitting all information following claim number (Column 48). The valuation card thus carries the policy number, state and effective year and month which are common to all punch cards used in the mechanical method. The card also carries the adjusting office code and claim number as the former may be useful in locating claim files. Note that the amounts of estimated incurred indemnity and medical are omitted as these are quite apt to change before the risk reporting date arrives. The

purpose of the valuation card is to indicate later that the latest estimates of incurred costs must be obtained at time of report. The valuation cards are placed in an accumulation file after they have been verified.

As has been described earlier, the final claim report is the notification from the field that the claim has been terminated. When this is received the entire file is routed to the Statistical Department as a closed file. Closed files are first reviewed to determine whether an individual case report is required and, if so, one is prepared. The file is then sent to the punch unit where a second type of loss card is cut on Form 739241. This card commonly referred to as a "loss" card (Kind 7) records every item of information pertinent to the claim and required to be reported. The loss card is identical with its corresponding valuation card so far as the latter has been completed. This fact is later used in a matching process which permits valuation cards with replacing loss cards to be discarded. The loss card also records the amounts of indemnity and medical incurred costs, accident date, the "F" designation to denote a closed file and claim counts for indemnity and medical separately. After verification the completed loss card is placed in an accumulation file.

The accumulation files of claim cards, premium cards, loss cards and valuation cards are maintained with the cards arranged in order by month and year regardless of state. In the preparation of punch cards each card is punched from the original record and turned over to a verifier who sits beside the original operator. This verification insures that every item is punched correctly. After the punch card is verified the card is placed in a tray and transferred from there to the accumulation file. Due care is exercised to see that the cards are not disturbed in transit.

PRELIMINARY TABULATIONS

There are certain preliminary tabulations which are required shortly before proceeding with the preparation of the final unit reports. These are necessary to insure that the cards are in proper order and that there are no obvious errors which can be easily corrected at this stage and which otherwise would spoil the final run of the cards.

The name cards are sorted to policy number, state and proper sequence by kind and then listed. The result is a listing of the headings of all of the final report forms. This list is inspected for errors and any necessary corrections are made.

The premium cards are sorted to policy number, state, coverage and classification and a preliminary list is made which serves as a check list and is of assistance in verifying classification assignment of losses or in locating missing cards, in case any should go astray in later operations.

Approximately a month previous to valuation date the loss cards and valuation cards are each sorted to claim number order. The two sets of cards are matched against one another and all valuation cards which have no corresponding loss cards are ejected and listed. This list represents a record of all open cases, the claim files for which must be pulled and consulted in order to obtain the latest estimates of incurred cost as they appear on the claim file backer at valuation date. These estimates are entered on the list opposite each claim number with a notation as to the kind of injury involved. The list is then referred to the punch unit and two complete loss cards are cut for each open claim, one, a plus card to be substituted for the valuation card in the current operation, and the other, a minus card which will later be added to the loss cards in preparation for the second reporting run one year hence.

The valuation cards which are found to match loss cards in this preliminary run are discarded as of no further value.

The loss cards which match valuation cards are listed to provide a check list for possible future reference.

Also, at this time the loss cards augmented by those which have been substituted for valuation cards are sorted by accident date under each policy number to uncover any multiple claim accidents or catastrophes which may exist in the experience. Claim files are consulted to run down these leads and to ascertain which, if any claims, result from the same accident.

Again, in order to true up the reporting, classification codes assigned to losses under each policy number are matched with the classification codes of the premium cards of the same policy number to ascertain if there are any errors in class assignment of losses. Mismatched losses are listed, claim files drawn and corrections made as may be necessary.

FINAL TABULATION

After the preliminary listings have been run and the adjustments and corrections which were indicated by them have been completed we figuratively are ready to make the final tabulation. There is now available three sets of cards in final condition and order, name cards on risks which have a full complement or complete history of audits, premium cards for all exposures under each policy and loss cards on closed claims supplemented by substitute loss cards on open claims carrying estimated incurred costs as they appeared on the claim file backer at valuation date. Each set of cards is in state and policy number order. The cards are now interspersed, with name cards leading in proper sequence under each policy number and followed by premium cards in coverage code and classification code order and loss cards in coverage code and classification code order and with loss cards involving indemnity

amounts preceding medical only cases. The cards are then fed into the printer-tabulator under control of a wiring board which is extremely intricate. With each change of policy number the strip of forms advances to the proper position to start a new final report. The name cards are transcribed in order and the exposure totals are accumulated by coverage and classification and then recorded. Special type bars are used in the machine to translate coverage codes into symbols. Losses are listed individually except that non-compensable medical items for each class are summarized. If the list of exposure and loss items is too large to be accommodated on one form, the excess items are carried along to the succeeding forms, automatically skipping the four lines at the top of the form designed for name card data. The identification data on second and subsequent forms in such cases are typed in later. After the detail cards for each policy number have been listed on the form the machine records exposure and loss totals and claim count at the bottom of the form in their respective blocks. Besides an original report several carbon copies are prepared by means of multiple forms with interleaved carbon paper. One of these carbon forms is set up in green ink to denote that it is to be used for experience rating purposes.

The stack of completed forms is next reviewed by the Statistical Department, borders are removed, identification data are inserted on second cards and miscellaneous exposures are totaled and typewritten. The cards are then serially numbered and are ready for shipment after transmittal controls have been established.

It has been found advantageous to break up the preparation of the unit reports into several sections. For example, priority is given to retrospectively rated risks because of the need for early reports on risks of this type. Also, it has been found expedient to deal next with the group of risks which have experienced no losses or which have all closed losses at report date. This group comprises a large part of the total run and they can be completed while work is progressing in securing estimates on open losses for other risks. As each report is completed and numbered it is checked off on the list of service card policy numbers which was prepared 18 months previous in order to insure that all policies will be reported to the experience agency.

From the preceding description it should be evident that mechanized unit reporting as here practiced is not a simple straightforward operation which can be undertaken by any carrier without deliberate study of many problems which are bound to be created by its adoption. There is a vast amount of preparatory work requiring meticulous care and accuracy before the button can be pushed to produce the final report. The method may not be particularly advantageous to a carrier which is uninterested in the by-product tabulation of its own classification experience or to the carrier of large risks which can turn to the experience of several risks

for an indication of current underwriting trends in a particular industry.

However, the mechanical method does have some very definite advantages. Immediately after the release of the unit reports there is available for statistical analysis a punch card record of the carrier's own experience from which may be prepared an aggregate classification experience and other studies. The finished reports are superior in appearance and legibility to those prepared by hand. The speed of preparation is accelerated for many risks, such as those having no open losses and this results in an earlier reporting of the whole experience. The reports are more accurate by reason of the mechanical check of loss classification assignments and the freedom from the necessity of spotting and correcting any typographical errors in the finished product. The most welcome advantage in the subject case was realized in the saving in clerical effort which resulted from the introduction of the mechanized procedure. Coming at a time when new clerical assistance was scarcely obtainable the clerks released from unit reporting were speedily transferred to statistical work for other lines of business where they were badly needed.

The reports prepared mechanically have been accepted by most statistical filing agencies who have been very gracious in their willingness to disregard the inconvenience of a slightly different arrangement of items in the report. The method seems to be working satisfactorily and there is reason to expect that it will continue to do so. When the Compensation Unit Statistical Plan is next subjected to a thorough overhauling at some date in the future, it would be desirable to make a studied effort looking toward the development of a reporting system more easily adaptable to mechanical methods for all reporting carriers. In this direction lies progress.

FINAL REPORT FORM

There is shown in Figure 1 a fac-simile of the final unit report form. The top line of the card lists the policy number, policy form, effective and expiration dates and the state location of the risk. In the case of interstate policies endorsed after the effective date to provide coverage in an additional state a notation "End" and the effective date of the added coverage will appear in the third line of the heading. Reports for canceled policies show the date and mode of cancellation (short rate cancellation is indicated as S.R. and pro rata cancellation as P.R.). The expiration date on canceled policies is the date of cancellation. The state block carries the abbreviation of the state. In the case of interstate policies there will be a report for each state covered by the policy with the symbol "&" shown after the state abbreviation.

The second line of the headings shows the name of the assured. The third line of the report shows the "conditions affecting

coverage" but in the event that address and location are required the third and fourth lines will indicate this information and the last line will be used to indicate conditions affecting coverage such as ex-medical and excess limits on lb coverage. In the event that the policy premium was determined by any mode other than an audit a notation will appear indicating that the exposure was obtained by a "statement" or "final audit not made" if such conditions prevail.

In the body of the report form the classification code appears in the first column opposite each item. All exposure items will be in class order followed by loss items also in class order. The coverage column indicates either standard coverage or occupational disease coverage as denoted by the symbols appearing in the key at the bottom of the printed report form.

Miscellaneous exposures, such as per capita, are indicated by a symbol in the lefthand part of the payroll column. The key to these symbols is found at the bottom of the report. The dotted line in the payroll field serves as the decimal point in reporting per capita exposures. The premium column is used for the premium for each exposure item. For each loss item this field will be used for showing accident date if this information is required.

The next column is used to indicate the rate for lines opposite exposure items. For lines opposite loss items this column is used for claim number or for a count of non-compensable medical cases by classification. The dotted line in this column indicates the decimal point in the rate. The type column indicates the type of loss and the key at the bottom of the card interprets this designation. The incurred indemnity amounts and incurred medical amounts are shown in their respective columns. The code in the coverage column distinguishes between standard and various other coverages. The last column designates open cases by the symbol 0 and closed cases by the symbol F.

At the bottom of the card are shown several exposure totals. Standard coverage, payroll and premium and occupational disease payroll and premium are shown in their respective fields. Any miscellaneous exposure appears opposite the item "all others". On the righthand side of the card there is shown the number of claims and the total amounts of indemnity and medical losses separated between standard and occupational disease coverages.

POLICY NUMBER	POLICY FORM	EFFECTIVE DATE	EXPIRATION DATE	STATE	ADM. FILE NO.	REP
1257435	UB	1/1/43	12/1/43	VA		
ADAMS BROTHERS CO INC					RISK SERIAL CARD NO.	1
P R 12 1 43						

DO NOT WRITE HERE	CLASS	*COV.	†	PAYROLL	PREMIUM ACCIDENT DATE	NO. OF NON COMP. CASES RATE - CL. NO.	** TYPE	INCURRED INDEMNITY	INCURRED MEDICAL	O/F
	0021	S				4				
	0912	S	P	9		8	9000			
	5538	S		16222	308	1897				
	5551	S		26884	1785	6639				
	8010	S		38605	265	686				
	8742	S		36863	115	313				
	8810	S		35553	25	071				
	5538	ODB		16222	3	020				
	5551	ODB		26884	5	020				
	8010	ODB		38605	8	020				
	8742	ODB		36863	4	010				
	8810	ODB		35553	4	010				
	5538	S			10 20 3	5828273	N	645	143	O
	5538	S			11 16 3	5828440	T	112	4	F
	5538	S				1	X		5	F
	5551	S			11 22 3	5828104	T	15	23	F
	5551	S				2	X		15	F

EXPOSURE TOTALS Form 21-38-C-8823A	STANDARD COVERAGE	154127	2510	06	TOTAL LOSSES	STANDARD	772	190
	O. D. COVERAGE	154127	24		NO. CLAIMS	OCC. DISEASE		
	ALL OTHERS	PC	9					

†M - Misc. Exposures
P - Per Capita
H - Flying Hours
D - Discounts
V - Vol. Firemen

**D - Death, P - Permanent, M - Major, N - Minor, T - Temporary Total, X - Non Comp. Medical, C - Contract Medical, E - Allocated Claim Exp. O.D.1(b) Only.

PR. SIZE	IND. GR.	TYPE	IND. SCHED.	COV.	MANUAL PREMIUM	E. M.
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Figure 1 - Unit Report prepared by alphabetic-tabulator.

PATENTED-MOORE BUSINESS FORMS, INC., HAGERSTOWN, M.D.

MECHANIZED UNIT REPORTING

61 257435450136000 55381 01 62220 0308 \												01 897											
POLICY NUMBER	STATE	POL. YR.	MO.	DAY	CLASS	PAYROLL	PREMIUM	ADJUSTING OFFICE	CLAIM NO.	RATE	INCURRED INDemnITY	INCURRED MEDICAL	ACCIDENT DATE	MO.	DAY	YEAR	THE TRAVELERS CAS. ACTU 10-43						
0000000000	00	00	00	00	00	0000000	000000000	000000000	000000000	000000000	000000000	000000000	000000000	00	00	00	00						
1111111111	11	11	11	11	11	1111111	111111111	111111111	111111111	111111111	111111111	111111111	111111111	11	11	11	11						
COMPENSATION EXPERIENCE																							

Premium Card

61 25743545013 \												1 \												1 465828273 \											
POLICY NUMBER	STATE	POL. YR.	MO.	DAY	CLASS	PAYROLL	PREMIUM	ADJUSTING OFFICE	CLAIM NO.	RATE	INCURRED INDemnITY	INCURRED MEDICAL	ACCIDENT DATE	MO.	DAY	YEAR	THE TRAVELERS CAS. ACTU 10-43																		
0000000000	00	00	00	00	00	0000000	000000000	000000000	000000000	000000000	000000000	000000000	000000000	00	00	00	00																		
1111111111	11	11	11	11	11	1111111	111111111	111111111	111111111	111111111	111111111	111111111	111111111	11	11	11	11																		
COMPENSATION EXPERIENCE																																			

Valuation Card

7125743545013000055381 \												58282731 421 00 6451 01 431 0203 \											
POLICY NUMBER	STATE	POL. YR.	MO.	DAY	CLASS	PAYROLL	PREMIUM	ADJUSTING OFFICE	CLAIM NO.	RATE	INCURRED INDemnITY	INCURRED MEDICAL	ACCIDENT DATE	MO.	DAY	YEAR	THE TRAVELERS CAS. ACTU 10-43						
0000000000	00	00	00	00	00	0000000	000000000	000000000	000000000	000000000	000000000	000000000	000000000	00	00	00	00						
1111111111	11	11	11	11	11	1111111	111111111	111111111	111111111	111111111	111111111	111111111	111111111	11	11	11	11						
COMPENSATION EXPERIENCE																							
2222222222	22	22	22	22	22	2222222	222222222	222222222	222222222	222222222	222222222	222222222	222222222	22	22	22	22						
3333333333	33	33	33	33	33	3333333	333333333	333333333	333333333	333333333	333333333	333333333	333333333	33	33	33	33						
4444444444	44	44	44	44	44	4444444	444444444	444444444	444444444	444444444	444444444	444444444	444444444	44	44	44	44						
5555555555	55	55	55	55	55	5555555	555555555	555555555	555555555	555555555	555555555	555555555	555555555	55	55	55	55						
6666666666	66	66	66	66	66	6666666	666666666	666666666	666666666	666666666	666666666	666666666	666666666	66	66	66	66						
7777777777	77	77	77	77	77	7777777	777777777	777777777	777777777	777777777	777777777	777777777	777777777	77	77	77	77						
8888888888	88	88	88	88	88	8888888	888888888	888888888	888888888	888888888	888888888	888888888	888888888	88	88	88	88						
9999999999	99	99	99	99	99	9999999	999999999	999999999	999999999	999999999	999999999	999999999	999999999	99	99	99	99						
1111 4 516 7 8 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80																							
IBM 739241																							

Loss Card

Figure 3 - Experience cards used in preparation of Unit Report of Figure 1. These have been prepared by an alphabet printing puncher which is not ordinarily used for the operation.

MECHANIZED UNIT REPORTING

WISCONSIN PLAN OF PREPAID SURGICAL, OBSTETRIC AND HOSPITAL INSURANCE

BY

N. E. MASTERSON

INTRODUCTION

The purpose of this paper is to explain the provisions of a voluntary plan of prepaid insurance for surgical and hospital care inaugurated in the state of Wisconsin late in 1945. The complete title of this insurance plan is "Wisconsin Plan of Prepaid Surgical, Obstetric and Hospital Insurance". It will be referred to in this paper under the popular name of "Wisconsin Plan".

Since this Wisconsin Plan has been in effect less than a year, the scope of this paper will be limited to a factual presentation of its historical development, policy provisions and rates.

It seemed desirable to record in our Proceedings for future reference and study the essential features of this pioneer effort to solve a health problem on a voluntary basis through cooperation between a state medical society and private insurance carriers.

HISTORY

In 1944, the House of Delegates of the State Medical Society of Wisconsin authorized the creation of a special committee to confer with insurance carriers licensed in Wisconsin to ascertain if it would be possible to secure the extension of sickness care policies written by insurance companies upon such a basis that protection could be offered with a premium structure that would particularly appeal to the low-income population groups. The aim was to formulate a model policy in the health insurance field to which the medical profession could give its unqualified support and to which insurance carriers could subscribe, and which would receive popular acceptance by employees and employers throughout the state. The objectives were:

1. Protection broad enough to relieve the minds of the people from the worries of surgical, obstetric and hospital bills.
2. A cost low enough to enable most of the people of the state to be brought under the protection of the plan.
3. A system that would retain for each individual his right of complete freedom in the selection of doctors and hospitals.
4. A plan that would raise the standards of public health through the encouragement of prompt surgical, obstetric and hospital care when needed.

This Medical Society committee and a committee representing insurance carriers interested in furthering a plan of prepaid surgical and hospital care, met jointly at frequent sessions during 1945 to

work out the provisions of the eventual Wisconsin Plan.

The Medical Society committee desired to keep the Society "out of the insurance business" and devoted major attention to surgical provisions and the schedule of benefits. The insurance company representatives tailored the provisions of life insurance group policies for use with the Wisconsin Plan and established a schedule of basic rates.

The committees did not adopt the usual medical society plan provision relative to payment for physician's services. In most of these medical society plans, if the funds were not sufficient to pay according to the schedule, the physicians were paid on a lower pro-rated basis. If the patient's income exceeded a specified limit, the physician could charge the patient the difference up to the amount of his usual fee. The Wisconsin Plan allows physicians to make higher charges to persons in families with income above specified amounts.

An important feature of the Wisconsin Plan was its adoption of the best features of two existing plans: (1) insurance company group policies and (2) medical society sponsored plans. The insurance companies retained jurisdiction and control of all insurance provisions and rates under policy forms approved by the Wisconsin Insurance Department. The Medical Society directed its attention to approval of the schedule of benefits and the enrollment of physicians under the Plan.

WISCONSIN PLAN CONTRACTS

There are two basic contracts provided under the Wisconsin Plan - an insurance policy and a participating physicians' agreement with the State Medical Society to accept amounts within a fee schedule in full payment for services.

The insurance policy is a regular disability insurance contract between the insurance company and one of three types of policyholders - a group, franchise, or an individual policyholder or family head. Under the Wisconsin laws, it is possible to write group insurance upon groups of ten or more while franchise policies may be written on groups of three or more. Policies may be written upon groups having a common employer, members of a cooperative, labor unions, or similar organizations with purposes other than that of obtaining insurance.

An insurance company can participate in the Wisconsin Plan if it is licensed in the state of Wisconsin and makes application to the State Medical Society. The application must include a copy of the policy which the applying carrier intends to use. Any policy providing benefits as established for the Wisconsin Plan receives Medical Society approval. Twenty-three companies now participate in the Wisconsin Plan.

Participating doctors have an agreement with the State Medical Society of Wisconsin referred to as the "Full Payment Provision" that their charges for operations will not exceed the benefits provided in the insurance policy for all insured employees without dependents whose yearly income does not exceed \$2,080 (\$40 for a 40-hour week) and for all those with dependents whose yearly income does not exceed \$2,600 (\$50 for a 40-hour week) (Exhibits E and F). The entire amount of the physician's or surgeon's fee for any operation, including the usual pre-operative and post-operative care, is paid in full according to this Full Payment Provision. Anesthesia and radiology benefits are paid in addition to the surgical fee.

Surgery for persons with higher yearly incomes and persons receiving care from a non-participating physician or surgeon or one who resides outside the state is paid for up to the amounts specified in the policy.

POLICY PROVISIONS

A complete Wisconsin Plan policy consists of a Master Disability Policy (Exhibit A); a Schedule of Benefits and Premium Rates for Employees Hospital and Surgical Expense Benefits (Exhibit B); a Rider providing Benefits with respect to Dependents, including Maternity Benefits (Exhibit C); and a Schedule of Surgical Expense Benefits (Exhibit D).

The Exhibits contain the exact provisions of a Master policy, the riders and the fee schedule. All exhibits relate to the Group basis. The coverage and policy provisions are similar for policies written on the Franchise or Individual bases except for a few minor differences. There follows a digest and interpretation of the important policy, rider and fee schedule provisions.

Hospital Expense Benefits

The policy provides that if the employee (or dependent) shall sustain accidental bodily injury or contract sickness and thereby becomes confined in a hospital, the company will pay to the employee an amount up to the Maximum Daily Benefit of \$5 per day, for not more than 31 days, of hospital charges actually incurred by the insured employee for room and board during such confinement, and the amount of all other hospital charges for therapeutic services, including ambulance service to and from the hospital, but not including special nursing services, during such confinement, subject to a maximum per confinement, for all hospital charges including room and board, of 36 times the Maximum Daily Benefit or \$180, except that with respect to hospital confinement due to any

one pregnancy, including resulting childbirth, abortion or miscarriage, such maximum shall be fourteen times the Maximum Daily Benefit. These benefits are payable from the first day for a maximum period of 31 days for any one disability. There is no limit to the number of unrelated disabilities or total number of days of hospital residence in any one year.

The maximum benefits per confinement for all charges incurred in the hospital, including room and board, is \$180. Charges of any hospital for room and board are paid up to \$5 per day up to 31 days for each period of disability, a maximum of \$155. The difference between the amount paid for room and board and \$180 is available for payment of other charges by the hospital. For example, a seven-day stay in the hospital at \$5 per day would permit payment up to \$145 for miscellaneous services in addition to \$35 for room and board; or a hospital stay of ten days at \$4 would permit payment up to \$140 for miscellaneous services in addition to \$40 for room and board. Hospital benefits are also provided for maternity cases, with the maximum benefit per confinement in these cases being \$70.

Benefits for hospital room and board and other hospital charges will be paid with respect to a hospital confinement for which a hospital room charge is made. If the only hospital charge is for emergency treatment for accidental bodily injury, no room charge is necessary to collect for other hospital charges. All cases, however must be under the care of a legally qualified physician or surgeon.

Surgical Expense Benefits

The policy provides that if the employee (or dependent), because of accidental bodily injury or sickness, shall undergo a surgical operation, whether performed inside or outside a hospital, specified in the Schedule of Surgical Expense Benefits, the company will pay to the employee the amount specified in said Schedule for the operation, but not more than the surgical fees actually incurred for such operation, subject to a maximum for all operations performed during one period of disability, of \$150.

When an operation described in the Schedule of Surgical Expense Benefits is performed outside of a hospital, the benefits described under Miscellaneous Procedures are payable up to a maximum of \$15 for anesthesia and \$35 for radiology, but not more than \$150 for the combined surgical, anesthesia and radiology procedures. For operations performed in a hospital, charges for anesthesia and radiology are paid to either the hospital or the doctor subject to the overall maximum hospital allowance of \$180 and the \$150 surgical expense maximum. In the event that several operations are required during the period of disability, payment will be made for each,

but the total amount paid for all operations during any one period of disability shall not exceed \$150.

General Provisions

Maternity and Obstetrical Benefits Waiting Period - With respect to benefits on account of pregnancy, including resulting childbirth, abortion or miscarriage, an employee does not become an insured employee until nine months after she has become such an employee with respect to other benefits under the policy. This provision does not apply to any employee who became an insured employee on the effective date of a group policy or within 31 days thereafter. All other employees as well as dependents become eligible to receive maternity and obstetrical benefits after being insured for nine months.

Under group policies, maternity and obstetric benefits are thus available immediately for all women employees enrolled under the plan within 31 days following the effective date of the policy. Thereafter, these benefits are effective after a waiting period of nine months. Under all individual and franchise policies, there is a waiting period of nine months for maternity and obstetric benefits. Dependents, under all contracts, receive the maternity and obstetric benefits only after a nine months' waiting period, unless an extra premium payment is made for immediate coverage under a group policy.

The entire amount of the physician's or surgeon's charge for obstetric care, including pre-natal and post-natal care, is paid under the terms of the Full Payment Provision. Payment is made whether or not confinement be in a hospital. For all those who do not qualify under the full payment clause, benefits are paid as specified in the policy.

In addition, if confinement is in a hospital, up to \$70 is paid to cover all hospital charges due to pregnancy or childbirth, subject to the maximum of \$5 per day for hospital room and board.

Period of Disability - Successive periods of hospital confinement or successive operations shall be considered to have occurred during one period of disability unless the subsequent confinement commences, or unless the subsequent operation is performed, after return to active work on full time (in the case of an employee) and after complete recovery from the injury or sickness causing the previous confinement or operation, or unless the subsequent confinement or operation is due to causes entirely unrelated to the causes of the previous confinement or operation.

Payment of Claims - Subject to due proof of claim, the Hospital and Surgical Expense Benefits will be paid immediately upon receipt of such proof. Under the provisions of the insurance policy, pay-

ments are made to the employee but if he qualifies under the Full Payment Provision, he directs the insurance company to pay the surgical benefits to the physician by completing a "Direction to Pay and Physician's Agreement" (Exhibit F). The physician signs the same agreement that his charges for services will not exceed those provided in the Schedule of Surgical Expense Benefits.

In the case of all hospital expense, and surgical expense for persons not eligible under the Full Payment Provision, the insurance companies can make payments direct to hospitals or physicians upon authorization by the insured employee.

In case of death of the employee, the Company may pay to the hospital, physician or surgeon, on whose fee claim is based, any sums due under the policy and such payments shall fully discharge, to the extent of the amounts so paid, all liability of the company with respect to such claim.

Extension of Benefits - If an employee (or dependent) becomes confined in a hospital or has an operation, for causes other than childbirth, abortion or miscarriage, after termination of insurance but prior to the expiration of the three-months' period immediately following such termination, and if due proof is furnished that the confinement or operation would result in a valid claim under the policy were the insurance in force at the commencement of such confinement or date of such operation, the company will recognize this as the basis for such claim, provided:

- (a) the confinement or operation was the result of an injury which was sustained or sickness resulting in disability which began during the policy period and
- (b) the employee (or dependent) was totally disabled by such injury or sickness when the insurance terminated and remained continuously so disabled until confined or until such operation was performed.

Hospital confinement and obstetrical operation for childbirth, abortion or miscarriage will also be recognized as the basis for a claim under the policy if the confinement commences or the operation is performed within nine months after termination, provided the confinement or operation would result in a valid claim were the insurance in force at the time of the confinement or operation, and provided termination of insurance was not due to failure of the employee to continue any agreed contributions towards premium payments while remaining eligible for the insurance.

Free Choice - The employee (or dependent) shall be granted free choice of any legally constituted hospital, or legally qualified physician or surgeon.

Exclusions

The insurance under the Wisconsin Plan does not apply: (a) to

disability due to bodily injury arising out of or in the course of the employee's (or dependent's) employment, nor to disability due to occupational or other disease or sickness covered by any applicable workmen's compensation or occupational disease law; (b) to disability for which the employee (or dependent) is not treated by a legally qualified physician or surgeon.

Payment of Premiums

Premiums are payable monthly, quarterly, semi-annually or annually. Group policies can be issued on the non-contributory basis insuring all eligible employees without contribution on their part toward the payment of premiums as respects themselves or their dependents, with the employer paying the entire premium. Group policies can also be issued on the contributory basis insuring all eligible employees who subscribe to the plan and agree to contribute toward the payment of premiums as respects themselves or their dependents or both. The underwriting rules of some of the companies require that the employer's contribution must be at least 25% of the total premium. Another requirement of most of the companies is that if the contributory plan is applied for, at least 75% of the eligible employees must subscribe before it becomes effective. Since the Wisconsin Plan must cover both employees and dependents, at least 75% of the eligible employees having dependents must subscribe to the plan both for themselves and their dependents.

RATES

The committee of insurance carriers, having determined the basic coverage to be afforded, naturally turned to the rates which had been developed by the actuaries of the large life insurance companies as a basis for promulgating Wisconsin Plan rates.

The basic monthly rate, common to many of the life companies, which had been developed for Hospital Expense for employees was \$.11 per \$1 daily benefit for policies on a fixed daily benefit basis and \$.10 on a reimbursement basis. Policies on the fixed daily benefit basis would pay the face amount, for example \$5, for each day of hospital confinement while the policies on a reimbursement basis would pay only the actual hospital expense per day subject to a maximum of \$5 per day. The \$.10 basic monthly rate was adopted for the Wisconsin Plan because the hospital expense thereunder is on the reimbursement basis.

In the case of Surgical Expense the schedule of benefits recommended by the Medical Society committee contained a higher fee schedule and was more comprehensive than that in the policies of the life insurance companies. The insurance company committee

estimated that the increased fee schedule under the Wisconsin Plan would cost about 25% more for employee's Surgical Expense. Therefore, the basic 40 cent rate being used by many of the life insurance companies was increased to 50 cents for Surgical Expense coverage for employees under the Wisconsin Plan.

In like manner, a comparison was made between the expected cost under the Wisconsin Plan as compared with the life insurance company policies for dependents' Hospital and Surgical Expense. As in the case of employees' coverage, the basic rates for dependents' coverage were keyed to the life company basic rates, adjusted to take into account any increased benefits under the Wisconsin Plan. The loadings for sex and race, age and industry were established to conform with similar loading schedules developed by life insurance company actuaries.

The "package policy" idea developed early in the studies leading up to the final Wisconsin Plan. With a package policy in mind, the basic rates were developed in terms of uniform provisions. The 31-day maximum was adopted for Hospital Expense. The reimbursement plan of payment subject to a maximum \$5 per day was selected as the standard. Maximum hospital benefits were fixed at 36 times the daily maximum or \$180. For maternity cases, the maximum was set at 14 times the \$5 daily rate or \$70.

Complete family protection is an objective under the Wisconsin Plan. Both employees' and dependents' Hospital and Surgical Expense Coverage must be written. Coverage for employees only cannot be written under the Wisconsin Plan.

The rates and loadings in the following sections of this paper are those from the filing of one of the companies with the Wisconsin Insurance Department.

WISCONSIN PLAN GROUP RATES

	Monthly Rates		
Employees Hospital (.10 per \$1)			\$.50
" Surgical			.50
			\$ 1.00
	Number of Dependents		
	One	More than One	Composite*
Dependents Hospital and Surgical	\$2.90	\$4.00	\$3.50
Total - Employee and Dependents	3.90	5.00	4.50

*A composite rate is a single rate for dependents' coverage regardless of the number of dependents.

Above rates are subject to the following loadings:

Employees Hospital - Sex and race, age, industry
 " Surgical - Sex and race, age
 Dependents Hospital and Surgical - Race

Schedule of Loadings

1. Sex and Race Loading

Percentage of Total Benefits for which Female and Non-Caucasian Employees are Eligible:	Percentage Loading of Basic rate
Less than 11%	None
11% but less than 21%	15%
21% " " " 31%	25%
31% " " " 41%	35%
41% " " " 51%	45%
51% " " " 61%	55%
61% " " " 71%	65%
71% " " " 81%	75%
81% " " " 91%	85%
91% " " " 101%	95%
etc. to	
191% or more	195%

2. Age Loading

Percentage of Benefits on Employees Age 60-69 plus 3 times % of Benefits on Employees Age 70 and Over	Percentage Loading of Basic Rate
Less than 15%	None
15% but less than 25%	10%
25% " " " 35%	15%
35% " " " 45%	20%

3. Industry Loading

Classification of Industries Industry	Min. Percen- tage Loading
Breweries, wine manufacturers, wholesale liquor dealers, and wine merchants	15%
Distilleries of ethyl or methyl alcohol or alcoholic beverages	15%
Furriers	15%
Gypsum, Lime cement (no quarrying)	15%

Industry	Min. Percentage Loading
Hot Metal Industries (Steel Works; Rolling Mills; Tube, Rod and Pipe Mills; Wire Drawing; Malleable Iron Works; Foundries Smelting and Refining - except lead and zinc)	15%
Marble and Stone yards - No cutting and polishing	15%
Mines (Surface and Underground and quarries)	40%
Railroads	25%
Refractories	15%
Smelting and refining	15%
Tanneries	15%
Textiles Industries, including any and all operations from the receipt of the raw material to and including spinning, weaving, knitting, braiding, bleaching, dyeing and finishing of any product from cotton, wool, rayon, hemp, jute, silk and linen. (This applies only in Ala., Ark., Fla., Ga., Ky., La., Md., Miss., Mo., N.D., Okla., S.C., Tenn., Texas, Va., and W. Va.)	15%
Woodsmen and loggers	25%

4. Extra Charge for Immediate Maternity - Immediate maternity benefits for employees' wives insured on the policy date, or within 31 days thereafter, are not included in the basic rates but may be provided on payment by the employer of the additional single premium indicated below with respect to each such wife. The additional single premium may be paid in one sum or in 12 monthly installments. In the latter case, the payments must be continued for the full 12 months even though the employee's services may terminate before the expiration of the 12 months' period.

	Hospital Expense	Surgical Expense
Either: One sum, payable at issue	\$4.00	\$4.20
Or: 12 Monthly installments of:	.35 per mo.	.35 per mo.

Special Rating for Group Risks

The Wisconsin Plan has not been in effect for a sufficient time for special rating based upon loss experience. These special rating plans will vary with the different carriers but are expected to recognize the variance in a group risk's loss experience from normal or expected in one of two ways: (a) an experience rating plan; or (b) a retrospective rating plan similar to that in effect in the Workmen's Compensation risk underwriting.

WISCONSIN PLAN FRANCHISE AND INDIVIDUAL RATES

Combined Hospital and Surgical - Monthly Rates

	Franchise	Individual
Insured Male	\$1.10	\$1.20
Insured Female	1.70	1.90
Additional Rates for		
Dependents' Hospital and Surgical:		
A Dependent Spouse	3.30	3.50
A Minor Dependent	2.20	2.40
Two or More Dependents	4.40	4.80

FUTURE DEVELOPMENT

The short time that the Wisconsin Plan has been in existence does not permit too many observations as to its current success and probable future development.

More flexibility may be desirable in some of the aspects of the Wisconsin Plan which are not responsive enough to changing conditions or variable conditions throughout the state.

The Full Payment Provision applies to persons without dependents and with incomes less than \$40 per week or \$50 or less per week for persons with dependents. Measured by current salary and wage levels these limits do not include a large enough proportion of the insured persons under the Full Payment Provision. Now pending for consideration is a proposal to change these income limits to \$2,000 per year for persons without dependents and to \$3,600 for persons with dependents.

Wisconsin Plan basic rates are now keyed to a \$5 per day hospital expense benefit. To reduce the cost of employers and employees it may be necessary to allow a lower amount per day as better adapted to needs outside metropolitan areas of the state.

The Wisconsin Plan covers surgical, obstetric and hospital expense for employees and dependents. Most carriers will endorse

their policies to cover Medical Expense Benefits for professional visits by physicians. This is typical of some extensions of coverage which may be added in the future to the Wisconsin Plan.

The currently favorable loss experience of many of the companies which have written hospital and surgical expense under the Wisconsin Plan is not too reliable. The period of the experience has been too short to pick up the normal lag in actual incurred losses. First year expenses of the companies have been high and there is yet no backlog of renewals to average down the expense ratio.

The status of cooperative ratemaking under state regulation after the expiration of the moratorium in Public Law 15 on January 1, 1948, may have a decisive effect on this Wisconsin Experiment. However, the public demand for adequate hospital and surgical care is too deep-rooted to materially halt its progress. Industry, the medical society, and the private insurance companies must and will continue to provide this social insurance within whatever Federal legal framework is developed.

The future loss experience and the ability of the private insurance companies to carry out a social insurance program at a low cost commensurate with satisfactory service will influence public acceptance of the idea embodied in the Wisconsin Plan.

GROUP DISABILITY POLICY

BLANK INSURANCE COMPANY

(A mutual insurance company, herein called the company)

Agrees with the employer named in the copy of the application and in the schedule of benefits, both of which are made a part hereof, in consideration of the payment of the premium and in reliance upon the statements in the application and subject to the exclusions, conditions and other terms of this policy:

INSURING AGREEMENTS

- I** Coverage. To pay the benefits provided by this policy to any insured employee who sustains disability resulting from accidental bodily injury or sickness.
- II** Insured Employees. If the insurance is afforded under the non-contributory plan the insured employees are those eligible for the insurance. request for the insurance.
 If the insurance is afforded under the contributory plan employees in the eligible classes, as stated in the application, who agree to contribute become insured employees. Enrolled employees, in an eligible class, of the subsidiary or affiliated companies named in the application shall be deemed insured employees.
 If an employee is not at work on the date when he would otherwise become insured the effective date of such employee's insurance shall be the date of his return to work.
 An employee shall cease to be an insured employee at the earliest time indicated below:
- (a) upon the date of eligibility if request for the insurance is made prior to that date, or
- (b) upon the date of such request if made within the first thirty-one days of eligibility, or
- (c) upon the date the company determines evidence of insurability to be satisfactory, such evidence to be furnished at the expense of those employees who request insurance more than thirty-one days after the date of their eligibility, or who request reinstatement of their insurance after it has been discontinued because of their failure to make any agreed contributions when due, but the insurance shall not be invalidated as to any employee by failure of the employer to record or report his written
- (a) when he fails to make any agreed contribution when due,
- (b) when he ceases to be within a class of employees eligible for the insurance,
- (c) when he is pensioned or retired,
- (d) when his employment terminates,
- (e) when he is absent from work for more than 31 consecutive days by reason of authorized vacation, temporary lay-off or leave of absence.
- III** Policy Period, Renewals. This policy applies only to disability which begins during the policy period. the time of such renewal, provided the number of insured employees is, if the insurance is under the contributory plan, not less than seventy-five per cent of those eligible or, if the insurance is under the non-contributory plan, not less than the total number of those eligible and in either case not less than the minimum provided by law.
 On the date stated in the schedule of benefits as the end of the policy period and on each anniversary thereof this policy is renewable for an additional annual period by the payment of the premium, in accordance with the provisions of this policy, at the company's premium rates in effect at

EXCLUSIONS

- This policy does not apply:
- (a) to disability due to bodily injury arising out of or in the course of the employee's employment, nor to disability due to occupational or other disease or sickness covered by any applicable workmen's compensation or occupational disease law;
- (b) to disability for which the employee is not treated by a legally qualified physician or surgeon.

CONDITIONS

(Under this section are 16 conditions of a type standard in all group policies.)

PARTS I AND II
SCHEDULE OF BENEFITS AND PREMIUM RATES

Group Disability Policy No.

BLANK INSURANCE COMPANY

Name of employer _____

Policy Period: From _____ to _____ 12:01 A. M.,
standard time at the address of the employer as stated in the application.

The insurance afforded is only with respect to the benefits stated in such Part or Parts of the Schedule of Benefits as are indicated by the entry of a premium rate. The entry of the letter "X" indicates that no insurance is afforded with respect to such Part.

BENEFITS <small>The benefits are in such amounts as are shown in the application as applicable to the class of which the employee is a member.</small>	PREMIUM BASES	MONTHLY PREMIUM RATES
PART I. Hospital Expense Benefits	Per \$1 of Daily Benefits in Force	
PART II. Surgical Expense Benefits	Per \$150 of Benefits in Force	

Part I.—Hospital Expense Benefits—The benefits under this Part consist of payments for hospital expense as follows, subject to the following provisions:

Up to the Maximum Daily Benefit per day, for not more than _____ days, of hospital charges actually incurred by an insured employee for room and board during one confinement because of accidental bodily injury sustained or sickness contracted by such employee, and the amount of all other hospital charges for therapeutic services, including ambulance service to and from the hospital, but not including special nursing services, during such confinement, subject to a maximum per confinement, for all hospital charges including room and board, of _____ times the Maximum Daily Benefit, except that with respect to hospital confinement due to any one pregnancy, including resulting childbirth, abortion or miscarriage, such maximum shall be fourteen times the Maximum Daily Benefit.

Benefits for hospital room and board and other hospital charges will be paid only with respect to a hospital confinement for which a hospital room charge is made, but if the only hospital charge is for emergency treatment for accidental bodily injury the room charge requirement is inapplicable.

With respect to benefits under this Part, on account of pregnancy, including resulting childbirth, abortion or miscarriage, an employee shall not become an insured employee until nine months after she has become such an employee with respect to other benefits under this policy. This provision does not apply to any employee who became an insured employee on the effective date of this policy or within thirty-one days thereafter.

Successive periods of hospital confinement shall be considered one period of confinement unless the subsequent confinement commences after return to work on full time and after complete recovery from the injury or sickness causing the previous confinement, or unless the subsequent confinement is due to causes entirely unrelated to the causes of the previous confinement.

Part II.—Surgical Expense Benefits—The benefits under this Part consist of payments in accordance with the Schedule of Surgical Expense Benefits, made a part hereof, subject to the following provisions:

Payment under this Part for any one operation shall not exceed the fees actually incurred by an insured employee for such operation nor the applicable amount stated in the schedule for such operation, and the total payments for all operations performed during one period of disability shall not exceed the applicable Maximum Benefit.

With respect to obstetrical operations an employee shall not become an insured employee until nine months after she has become such an employee with respect to other benefits under this policy. This provision does not apply to any employee who became an insured employee on the effective date of this policy or within thirty-one days thereafter.

Successive operations shall be considered to have been performed during one period of disability unless the subsequent opera-

(Continued on reverse side)

Date of Issue _____

Countersigned _____

tion is performed after return to work on full time and after complete recovery from the injury or sickness causing the previous operation, or unless the subsequent operation is due to causes entirely unrelated to the causes of the previous operations.

FURTHER PROVISIONS

1. **Definition of Disability.** The word "disability" shall mean, (1) when used in connection with Part I, hospital confinement for which benefits are afforded, or (2) when used in connection with Part II, undergoing a surgical operation for which benefits are payable under the Schedule of Surgical Expense Benefits.

2. **Extended Insurance Benefits.** If an employee becomes confined in a hospital, or undergoes an operation, for causes other than childbirth, abortion or miscarriage, after termination of insurance but prior to the expiration of the three months' period immediately following such termination, and if due proof is furnished that the confinement or operation would result in a valid claim under this policy were the insurance in force at the commencement of such confinement or date of such operation, the company will recognize this as the basis for such claim, provided (a) the confinement or operation was the result of an injury which was sustained or sickness resulting in disability which began during the policy period; (b) the employee was totally disabled by such injury or sickness when the insurance terminated and remained continuously so disabled until confined or until such operation was performed.

Hospital confinement and obstetrical operation for childbirth, abortion or miscarriage, will also be recognized as the basis for a claim under this policy if the confinement commences or the operation is performed within nine months after termination, provided the confinement or operation would result in a valid claim were the insurance in force at the time of the confinement or operation, and provided termination of insurance was not due to failure of the employee to continue any agreed contributions toward premium payments while remaining eligible for the insurance.

PARTS IA AND IIA
RIDER PROVIDING BENEFITS WITH RESPECT TO DEPENDENTS
(Including Maternity Benefits)

Effective Date of this Rider

Date of Issue

BLANK INSURANCE COMPANY
(A mutual insurance company, herein called the company)

Agrees with

(herein called the Employer)

named in the copy of the application, in consideration of the payment of the additional premium and subject to the provisions of Policy No. _____ of which this Rider forms a part, that such insurance as is afforded by said policy with respect to insured employees is extended to insure such employees with respect to their dependents subject to the following provisions:

Except as used with reference to eligibility, the word "employee" as used in the policy, other than in this Rider, to apply to the insurance afforded by virtue of this Rider shall mean "dependent".

The insurance afforded such insured employees with respect to their dependents is only with respect to the benefits stated in such Part or Parts of the Supplementary Schedule of Benefits as are indicated by the entry of a premium rate. The entry of the letter "X" indicates that no insurance is afforded with respect to such Part.

SUPPLEMENTARY SCHEDULE OF BENEFITS		
BENEFITS The benefits are in such amounts as are shown in the application as applicable to the class of which the employee is a member.	PREMIUM BASES	MONTHLY PREMIUM RATES
PART IA. Hospital Expense Benefits	Per \$1 of Daily Benefits in force for Children Wife Wife and Children Composite*	
PART IIA. Surgical Expense Benefits	Per \$150 of Benefits in force for Children Wife Wife and Children Composite*	

*Determined on the basis of the distribution of insurance at effective date of this Rider and to be used in computing the premiums for this Rider.

EXCLUSIONS

This Rider does not apply:

- (a) to disability due to bodily injury arising out of or in the course of the dependent's employment, nor to disability due to occupational or other disease or sickness covered by any applicable workmen's compensation or occupational disease law;
- (b) to disability for which the dependent is not treated by a legally qualified physician or surgeon;
- (c) if the application shows that the maternity benefits applied for are subject to a nine months waiting period the insurance does not apply with respect to hospital confinement of or obstetrical operation upon a dependent caused by her pregnancy, resulting childbirth, abortion or miscarriage, if such confinement begins or such operation is performed within nine months after the insurance would otherwise become effective with respect to such dependent;
- (d) with respect to such maternity benefits as are afforded under Part IA of the Supplementary Schedule of Benefits, to disability in excess of that requiring the payment of benefits equal to fourteen times the maximum daily benefit, if caused by any one pregnancy, resulting childbirth, abortion or miscarriage.

(Continued on reverse side)

FURTHER PROVISIONS

Definitions. The word "dependent" shall mean the wife, or any unmarried children of an employee, excluding:

- (a) children less than three months of age, or eighteen or more years of age;
- (b) the wife of an employee, if legally separated from the employee; and
- (c) the wife or any child who is also an employee of the employer and who is eligible for insurance under the policy as an employee, or who is entitled to benefits under the extension of benefits provisions of insurance for employees.

The word "children" shall include the employee's children, step-children, legally adopted children, and foster children, provided they are dependent upon the employee for support and maintenance and have been reported to the employer for the insurance.

Eligibility and Effective Date. Eligibility for insurance under this Rider shall be on the latest of the following dates: (a) On the effective date of this Rider, or (b) on the date the employee first acquires a dependent, or (c) on the date the employee becomes eligible for insurance under the policy.

If a dependent is confined in a hospital on the date the insurance would otherwise become effective, the effective date of insurance with respect to such a dependent shall be deferred until final discharge from the hospital.

Period of Disability. Successive periods of hospital confinement and successive operations shall be considered to have occurred during one period of disability unless the subsequent confinement commences, or unless the subsequent operation is performed, after complete recovery from the injury or sickness causing the previous confinement or operation, or unless the subsequent confinement or operation is due to causes entirely unrelated to the causes of the previous confinement or operation.

Termination of Insurance. The insurance with respect to a dependent shall terminate if the employee ceases to be an insured employee, or if the dependent ceases to be a "dependent" as herein defined.

In Witness Whereof, the Blank Insurance Company has caused this Rider to be executed at

SECRETARY

SCHEDULE OF SURGICAL EXPENSE BENEFITS

The Benefit stated in the following Schedule for each operation is the maximum amount for which the company will be liable for such operation; the Maximum Benefit for all operations during any one period of disability is \$150.

Benefits for operations which are not listed in this Schedule will be determined by the company and will be in amounts which are comparable to those listed.

Physicians and surgeons who are subscribers to the Wisconsin Plan, accepted and approved by the State Medical Society of Wisconsin, have agreed with the said Society that their charges for operations, including usual pre- and post-operative care, described or referred to in this Schedule, will not exceed the benefit herein provided for such operations provided the insured employee is within the Eligible Income Group (insured employee without dependents whose rate of remuneration from the employer at the time of disability does not exceed \$2,080 per year, and employee with dependents whose rate does not exceed \$2,600 per year) and directs the company to pay the amount of the benefit to the physician or surgeon performing the operation. This Schedule represents charges that are less on the average than the usual charges of subscribing physicians and surgeons.

SURGICAL PROCEDURES

Description of Operation	Maximum Benefits	Description of Operation	Maximum Benefits
INFECTIONS AND TRAUMATA			
Abscesses (deep) incision and drainage	\$ 10.00	Appendicostomy	75.00
Carbuncle, operative (Surgical Management only)	25.00	Subdiaphragmatic abscess	100.00
Ulcer surface, excision	10.00	Cholecystectomy	125.00
Septic finger (tendon sheath involvement)	50.00	Common duct, resection or reconstruction	150.00
Grafts, extensive	50.00	Pancreas, drainage	125.00
CYSTS			
Cysts, sebaceous, removal	10.00	Splenectomy	150.00
Pilonidal cyst or sinus	50.00	PROCTOLOGY	
Thyroglossal cyst, removal	125.00	Hemorrhoids, injection treatment (complete procedure)	25.00
TUMORS			
Tumors, external, removal	10.00	Hemorrhoidectomy, external single	25.00
Tumors, complicated, removal	25.00	Hemorrhoidectomy, external multiple	50.00
Epithelioma of face, surgical removal	50.00	Hemorrhoidectomy, internal and external	50.00
Cancer of lip (local operation)	35.00	Fistulotomy, single	50.00
BIOPSY			
Biopsy, superficial	10.00	Fistulotomy, multiple	75.00
Biopsy, needle aspiration	5.00	Abscess, ischio-rectal drainage	20.00
GLANDS			
Glands, superficial, removal	10.00	Carcinoma of rectum, extirpation	150.00
Dissection glands of neck (for cancer)	100.00	Prolapsed rectum, repair	100.00
THYROID			
Thyroid, gland, one or more poles, ligation	75.00	UROLOGY	
Lobectomy	100.00	Urethrotomy, external	50.00
Parathyroidectomy	150.00	Prostatic abscess	50.00
BREASTS			
Breast tumor, removal	35.00	Prostatectomy, perineal	125.00
Breast, simple removal	75.00	Epididymectomy	50.00
MISCELLANEOUS			
Ligation, saphenous vein, low	25.00	Vesiculectomy	100.00
Extensive bilateral varicose veins	75.00	Cystostomy or cystostomy	75.00
Toe nail, ingrown, removal radical	10.00	Bladder Tumor, diverticula, etc. (resection)	125.00
Removal of coccyx	35.00	Nephrectomy	150.00
CASTS			
Plaster or Similar Material— (Not including first application with reduction or operation)		Plastic Hypo—and epispadias	125.00
Whole arm	10.00	Caruncle excision	25.00
Leg to knee	7.50	OBSTETRICS	
Leg spica	25.00	Pregnancy, delivery with monthly office pre-natal and office six week post-natal care (exclusive of medical complications)	50.00
Plaster jacket (including head)	30.00	Miscarriage (curettage)	25.00
THORACIC SURGERY			
Empyema, closed drainage	50.00	Caesarean section, vaginal	100.00
Thoracoplasty (complete)	150.00	GYNECOLOGY	
Aneurysmorrhaphy	100.00	Atresia of vagina, correction	50.00
ABDOMINAL SURGERY			
Abdomen, paracentesis	10.00	Fistula, recto-vaginal	100.00
Herniotomy, single, inguinal, femoral, or umbilical	75.00	Dilatation and curettage	25.00
Herniotomy, bilateral (same or successive days)	100.00	Uterine polyp, removal	25.00
inguinal or femoral	100.00	Ovarian tumor removal	100.00
Herniotomy, post operative	100.00	Hysterectomy, total	150.00
Esophagoscopy	25.00	Supravaginal hysterectomy, subtotal	100.00
Gastrostomy	100.00	Combined cervical and vaginal repair (no procioidal)	150.00
Gastric ulcer, excision	125.00	Carcinoma of the cervix—radiation therapy—including cost of the radium	125.00
Gastrectomy	150.00	OPHTHALMOLOGY	
Peptic ulcer, perforated, closure	100.00	Conjunctival suture	15.00
Duodenal ulcer, excision (pyloroplasty)	125.00	Lachrymal sac, removal, or dacryocystorhinostomy	30.00
Intestines, anastomosis	100.00	Entropion or ectropion, plastic operation	60.00
Adhesions, freeing of	75.00	Tarsorrhaphy	75.00
Laparotomy, exploratory	75.00	Strabismus, two or more stages	100.00
Colon resection (with one closure colostomy)	150.00	Cataract, needling	25.00
Appendectomy	100.00	Cataract, removal	100.00
Diverticulum, intestinal	100.00	Enucleation	75.00
Appendiceal, abscess, drainage	75.00	Evisceration	75.00
		OTOLOGY	
		Patent tympani	5.00
		Mastoidectomy, acute simple	100.00
		Mastoidectomy, radical bilateral	150.00
		NOSE AND THROAT	
		Nasal polyps, removal, unilateral	15.00
		Nasal polyps, removal, bilateral	25.00
		Antrum window, bilateral	50.00

(Continued on Reverse Side)

Description of Operation	Maximum Benefits
Frontal sinus, external radical	125.00
Tonsillectomy and adenoidectomy	25.00
Larynx, intubation	25.00
Laryngectomy	150.00
Laryngoscopy, operative	50.00
NEURO-SURGERY	
Fractures, Injuries, Tumors	
Skull	
Simple (non-operable) without intracranial injury	25.00
Simple (non-operable) with intracranial injury	75.00
Depressed	75.00
Compound	150.00
Spine	
Cases uncomplicated by cord damage	
Injury	50.00
Compound	150.00
Brain Injuries: Operable type	
Extradural hematoma	150.00
Subdural hematoma	150.00
Spinal Cord Injuries	
Section of anterior roots for spasm	150.00
Decompressive laminectomy	150.00
Removal of or exploration for an extruded nucleus pulposus or ruptured intervertebral disc	150.00
Miscellaneous	
Suture, decompression, and transplantation of single or multiple nerves	100.00
Brain tumors	150.00
Section of sensory root for Vth nerve neuralgia	125.00
Craniotomy for brain abscess	150.00
Excision of meningocele	75.00
Injection of Vth nerve ganglion or branches	25.00
Sympathetic System	
Unilateral resection of any part	100.00
Bilateral resection of any part	150.00
BONE, JOINT, TENDON, SURGERY	
Simple Fractures	
Nose	15.00
Ribs	10.00
Humerus	50.00
Radius and ulna, shaft	50.00
Fracture head of radius	50.00
Finger	10.00

Description of Operation	Maximum Benefits
Pelvis	75.00
Tibia, shaft	40.00
Tarsal bone, one, excluding os calcis and astragalus ..	25.00
Great toe	10.00
For Fractures Requiring an Open Operation or Skeletal Traction	
(The maximum amount of reimbursement will be twice the amount shown above for corresponding simple fractures up to \$150.00)	
Compound Fractures	
All compound fractures are allowed double the fee of simple fractures up to \$150.00	
Fresh Uncomplicated Dislocations	
Spine	100.00
Maxilla, inferior	5.00
Shoulder	15.00
Wrist	35.00
Hip	50.00
Knee	50.00
Knee, semi lunar cartilage requiring open operation ..	100.00
Metatarsal bone, one	15.00
Metatarsal bone, each additional bone	5.00
Joint Resections	
Shoulder joint, resection	150.00
Elbow joint, resection	100.00
Hip joint, resection	150.00
Orthopedic	
Spinal fusion	150.00
Bone graft	150.00
Tenotomy	25.00
Arthroplasty, any major joint	150.00
Amputations	
Shoulder	125.00
Upper arm	75.00
Hand	50.00
Thigh	100.00
Toe	10.00
Foot	50.00
BLOOD TRANSFUSIONS	
(Not including cost of blood)	
First transfusion	10.00
Subsequent transfusions—each	5.00

MISCELLANEOUS PROCEDURES

The following procedures shall be deemed to be operations within the meaning of this policy if performed in connection with a surgical procedure for which benefits are payable and if performed outside of a hospital, but the maximum amount for which the company may be liable on account of such procedures performed during any one period of disability shall be as follows: For Radiology Benefits, \$35; for Anaesthesia, \$15; subject, however, to the applicable Maximum Benefit of \$150 for all surgical and miscellaneous procedures during any one period of disability.

Description of Operation	Maximum Benefits
RADIOLOGY	
Head and Neck	
Skull	10.00
Ventriculography	15.00
Eye for foreign body	10.00
Eye for localizing foreign body (extra)	15.00
Mastoids (a) regular	10.00
Nose	5.00
Optic foramina	10.00
Neck for soft tissue	10.00
Chest	
Thorax—ribs	10.00
Sternum	5.00
Lungs, posterior—anterior and lateral	10.00
Heart, single teleo roentgenogram	7.50
Spine and Pelvis	
Spine, cervical	10.00
Spine, lumbar and pelvis	15.00
Spine, entire	20.00
Pelvis	10.00
Upper Extremities	
Shoulder girdle	10.00
Clavicle	5.00
Elbow	5.00
Wrist	5.00
Finger	5.00
Lower Extremities	
Hips	10.00
Knee	5.00

Description of Operation	Maximum Benefits
Ankle	5.00
Foot	5.00
Gastro-Intestinal	
Gastro-intestinal tract by barium meal (with or without preliminary film of abdomen)	15.00
Gastro-intestinal tract by barium meal and enema	25.00
Gastro-intestinal tract—barium meal and gall-bladder (dye) and colon (enema)	35.00
Gall-bladder by dye method	15.00
Colon by barium enema (complete)	15.00
Kidney in situ (operating table)	10.00
Urological	
Genito-urinary, simple K U B	7.50
Pyelogram, intravenous (with injection of medium) ..	15.00
Pyelogram, retrograde	15.00
Cystography	10.00
Urethro-cystography	10.00
Fluoroscopic and General	
Reduction of fractures	5.00
Foreign body detection	5.00
Foreign body removal (endoscopic)	10.00
Foreign bodies in esophagus or respiratory tract	10.00
ANAESTHESIA	
(By other than surgeon or assistant)	
Amounts stated include the cost of materials used	
Less than half hour	5.00
Half hour to one and a half hours	10.00
Over one and a half hours	15.00

EXHIBIT E

PARTICIPATING PHYSICIAN OF
THE STATE MEDICAL SOCIETY OF WISCONSIN
FOR
THE WISCONSIN PLAN

I hereby subscribe as a participating physician under the Wisconsin Plan for prepaid surgical, obstetric, and hospital insurance, and the added insurance covering certain associated radiology and anesthesiology, as has been accepted and approved by the State Medical Society of Wisconsin. I further agree to abide by the rulings of the Conference Committee which will function under the Wisconsin Plan for the express purpose of facilitating any administrative problems that may arise. I reserve the right to withdraw as a participating physician at any time, providing that such withdrawal can be effective only upon the publication date of new lists of participating physicians.

Name	Address	Date

EXHIBIT F

DIRECTION TO PAY AND PHYSICIAN'S AGREEMENT
(Wisconsin Plan)

Date _____

IN CONSIDERATION of the Physician's Agreement hereto annexed, I hereby authorize and direct the BLANK INSURANCE COMPANY to pay to Name, Address the surgical benefits to which I may or become entitled under the Wisconsin Plan Disability Policy issued to (Name of Employer, Organization, or Other Insured) by reason of service performed. I am within the Eligible Income Group, as defined below.

(Signature of Employee or Insured)

IN CONSIDERATION of the direction to pay hereto annexed, I hereby agree with (Employee or Insured) that my charges for the services which are included in the Schedule of Surgical Expense Benefits (Wisconsin Plan), rendered to said employee, whose signature appears above, shall not exceed the amount specified therein, provided that said employee is within the Eligible Income Group (insured employees without dependents whose rate of remuneration from the employer at the time of disability does not exceed \$2,080 per year, and employee with dependents whose rate does not exceed \$2,600 per year).

(Signature of Physician)

MULTIPLE INJURY ACCIDENTS AND LOSSES IN EXCESS
OF ANY SPECIFIC RETENTION: - PENNSYLVANIA
WORKMEN'S COMPENSATION

BY
GEORGE B. ELLIOTT

INTRODUCTION

In the fall of 1945, at the request of the Pennsylvania Insurance Commissioner, the Pennsylvania Compensation Rating and Inspection Bureau made an analysis of multiple injury accidents occurring under the workmen's Compensation Act. While at present the question of rate-making for this form of insurance in Pennsylvania is somewhat academic, the tabulations made in connection with the Bureau's study, as well as others which have been compiled since that time, are factual, and it is hoped they will serve as a statistical approach to the problem of determining pure premiums for excess workmen's compensation insurance.

SCOPE OF THE STUDY

Experience under excess contracts issued to self-insurers was available for policy years 1942 and 1943, but it was so limited that it had little value for rate-making purposes. Accordingly, the experience of the fifteen policy years 1928 to 1942, for insured risks other than coal mining, was selected as the basis for the study. This information was supplemented from the records of the Coal Mine Section of the Rating Bureau, for the fifteen calendar years 1930 to 1944. For risks other than coal mining, the experience of "Large Risks" and "Small Risks" was tabulated separately. "Large Risks" are those risks having a premium of approximately \$10,000 or more at manual rates. "Small Risks" include all other risks with the exception of minimum premium risks, and it is this group whose experience forms the basis of Pennsylvania manual rates. The validity of a rate-making theory which expresses the rates for excess insurance contracts issued to self-insurers (usually very large risks) as a percentage of manual rates which, in Pennsylvania, are developed from the experience of the smaller risks, and in other states from the experience of all risks, both large and small, was questioned both by the Rating Bureau and the Insurance Department. For that reason the separate tabulations referred to above were made. Mr. Howard Crane, in his discussion of Mr. Cahill's excellent paper on "Excess Coverage (Per Accident Basis) for self-Insurers," (1) voiced much the same criticism of the "per cent of manual rate" method.

(1) P. C. A. S., Vol. XXVII.

The material here presented is developed for losses in excess of \$10,000 per accident under a relatively low scale of benefits. However, the method used is equally applicable to experience under other benefit levels and with the same or higher retentions.

The experience, including coal mining, of the fifteen years included in the study developed a payroll exposure (translated to 1946 wage levels) of \$55,607,373,000, total incurred losses of \$235,815,200 (1946 basis), and excess losses over \$10,000 per accident of \$2,116,972 (1946 basis). There were 2,546 single accident cases involving cost in excess of \$10,000 and 397 multiple injury cases involving injury to two or more persons.

MODIFICATION OF LOSSES AND PAYROLLS

Since the accidents under review occurred over a period of fifteen years, under different benefit levels, and in periods of varying wage rates, some means of translating the cost of the multiple injury cases, as well as all losses, to present-day levels was necessary. The first step in computing total losses was to tabulate the accidents by degree of injury for all classifications having multiple injury accidents, as well as for the total experience by major industry divisions. Separate tabulations were made for "Large Risks" and "Small Risks." The average cost per case for each kind of injury (except Permanent Total) as used in the 1946 rate revision was then multiplied by the number of accidents and the results tabulated in the manner shown in Table III. The values for single accident cases are as follows:

Kind of Injury (1)	Average Comp. and Med. (2)	Average Comp. (3)
Death	\$ 4 100	
Perm. Total	9 200	
Major Perm.	2 469	
Minor Perm.	690	\$592.00
Temporary		71.36

Medical cost of Minor Perm., Temp., and Non-Comp. as reported x 1.05.

42 MULTIPLE INJURY ACCIDENTS AND LOSSES IN EXCESS OF ANY SPECIFIC
RETENTION: - PENNSYLVANIA WORKMEN'S COMPENSATION

(The Value assigned to Permanent Total cases will be discussed later in connection with the valuation of losses for excess of \$10,000.)

Payrolls were translated by wage factors to the current wage level by the following procedure:

(1) The average weekly compensation wage for each of the major industry divisions was tabulated for each policy year of the fifteen-year period and the numerical average was then determined. These averages are as follows:

Manufacture and Utilities	\$25.04
Contracting and Quarrying	28.63
Other Industries	22.32

(2) The anticipated average weekly compensation wages for 1946-1947 are as follows:

Manufacture and Utilities	\$46.00
Contracting and Quarrying	49.00
Other Industries	39.00

(3) Payroll multipliers were determined by finding the ratio between 1946-1947 anticipated wages and the numerical averages shown for the fifteen-year period. These multipliers, which were applied to payrolls as reported, are as follows:

Manufacture and Utilities	\$ 1.84
Contracting and Quarrying	1.71
Other Industries	1.75

VALUATION OF LOSSES FOR EXCESS OVER \$10,000

1. FATALITIES.

Of the several kinds of injury, the cost of death cases varies with dependency. The No Dependency cases were taken at \$300 - the funeral and medical cost. A death case involving a widow and three

children at maximum weekly compensation rates, without discount for death or remarriage of the widow, and with the average ages of the children being 5.5, 8.9 and 11.4 years respectively, (2) amounts to \$7,458, including funeral and medical, under the present Pennsylvania scale of benefits. In the case of a widow and nine children of ages 0, 2, 6, 8, 9, 11, 13, 14 and 16 years, the amount is \$10,836. Out of 1635 Fatalities in Policy Years 1939 to 1942, Table V, there were 320 "No Dependency" cases, and 145 with a widow and three or more children. The aggregate cost of the cases of widow and three or more children was \$1,159,028 or an average of \$7,993 (\$8,000). In every one hundred cases, therefore, it was assumed that Fatalities would be distributed in the following manner:

Dependency	No.	Average Cost
All	100	4 100
Widow and 3 or more children	9	8 000
Other dependents	71	4 676
No dependents	20	300

In the case of two-person injuries involving one or more deaths and also in the three-person and four-person cases, the range in possible cost - from \$300 to \$10,836 for a single death - is so great that the average death value has little significance. The probability of a death with widow and three or more children must be taken into account.

Given a two-death accident, the probability that both deaths will be of the \$8,000 class is:

$$(.09)^2 = .0081$$

The probability that one will be an \$8,000 case and the other a \$4,676 case is:

$$2(.09)(.71) = .1278$$

and the amount of the probable excess over \$10,000 is:

(2)

See "A Statistical Approach to Compensation Benefits"
 by G. C. Kelly, P. C. A. S. Vol. XXXII.

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RETENTION: - PENNSYLVANIA WORKMEN'S COMPENSATION

$$(\$16,000 - \$10,000).0081 = \$ 49$$

$$(\$12,676 - \$10,000).1278 = 342$$

\$391

Given a three-death accident, the combinations which will produce a loss in excess of \$10,000 have the following probabilities:

(1) Three \$8,000:

$$(.09)^3 = .0073$$

(2) Two \$8,000, one \$4,676:

$$3(.09)^2(.71) = .01725$$

(3) Two \$8,000, one \$300:

$$3(.09)^2(.20) = .00486$$

(4) One \$8,000, two \$4,676:

$$3(.09)(.71)^2 = .13611$$

(5) One \$8,000, one \$4,676, one \$300:

$$6(.09)(.71)(.20) = .07668$$

(6) Three \$4,676:

$$(.71)^3 = .35791$$

The sum of these probabilities, that is, the chance that in any three-death accident the cost will exceed \$10,000 is .59354.

The value of these probabilities is as follows:

$$(1) (\$24,000 - \$10,000) = \$ 10$$

$$(2) (\$20,676 - \$10,000) = 184$$

$$(3) (\$16,300 - \$10,000) = 31$$

$$(4) (\$17,352 - \$10,000) = 1,001$$

$$(5) (\$12,976 - \$10,000) = 228$$

$$(6) \quad (\$14,028 - \$10,000) = \$1,442$$
$$\$2,896$$

Similarly, in four-death accident, the combinations which will produce a loss in excess of \$10,000 have the following probabilities:

- (1) Four \$8,000:
 $(.09)^4 = .00007$
- (2) Four \$4,676:
 $(.71)^4 = .25412$
- (3) Three \$8,000, one \$4,676:
 $4(.09)^3(.71) = .00207$
- (4) Three \$8,000, one \$300:
 $4(.09)^3(.20) = .00058$
- (5) Two \$8,000, two \$4,676:
 $6(.09)^2(.71)^2 = .02450$
- (6) Two \$8,000, two \$300:
 $6(.09)^2(.20)^2 = .00194$
- (7) Two \$8,000, one \$4,676, one \$300:
 $12(.09)^2(.71)(.20) = .01380$
- (8) One \$8,000, three \$4,676:
 $4(.09)(.71)^3 = .12885$
- (9) One \$8,000, two \$4,676, one \$300:
 $12(.09)(.71)^2(.20) = .10889$
- (10) One \$8,000, one \$4,676, two \$300:
 $12(.09)(.71)(.20)^2 = .03067$

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RETENTION: - PENNSYLVANIA WORKMEN'S COMPENSATION

(11) Three \$4,676, one \$300:

$$4(.71)^3(.20) = .28633$$

The sum of these probabilities is .85182, and their value is:

(1)	(\$32,000 - \$10,000).00007 =	\$ 2
(2)	(\$18,704 - \$10,000).25412 =	2,212
(3)	(\$28,676 - \$10,000).00207 =	39
(4)	(\$24,300 - \$10,000).00058 =	8
(5)	(\$25,352 - \$10,000).02450 =	376
(6)	(\$16,600 - \$10,000).00194 =	13
(7)	(\$20,976 - \$10,000).01380 =	151
(8)	(\$22,028 - \$10,000).12885 =	1,550
(9)	(\$17,652 - \$10,000).10889 =	833
(10)	(\$13,276 - \$10,000).03067 =	100
(11)	(\$14,328 - \$10,000).28633 =	1,239
		\$6,523

Accidents involving five or more deaths can be used at the general average, as is evident from the following tabulation:

Multiple Injury Involving	Value for Excess of \$10,000	Value at General Average
Two Deaths	\$10,391	\$ 8,200
Three Deaths	12,896	12,300
Four Deaths	16,523	16,400

2. PERMANENT TOTAL DISABILITY.

Because of the advanced age of persons incurring Permanent Total Disability, it is reasonable to include a mortality factor for

deaths occurring during the 500 week benefit period provided under the Pennsylvania Act. The average age of persons incurring Permanent Total Disability for the four policy years 1939 to 1942 was 49.9 years. Using the mortality rates of the Table for Lives Disabled by Industrial Accidents, it was found that 30.51 deaths per hundred could be expected during the 500 week period. (See Table VI.) If it is assumed that these 30 deaths will be equally distributed over the 500 week period, then the average compensation period for such cases will be 250 weeks. This is equivalent to \$8,500 compensation at the maximum rate of \$20 per week, and, with medical costs of \$700, makes a total cost per case of \$9,200. This average can be represented by 70 cases of \$10,700 and 30 cases of \$5,700. The value of these for excess of \$10,000, because of the relatively small number of cases, can be taken at $(\$10,700 - \$10,000) \times 70$ or \$490 each.

3. MULTIPLE INJURIES.

An accident involving one Death and one case of Permanent Total Disability, since nearly all such cases will exceed \$10,000, can be taken at:

$$(4,100 + \$9,200) - \$10,000 = \$3,300.$$

Cases of two Permanent Total Disabilities can be taken at $(\$9,200 \times 2) - \$10,000 = \$8,400$; one Permanent Total Disability and one Major Permanent at $(\$9,200 + \$2,469) - \$10,000 = \$1,669$.

The following cases may be disregarded, since there is little chance they will exceed \$10,000:

- Two Major Permanents
- One Death and one Major Permanent
- One Death and one Minor Permanent
- One Permanent Total and one Minor Permanent
- One Major and one Minor Permanent
- Two Minor Permanents

The values used for excess of \$10,000 may be summarized as follows:

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RETENTION: - PENNSYLVANIA WORKMEN'S COMPENSATION

Values for Excess of \$10,000:

Single Accident Cases:

1 Permanent Total	\$ 490
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Multiple Injury Cases:

2 Permanent Totals	8 400
1 Death, 1 Perm. Total	3 300
1 Perm. Total, 1 Major Perm.	1 669
2 Deaths	391
2 Deaths, 1 Perm. Total	7 400
1 Death, 1 Perm. Total, 1 Major Perm.	5 769
1 Perm. Total, 2 Major Perm.	4 138
3 Deaths	2 896
2 Deaths, 1 Major Perm.	669
4 Deaths	6 523
2 Deaths, 2 Major Perm.	3 138

TABULATION OF MULTIPLE INJURY ACCIDENTS

All multiple injury accidents occurring during the fifteen-year period were reviewed. There were very few Temporary injuries in these accidents, and the cost of such injuries, as well as the medical cost of non-compensable cases was disregarded. The remaining multiple injury accidents were tabulated by manual classification and by type of accident. The cost of each case was computed and if it exceeded \$10,000 the excess loss above that amount was tabulated in the manner shown in Table IV. The excess cost for single cases of Permanent Total Disability was added to that for the multiple injury cases in order to determine the total excess cost for each classification and industry group. Tables VIII and IX show a summary by industry group of the accidents and the cost in excess of \$10,000 per accident, by number of persons injured. Pure premiums were calculated for total losses and for excess losses. These pure

premiums, as well as the ratios of excess losses to total losses, for each industry group, are shown in Table I.

COAL MINING

The period selected for study of coal mine experience was the fifteen calendar years 1930-1944. In general, the same methods were followed and need not be repeated in detail here. The following summary shows the values used in computing the excess cost for coal mining:

1. Averages for Computing Total Losses:

Kind of Injury	Average Comp. & Med.	Average Comp.
Death	\$4 600	
Perm. Total	9 400	
Major Perm. (ex. Disfig.)	3 815	
Disfigurement		\$270
Minor Perm.		590
Temporary		98.34

Medical Cost of Disfigurement, Minor Perm., Temp. and Non-Comp. as reported.

2. Dependency Distribution of Fatal Cases:

Dependency	No.	Average Cost
All	100	\$4 600
Widow and 3 or more Children	21	8 300
Other dependents	65	4 331
No dependents	14	300

3. Comparison of Values of Death Cases Calculated from Dependency Distribution and General Average:

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Multiple Injury Involving	Value for Excess of \$10,000	Value at General Average
2 Deaths	\$11 009	\$ 9 200
3 Deaths	14 217	13 800
4 Deaths	18 475	18 400

4. Values for Excess of \$10,000

Single Accident Cases:

1 Permanent Total \$ 518

Multiple Injury Cases:

2 Permanent Totals 8 800

1 Death, 1 Perm. Total 4 000

1 Perm. Total, 1 Major Perm. 3 215

2 Deaths 1 009

3 Deaths 4 217

1 Death, 2 Major Perm. 2 230

3 Major Perm. 1 445

4 Deaths 8 475

2 Deaths, 2 Major Perm. 6 830

3 Deaths, 1 Perm. Total, 1 Major Perm. 17 015

4 Deaths, 1 Major Perm. 12 215

5. Calculation of Wage Factors for Translation of Payrolls:

(a) Numerical average of compensation wages of
each year of the fifteen years is as follows:

Anthracite Mining	32.01
Bituminous Mining	27.81

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RETENTION: - PENNSYLVANIA WORKMEN'S COMPENSATION

(b) Anticipated Compensation Wages - 1946

Anthracite Mining	57.50
Bituminous Mining	56.50

(c) Ratios - (b) ÷ (a)

Anthracite Mining	1.80
Bituminous Mining	2.03 (Use 2.00)

CONCLUSION

Several conclusions may be drawn from a review of the material compiled in the course of this study. First, with the exception of Coal Mining and Explosives Manufacturing, the cost in excess of \$10,000 per accident under current Pennsylvania benefits is so small as to be almost negligible. Reference to the pure premiums shown in Table I, will readily support such a conclusion. As a matter of fact, the Classification and Rating Committee of the Pennsylvania Bureau adopted the following motion in its meeting of December 6, 1945:

"To adopt an 'A' rating procedure for the premium rates, with a minimum rate of \$.01 for a limit of \$250,000 in excess of \$10,000."

The minimum rate of \$.01 was selected since it was felt that, even though the pure premium in the Manufacturing and Other Industries groups indicated that rates of less than \$.01 would be adequate, contracts involving a potential catastrophe hazard should not be written at a lower figure. Even at a rate of \$.01 per hundred dollars of payroll, the premium collected amounts to little more than a "service charge," and a very small one, at that.

Secondly, it is the writer's opinion that rates for excess coverage on a per-accident basis, which are expressed as a percentage of the manual rate, are not calculated on a sound actuarial basis, in view of the well-defined differences between "large" and "small" risks found in this study. Again referring to Table I, it will be noted that the difference in excess pure premium between large and small risks is quite marked for Manufacturing and Explosives. In the Manufacturing group, the pure premium for large risks is about three times that for small risks, whereas in the Explosives Manufacturing classification, on a much smaller exposure, the situation is reversed, the pure premium for small risks being about eight times that for the large risks. In the Contracting and Quarrying and Other Industries groups, the difference is not so great, but in each case the excess pure premium is greater for the large risks than it is for the small risks. Significant differences will

also be noted in the ratios of excess losses to total losses - an important factor in the consideration of rates for this type of insurance. In the Manufacturing group, this ratio for large risks is more than double that for small risks, but in the Contracting and Quarrying group, the situation is just the reverse, the ratio for the small risks being nearly three times that for the large risks. Therefore, in view of the differences between the experience of large and small risks, as demonstrated in this study, as well as others, (3) it does seem that the rate-making method which relates the premium rate for excess insurance to the manual rate, should be given further study, and an effort made to develop a method which will produce rates based on the experience of risks which are similar to those to which the rates will be applied.

(3)

For example, "Small Risks versus Large Risks in Workmen's Compensation Insurance" by Mark Kormes, P. C. A. S., Vol. XXIII.

TABLE I

SUMMARY OF EXPERIENCE TAKEN FROM PENNSYLVANIA SCHEDULE Z - EXCLUSIVE OF MINIMUM PREMIUM RISK EXPERIENCE
POLICY YEARS 1928-1942
PAYROLLS AND LOSSES TRANSLATED TO CURRENT WAGES AND BENEFITS

Industry (1)	Modified Payrolls (000 omitted) (2)	All Losses (3)	Excess Losses Over \$10,000 Per Accident (4)	Pure Premium All Losses (5)	Pure Premium Excess Losses (6)	Ratio (Per Cent) - Excess Losses to Total Losses (7)
All	\$55 607 373	\$235 815 200	\$2 116 972	\$.4211	\$.0038	0.90
Mfg. (Ex. Explosives) and Utilities	23 147 161	78 908 483	369 040	.3409	.0016	0.47
Large Risks	4 871 762	20 447 574	162 055	.4197	.0033	0.79
Small Risks	18 275 399	58 460 809	206 985	.3199	.0011	0.35
Explosives	29 731	323 843	74 008	1.0892	.2489	22.85
Large Risks	8 326	41 993	3 386	.5044	.0407	8.06
Small Risks	21 405	281 850	70 622	1.3167	.3299	25.06
Contracting and Quarrying	3 403 732	54 163 007	543 598	1.5913	.0160	1.00
Large Risks	494 648	19 771 413	94 415	3.9971	.0191	0.48
Small Risks	2 909 084	34 391 594	449 183	1.1822	.0154	1.31
Other Industries	27 320 695	64 099 779	445 837	.2346	.0016	0.70
Large Risks	5 230 951	12 121 332	111 839	.2317	.0021	0.92
Small Risks	22 089 744	51 978 447	333 998	.2353	.0015	0.64
Coal Mining *	1 706 054	38 320 088	684 489	2.2461	.0401	1.79
Anthracite	351 590	10 073 528	202 803	2.8651	.0577	2.01
Bituminous	1 354 464	28 246 560	481 686	2.0854	.0356	1.71

Note: The term "small risks" in this tabulation refers to risks greater than Minimum Premium but less than approximately \$10,000 annual premium at Manual rates.

* Coal Mining experience is for calendar years 1930-1944.

TABLE II
ACCIDENTS BY DEGREE OF INJURY
AND
PAYROLLS AS REPORTED
LARGE RISK EXPERIENCE - POLICY YEARS 1928-1942
BY INDUSTRY DIVISIONS AND CLASSES WITH MULTIPLE INJURY ACCIDENTS
RISKS OF APPROXIMATELY \$10,000 OR MORE ANNUAL PREMIUM AT MANUAL RATES

Manual Code No.	Industry (1)	Payroll as Reported (000 omitted) (2)	Number of Accidents by Kind				Medical Cost - Minor, Temp., Non-Comp. as Reported x 1.05 (8)	
			Death (3)	Perm. Total (4)	Major Perm. (5)	Minor Perm. (6)		Temp. (7)
	All	5 930 605	1 793	611	3 607	3 284	88 322	22 257 443
	Mfg. (Ex. Explosives) and Utilities	2 647 697	891	291	1 515	2 452	48 762	5 445 599
	Explosives Mfg.	4 525	5	1	1	-	34	7 398
	Contracting and Quarrying	289 268	304	110	929	358	12 399	11 122 583
	Other Industries	2 989 115	593	209	1 162	474	27 127	2 681 863
<u>CLASSIFICATIONS WITH MULTIPLE INJURY ACCIDENTS</u>								
255	Paper Mfg.	52 325	14	-	37	53	1 731	168 963
257	Paper Goods Mfg.	3 110	4	-	2	3	151	7 228
401	Blast Furnaces	9 120	12	1	8	6	257	42 326
404	Steel Mills	130 886	33	7	129	143	3 210	110 929
411	Bridge Shops	65 602	26	4	64	105	1 551	223 653
416	Railroad Car Mfg.	52 211	12	2	61	93	1 552	194 759
718	Ship Building	15 276	6	1	21	14	332	70 620
421	Steel Foundries	132 502	50	16	97	166	2 411	296 668
425	Iron Foundries	55 560	7	4	37	44	1 692	174 164
431	Forging Works	30 896	4	1	26	52	1 217	126 882
451	Auto Body Mfg.	76 999	11	2	83	240	1 272	163 920
454	Sheet Metal Shop	37 273	4	-	18	86	651	88 064

TABLE II (Cont'd)

ACCIDENTS BY DEGREE OF INJURY
AND
PAYROLLS AS REPORTED
LARGE RISK EXPERIENCE - POLICY YEARS 1928-1942
BY INDUSTRY DIVISIONS AND CLASSES WITH MULTIPLE INJURY ACCIDENTS
RISKS OF APPROXIMATELY \$10,000 OR MORE ANNUAL PREMIUM AT MANUAL RATES

Manual Code No.	Industry (1)	Payroll as Reported (000 omitted) (2)	Death (3)	Number of Accidents by Kind				Medical Cost - Minor, Temp., Non-Comp. as Reported x 1.05 (8)
				Perm. Total (4)	Major Perm. (5)	Minor Perm. (6)	Temp. (7)	
463	Auto Mfg.	78 852	4	1	16	65	932	111 950
501	Cement Mfg.	25 343	12	-	11	12	160	59 166
555	Drug Mfg.	376	1	-	2	-	12	987
581	Oil Refining	50 484	12	1	25	18	711	100 584
755	Electric Utilities	174 105	110	10	93	36	1 600	337 964
005	Tree Pruning	2 017	3	-	14	1	102	14 343
593	Explosives Mfg.	4 525	5	1	1	-	34	7 398
028	Oil and Gas Production	17 302	9	2	32	30	521	63 400
051	Quarries	16 134	26	1	26	13	696	58 067
601	Road Construction	74 068	75	22	149	66	4 376	289 754
605	Railroad Construction	23 427	43	6	89	18	1 265	102 444
615	Tunneling	4 214	8	4	42	27	320	45 904
654	Concrete Construction	46 928	63	14	179	58	2 418	314 665
675	Millwrighting	6 872	2	1	6	8	109	18 674
910-928	Stores	815 707	43	16	136	83	5 796	693 381
980	Cities, Towns and Boroughs	820 031	296	107	594	202	8 875	850 151
701	Stevedoring	22 491	22	10	164	50	3 133	165 024

TABLE III
 MODIFIED LOSSES AND PAYROLLS
 LARGE RISK EXPERIENCE - POLICY YEARS 1928-1942
 BY INDUSTRY DIVISIONS AND CLASSES WITH MULTIPLE INJURY ACCIDENTS
 RISKS OF APPROXIMATELY \$10,000 OR MORE ANNUAL PREMIUM AT MANUAL RATES

Manual Code No.	Industry (1)	Modified Payrolls (000 omitted) (2)	Total Incurred Losses (3)	Death (4)	Perm. Total (5)	Major Perm. (6)	Minor Perm. (7)	Temp. (8)	Modified Medical Cost (9)
	All	10 605 687	52 382 412	7 351 300	5 621 200	8 905 683	1 944 128	6 302 658	22 257 443
	Mfg. (Ex. Explosives) and Utilities	4 871 762	20 447 674	3 653 100	2 677 200	3 740 535	1 451 584	3 479 656	5 445 599
	Explosives Mfg.	8 326	41 993	20 500	9 200	2 469	-	2 426	7 398
	Contracting and Quarrying	494 648	19 771 413	1 246 400	1 012 000	2 293 701	211 936	884 793	14 122 583
	Other Industries	5 230 951	12 121 332	2 431 300	1 922 800	2 868 978	280 608	1 935 783	2 681 863
<u>CLASSIFICATIONS WITH MULTIPLE INJURY ACCIDENTS</u>									
255	Paper Mfg.	96 278	472 616	57 400	-	91 353	31 376	123 524	168 963
257	Paper Goods Mfg.	5 722	41 117	16 400	-	4 938	1 776	10 775	7 228
401	Blast Furnaces	16 781	142 370	49 200	9 200	19 752	3 552	18 340	42 326
404	Steel Mills	240 830	1 242 852	135 300	64 400	318 501	84 656	229 066	410 929
411	Bridge Shops	120 708	697 908	106 600	36 800	158 016	62 160	110 679	223 653
416	Railroad Car Mfg.	96 068	578 775	49 200	18 400	150 609	55 056	110 751	194 759
718	Ship Building	28 108	188 249	24 600	9 200	51 849	8 288	23 692	70 620
421	Steel Foundries	243 804	1 158 682	205 000	147 200	239 493	98 272	172 049	296 668
425	Iron Foundries	102 230	477 806	28 700	36 800	91 353	26 048	120 741	174 164
431	Forging Works	56 849	334 305	16 400	9 200	64 194	30 784	86 845	126 882
451	Auto Body Mfg.	141 678	665 197	45 100	18 400	204 927	142 080	90 770	163 920
454	Sheet Metal Shop	68 582	246 273	16 400	-	44 442	50 912	46 455	88 064
463	Auto Mfg.	145 088	282 042	16 400	9 200	39 504	38 480	66 508	111 950
501	Cement Mfg.	46 631	154 047	49 200	-	27 159	7 104	11 418	59 166
555	Drug Mfg.	692	10 881	4 100	-	4 938	-	856	987
581	Oil Refining	92 891	282 102	49 200	9 200	61 725	10 656	50 737	100 584

TABLE III (Cont'd)

MODIFIED LOSSES AND PAYROLLS
 LARGE RISK EXPERIENCE - POLICY YEARS 1928-1942
 BY INDUSTRY DIVISIONS AND CLASSES WITH MULTIPLE INJURY ACCIDENTS
 RISKS OF APPROXIMATELY \$10,000 OR MORE ANNUAL PREMIUM AT MANUAL RATES

Manual Code No.	Industry (1)	Modified Payrolls (000 omitted) (2)	Total Incurred Losses (3)	Death (4)	Perm. Total (5)	Major Perm. (6)	Minor Perm. (7)	Temp. (8)	Modified Medical Cost (9)
755	Electric Utilities	320 353	1 246 069	451 000	92 000	229,617	21 312	114 176	337 964
005	Tree Pruning	3 711	69 080	12 300	-	34 566	592	7 279	14 343
593	Explosives Mfg.	8 326	41 993	20 500	9 200	2 469	-	2 426	7 398
028	Oil and Gas Production	29 586	252 647	36 900	18 400	79 008	17 760	37 179	63 400
051	Quarries	27 589	295 424	106 600	9 200	64 194	7 696	49 667	58 067
601	Road Construction	126 656	1 518 878	307 500	202 400	367 881	39 072	312 271	289 754
605	Railroad Construction	40 060	654 611	176 300	55 200	219 741	10 656	90 270	102 444
615	Tunneling	7 206	258 021	32 800	36 800	103 698	15 984	22 835	45 904
654	Concrete Construction	80 247	1 350 600	258 300	128 800	441 951	34 336	172 548	314 665
675	Millwrighting	11 751	63 402	8 200	9 200	14 814	4 736	7 778	18 674
910-928	Stores	1 427 487	1 815 404	176 300	147 200	335 784	49 136	413 603	693 381
980	Municipalities	1 435 054	5 267 641	1 213 600	984 400	1 466 586	119 584	633 320	850 151
701	Stevedoring	39 359	1 005 311	90 200	92 000	404 916	29 600	223 571	165 024

TABLE IV

EXCESS LOSSES OVER \$10,000 PER ACCIDENT
 LARGE RISK EXPERIENCE - POLICY YEARS 1928-1942
 BY INDUSTRY DIVISIONS AND CLASSES WITH MULTIPLE INJURY ACCIDENTS
 RISKS OF APPROXIMATELY \$10,000 OR MORE ANNUAL PREMIUM AT MANUAL RATES

Industry (1)	Modified Payrolls (000 omitted) (2)	All Losses (3)	Excess Over \$10,000 Per Accident - Injury to Specified No. of Persons						
			Total (4)	Single Cases of P. T. Disability (5)	Multiple Injury Accidents				
					All Multiples (6)	2 (7)	3 (8)	4 (9)	5 or More (10)
All	10 605 687	52 382 412	371 695	299 390	72 305	17 081	20 249	6 523	28 452
Mfg. (Ex. Explosives) and Utilities	4 871 762	20 447 674	162 055	142 590	19 465	3 128	5 792	-	10 545
Explosives Mfg.	8 326	41 993	3 386	490	2 896	-	2 896	-	-
Contracting and Quarrying	194 648	19 771 413	94 415	53 900	40 515	7 420	8 665	6 523	17 907
Other Industries	5 230 951	12 121 332	111 839	102 410	9 429	6 533	2 896	-	-
<u>CLASSIFICATIONS WITH MULTIPLE INJURY ACCIDENTS</u>									
Paper Mfg.	96 278	472 616	-	-	-	-	-	-	-
Paper Goods Mfg.	5 722	41 117	2 896	-	2 896	-	2 896	-	-
Blast Furnaces	16 781	142 370	881	490	391	391	-	-	-
Steel Mills	240 830	1 242 852	3 821	3 430	391	391	-	-	-
Bridge Shops	120 708	697 908	2 351	1 960	391	391	-	-	-
Railroad Car Mfg.	96 068	578 775	980	980	-	-	-	-	-
Ship Building	28 108	188 249	490	490	-	-	-	-	-
Steel Foundries	243 804	1 158 682	10 736	7 840	2 896	-	2 896	-	-
Iron Foundries	102 230	477 806	1 960	1 960	-	-	-	-	-
Forging Works	56 849	334 305	490	490	-	-	-	-	-
Auto Body Mfg.	141 678	665 197	980	980	-	-	-	-	-
Sheet Metal Shop	68 582	246 273	391	-	391	391	-	-	-
Auto Mfg.	145 088	282 042	490	490	-	-	-	-	-
Cement Mfg.	46 631	154 047	782	-	782	782	-	-	-

TABLE IV (Cont'd)

EXCESS LOSSES OVER \$10,000 PER ACCIDENT
 LARGE RISK EXPERIENCE - POLICY YEARS 1928-1942
 BY INDUSTRY DIVISIONS AND CLASSES WITH MULTIPLE INJURY ACCIDENTS
 RISKS OF APPROXIMATELY \$10,000 OR MORE ANNUAL PREMIUM AT MANUAL RATES

Industry (1)	Modified Payrolls (000 omitted) (2)	All Losses (3)	Excess Over \$10,000 Per Accident - Injury to Specified No. of Persons						
			Total (4)	Single Cases of P. T.		Multiple Injury Accidents			
				Disability (5)	All Multiples (6)	2 (7)	3 (8)	4 (9)	5 or More (10)
Drug Mfg.	692	10 881	-	-	-	-	-	-	-
Oil Refining	92 891	282 102	881	490	391	391	-	-	-
Electric Utilities	320 353	1 246 069	5 291	4 900	391	391	-	-	-
Tree Pruning	3 711	69 080	10 545	-	10 545	-	-	-	10 545
Explosives Mfg.	8 326	41 993	3 386	490	2 896	-	2 896	-	-
Oil and Gas Production	29 586	252 647	980	980	-	-	-	-	-
Quarries, N. O. C.	27 589	295 424	881	490	391	391	-	-	-
Road Construction	126 656	1 518 878	32 025	10 780	21 245	3 338	-	-	17 907
Railroad Construction	40 060	654 611	3 331	2 940	391	391	-	-	-
Tunneling	7 206	258 021	8 483	1 960	6 523	-	-	6 523	-
Concrete Construction	80 247	1 350 600	15 525	6 860	8 665	-	8 665	-	-
Millwrighting	11 751	63 402	3 790	490	3 300	3 300	-	-	-
Stores	1 427 487	1 815 404	10 736	7 840	2 896	-	2 896	-	-
Municipalities	1 435 054	5 267 641	58 963	52 430	6 533	6 533	-	-	-
Stevedoring	39 359	1 005 311	4 900	4 900	-	-	-	-	-

TABLE V

DEPENDENCY DISTRIBUTION OF FATAL CASES
PENNSYLVANIA EXPERIENCE - EXCLUDING COAL MINING
POLICY YEARS 1939-1942

<u>Dependency</u>	<u>Number of Cases</u>
All	1 635
<hr/>	
No Dependents	320
Widow Only	521
<u>All Widows and Children:</u>	<u>534</u>
Widow and 1 child	234
" " 2 children	155
" " 3 "	74
" " 4 "	37
" " 5 "	16
" " 6 "	13
" " 7 "	3
" " 8 "	1
" " 9 "	1
<u>All Other Children:</u>	<u>52</u>
1 Orphan child	21
2 " children	14
3 " "	10
4 " "	4
5 " "	2
6 " "	-
7 " "	1
Parents	192
Brothers or Sisters	1
Dependents Unknown	15
<hr/>	

TABLE VI
 CASES OF PERMANENT TOTAL DISABILITY
 AS REPORTED ON PENNSYLVANIA SCHEDULE "Z"
 POLICY YEARS 1939-1942

Age of Injured (1)	No. of Cases (2)	Average Age (3)	Number, per 100, of Deaths During 500 Weeks from Date of Accident * (4)	No. of Deaths (4) x (2) ÷ 100 (5)
All	286	49.9	30.51	87.27
Under 20	5	17.8	22.88	1.14
20 and under 25	16	22.2	21.12	3.38
25 and under 30	12	27.2	18.25	2.19
30 and under 35	16	32.2	15.76	2.52
35 and under 40	23	36.6	15.72	3.62
40 and under 45	28	42.0	18.39	5.15
45 and under 50	26	46.7	22.51	5.85
50 and under 55	37	51.8	27.06	10.01
55 and under 60	29	57.4	30.88	8.96
60 and under 65	38	62.0	36.27	13.78
65 and under 70	28	66.9	48.31	13.53
70 and under 75	8	71.5	60.90	4.87
75 and under 80	12	76.3	74.98	9.00
80 and under 85	2	82.0	87.73	1.75
Age not given	6	49.9	25.27	1.52

* From "Table for Lives Disabled by Industrial Accidents"

TABLE VII
 EXHIBIT OF MULTIPLE INJURY ACCIDENTS
 PENNSYLVANIA INSURED RISKS - POLICY YEARS 1928-1942
 LARGE RISK EXPERIENCE

Code No.	Industry	INJURY TO SPECIFIED NUMBER OF PERSONS							
		Two		Three		Four		Five or More	
		Number of Accidents	Type of Accident	Number of Accidents	Type of Accident	Number of Accidents	Type of Accident	Number of Accidents	Type of Accident
	ALL MFG. (EX. EXPLOSIVES)	18	-	3	-	-	-	-	-
255	Paper Mfg.	2	1 D., 1 M.	-	-	-	-	-	-
259	Paper Goods Mfg.	-	-	1	3 D.	-	-	-	-
401	Blast Furnaces	1	2 D.	-	-	-	-	-	-
404	Steel Mfg.	1	2 D.	-	-	-	-	-	-
411	Bridge Shops	1	2 D.	-	-	-	-	-	-
	" "	1	1 D., 1 M.	-	-	-	-	-	-
416	Rwy. Car Mfg.	1	1 M., 1 Min.	-	-	-	-	-	-
421	Steel Foundries	2	1 D., 1 M.	1	3 D.	-	-	-	-
425	Iron Foundries	1	1 D., 1 M.	-	-	-	-	-	-
431	Forging Works	1	2 M.	-	-	-	-	-	-
451	Auto Body Mfg.	1	1 D., 1 M.	-	-	-	-	-	-
454	Sheet Metal, Shop	1	2 D.	-	-	-	-	-	-
463	Auto Mfg.	1	1 D., 1 M.	-	-	-	-	-	-
501	Cement Mfg.	2	2 D.	-	-	-	-	-	-
555	Drug Mfg.	-	-	1	1 D., 2 M.	-	-	-	-
581	Oil Refining	1	2 D.	-	-	-	-	-	-
718	Ship Building	1	2 M.	-	-	-	-	-	-
593	EXPLOSIVES MFG.	-	-	1	3 D.	-	-	-	-
	UTILITIES	5	-	-	-	-	-	1	-
755	Electric Utilities	3	1 D., 1 M.	-	-	-	-	-	-
	" "	1	2 D.	-	-	-	-	-	-
	" "	1	2 M.	-	-	-	-	-	-
005	Tree Pruning	-	-	-	-	-	-	1	2 D., 5 M.

TABLE VII (Cont'd)

EXHIBIT OF MULTIPLE INJURY ACCIDENTS
PENNSYLVANIA INSURED RISKS - POLICY YEARS 1928-1942
LARGE RISK EXPERIENCE

Code No.	Industry	INJURY TO SPECIFIED NUMBER OF PERSONS							
		Two		Three		Four		Five or More	
		Number of Accidents	Type of Accident	Number of Accidents	Type of Accident	Number of Accidents	Type of Accident	Number of Accidents	Type of Accident
	<u>CONTRACTING AND QUARRYING</u>	9	-	3	-	1	-	1	-
028	Oil and Gas Production	1	1 D., 1 M.	-	-	-	-	-	-
051	Quarries, N. O. C.	1	2 D.	-	-	-	-	-	-
601	Road Construction	1	1 D., 1 M.	-	-	-	-	1	5 D., 3 M.
	" "	2	1 P.T., 1 M.	-	-	-	-	-	-
605	R. R. Construction	1	2 D.	-	-	-	-	-	-
615	Tunneling	1	2 M.	-	-	1	4 D.	-	-
654	Concrete Construction	1	2 M.	1	3 D.	-	-	-	-
	" "	-	-	1	3 M.	-	-	-	-
	" "	-	-	1	1 D., 1 M., 1 P.T.	-	-	-	-
675	Millwrighting	1	1 D., 1 P.T.	-	-	-	-	-	-
	<u>OTHER INDUSTRIES</u>	15	-	1	-	-	-	-	-
910-928	Stores	1	2 M.	1	3 D.	-	-	-	-
980	Cities, Towns and Boroughs	4	2 D.	-	-	-	-	-	-
	" " " "	3	1 D., 1 M.	-	-	-	-	-	-
	" " " "	2	2 M.	-	-	-	-	-	-
	" " " "	1	1 D., 1 P.T.	-	-	-	-	-	-
	" " " "	1	1 P.T., 1 M.	-	-	-	-	-	-
701	Stevedoring	2	2 M.	-	-	-	-	-	-
	" "	1	1 D., 1 M.	-	-	-	-	-	-

TABLE VIII
 MULTIPLE INJURY ACCIDENTS
 AND
 EXCESS LOSSES OVER \$10,000 PER ACCIDENT
 PENNSYLVANIA INSURED RISKS - POLICY YEARS 1928-1942
 LARGE RISK EXPERIENCE

Number of Persons Injured	Total - All Groups		Mfg. (Ex. Explosives) and Utilities		Explosives		Contracting & Quarrying		Other Industries	
	No. of Accidents	Amount of Excess	No. of Accidents	Amount of Excess	No. of Accidents	Amount of Excess	No. of Accidents	Amount of Excess	No. of Accidents	Amount of Excess
1	611	299 390	291	142 590	1	490	110	53 900	209	102 410
2	47	17 081	23	3 128	-	-	9	7 420	15	6 533
3	8	20 249	3	5 792	1	2 896	3	8 665	1	2 896
4	1	6 523	-	-	-	-	1	6 523	-	-
5	-	-	-	-	-	-	-	-	-	-
6	-	-	-	-	-	-	-	-	-	-
7	1	10 545	1	10 545	-	-	-	-	-	-
8	1	17 907	-	-	-	-	1	17 907	-	-
Total	669	371 695	318	162 055	2	3 386	124	94 415	225	111 839

TABLE IX
 MULTIPLE INJURY ACCIDENTS
 AND
 EXCESS LOSSES OVER \$10,000 PER ACCIDENT
 PENNSYLVANIA INSURED RISKS - POLICY YEARS 1928-1942
 EXCLUSIVE OF MINIMUM PREMIUM RISKS AND LARGE RISKS

Number of Persons Injured	Total - All Groups		Mfg. (Ex. Explosives) and Utilities		Explosives		Contracting & Quarrying		Other Industries	
	No. of Accidents	Amount of Excess	No. of Accidents	Amount of Excess	No. of Accidents	Amount of Excess	No. of Accidents	Amount of Excess	No. of Accidents	Amount of Excess
1	1 182	579 180	311	152 390	2	980	380	186 200	489	239 610
2	211	104 988	37	7 534	1	391	103	57 200	70	39 863
3	22	48 897	7	21 261	-	-	9	17 610	6	10 026
4	6	35 753	-	-	1	6 523	4	22 707	1	6 523
5	5	75 004	1	25 800	1	10 500	2	27 997	1	10 707
6	2	32 669	-	-	-	-	2	32 669	-	-
7	1	27 269	-	-	-	-	-	-	1	27 269
8	-	-	-	-	-	-	-	-	-	-
9	2	52 228	-	-	2	52 228	-	-	-	-
.
.
.
28	1	104 800	-	-	-	-	1	104 800	-	-
Total	1 432	1 060 788	356	206 985	7	70 622	501	449 183	568	333 998

TABLE X
 MULTIPLE INJURY ACCIDENTS
 AND
 EXCESS LOSSES OVER \$10,000 PER ACCIDENT
 PENNSYLVANIA INSURED RISKS - CALENDAR YEARS 1930-1944
 COAL MINING

Number of Persons Injured	All Coal Mining		Anthracite Mining		Bituminous Mining	
	No. of Accidents	Amount of Excess	No. of Accidents	Amount of Excess	No. of Accidents	Amount of Excess
1	753	\$390,054	138	\$ 71,484	615	\$318 570
2	75	117 140	34	54 040	41	63 100
3	7	24 760	3	10 664	4	14 096
4	2	15 305	-	-	2	15 305
5	2	29 230	1	12 215	1	17 015
6	1	17 600	-	-	1	17 600
7	-	-	-	-	-	-
8	-	-	-	-	-	-
9	-	-	-	-	-	-
10	1	36 000	-	-	1	36 000
11	-	-	-	-	-	-
12	-	-	-	-	-	-
13	-	-	-	-	-	-
14	1	54 400	1	54 400	-	-
Total	842	684 489	177	202 803	665	481 686

ABSTRACT OF THE DISCUSSION OF PAPERS READ
AT THE PREVIOUS MEETING

NON-RANDOM ACCIDENT DISTRIBUTION AND THE POISSON SERIES.

JOHN CARLTON
Volume XXXII Page 21
Written Discussion
F. S. PERRYMAN

This is a neat little paper dealing with a subject which at first sight may not look too important but yet is one that is worth investigating, not only for its own sake, that is to say to judge the importance of the effect of the alteration in the variances and probabilities under the conditions cited, but also worthwhile because it points the way in which such questions should be investigated. In this respect the paper is a model one. Mr. Carleton sets out the data and premises clearly and succinctly and then makes the appropriate mathematical investigation, gives numerical examples and draws conclusions. Students and younger members of the Society, not to mention older ones, can benefit greatly from the subject matter of the paper and its treatment.

It is very timely to have presented such an example of restricted randomness among events whose probabilities it is desired to measure. Text books, both on "classic" statistics and on "modern" statistics, and papers in the Proceedings and other technical publications, particularly recent ones, giving accounts of modern theories and applying them to insurance, are always careful to stress that the events must be independent or random or unconnected, etc., but rarely do they give very practical examples of statistics or events that are not random, etc., and how to deal with them if they do occur. This last statement is not universally true of course and from time to time we do come across discussions of non-independent events. Taking an example at random, I remember a good discussion of independence in connection with events coming within the scope of the Poisson formula: this discussion you will find in Mr. Satterthwaite's paper in the PCAS Vol. XXIX. Nevertheless it is quite welcome to have further examples of non-random or dependent events and so I am glad that Mr. Carleton chose to give this phase of our theory the spotlight of a paper to itself.

The mathematics of the probabilities of the events postulated in the paper are treated quite satisfactorily from first principles. The double, triple and multiple integrals required may look rather formidable to some but after all they do represent the operations needed to obtain the probabilities. Mr. Carleton attains quite a neat formula which can be expressed in words as follows. Using

the notation of the paper, which is that the accident expectation is such that in a unit period the average number of accidents would be a but the conditions assumed are such that after each accident a period of b elapses during which no further accidents are possible: then "the probability of having not more than n accidents in a unit period under such conditions is the same as the probability of having not more than n accidents in a period of unity less n times b if the accident expectation were not suspended for the period of b after each accident". This formula of course only applies if n times b does not exceed unity as it is impossible to have more than n accidents if nb exceeds unity. It may be mentioned here, for those who do not wholly trust the multiple integrals which were used to develop Mr. Carleton's formula, that it is quite possible to check the formula by mathematical induction, i.e. assuming it to be true for $n - 1$ and then proving it is true for n . To do this it is only necessary to use single integrals. It is also worthy of note, and this time by the more mathematically minded ones, that while Mr. Carleton's formula is quite a simple one, considering the underlying assumptions, it naturally applies only when it is assumed, as Mr. Carleton does, that at the beginning of the period it is known that no catastrophes have occurred in the immediate past. The mathematical formula to express the probabilities if it is unknown whether such catastrophes have recently taken place is considerably more complicated. However, the simple formula is obviously all that is needed in practice. The fact that the probabilities considered by Mr. Carleton can be expressed by means of straight-forward Poisson terms greatly simplifies any calculations that have to be made and I assume that Mr. Carleton utilized this fact in the calculation of the arithmetical examples which he gives in his paper. Using the tables of Poisson distributions, given in the well-known "Tables for Statisticians and Biometricians" edited by Karl Pearson I checked these calculations as a matter of interest and arrived at the same results as in the paper, except in one instance where the deviation was minor.

The paper concludes by giving an example of the application of the arithmetical results. In this connection it must be borne in mind that the example suggested, namely that of a Workmen's Compensation risk of such a size that an average of 1.8 serious accidents occur each year, must be a single risk and not an aggregation of Compensation risks, say for instance of one industry, for by the nature of the assumptions in the paper the occurrence of a catastrophe must operate so as to eliminate or suspend the probability of a repetition. This condition is much more likely of realization in a single large risk than it would be in an industry as a whole.

In conclusion, let me repeat that the paper is very worthwhile

and the author is to be congratulated not only on the subject matter but also on the manner in which the material is presented. The paper is not only thorough but concise.

PURE PREMIUM TRENDS IN WORKMEN'S COMPENSATION

R. P. GODDARD
Volume XXXII, Page 48
Written Discussion
A. N. MATTHEWS

Mr. Goddard's study of Workmen's Compensation pure premium trends brings out the fact that, in general, loss costs related to payrolls in Massachusetts have been decreasing steadily since 1930. This downward trend will undoubtedly be terminated by the law amendments which became effective in October of 1945. The decreases in Compensation rates for most states during the past several years would indicate that the downward trend in pure premiums has been quite general. On the other hand, the New York pure premiums show no particular trend. During this period the trend of wages and of claim frequency in New York and Massachusetts has been very similar. In New York, however, the average claim costs have been steadily increasing, whereas in Massachusetts the average claim cost is nearly constant. It is apparent that in Massachusetts the upward trend in wages over the period has resulted in a downward trend in the pure premium and the average claim costs show no definite trend. On the other hand, in New York the upward trend in wages has been accompanied by an upward trend in average claim costs and the pure premiums show no definite trend.

The average claim cost for New York increased from \$268 in 1932 to \$417 in 1942. For Massachusetts the average claim cost was \$202 in 1932 and \$201 in 1942. An analysis of the average cost per claim by kind of injury shows very substantial increase in the average cost of each kind of injury in New York whereas the changes in Massachusetts have been relatively small. Furthermore, the proportion of serious claims in the experience increased from 2.5% to 3.0% in New York but decreased from 3.1% to 2.9% in Massachusetts.

This study shows that wages alone will not explain trends in pure premiums. Factors which tend to increase pure premiums are increasing liberality of Compensation Commissioners in awarding benefits, a tendency for injured employees to prolong the period of disability and increasing medical costs. On the other hand safety education and appliances designed to prevent accidents should have a tendency to reduce pure premiums. Of course, the effect of none of these items can be measured.

The obvious purpose of Mr. Goddard's study was to attempt to

obtain statistics which will reflect the trend in Workmen's Compensation costs currently and which will serve to cover the interval between the period over which experience is accumulated and the effective date of the rates based upon such experience. The manual rate revisions which are now in process to produce rates to become effective early in 1947 will use experience for no later than policy year 1944. In the interim, wartime restrictions on wages and prices have been lifted and both have increased to a very considerable extent. This inflationary trend tends to increase both payrolls and losses but the effect on pure premiums will probably vary by state and by industry and classification within states.

Although it is doubtful that any immediate use will be made of the phenomena brought to light in Mr. Goddard's paper, nevertheless, the work which he has so well presented should be continued and expanded in an ever continuing effect to obtain rates that will reflect as accurately as possible the trend of pure premiums. Thus only will the extended periods of excessive losses which have been the curse of the Compensation business be avoided.

VALUATION OF NON-CANCELLABLE ACCIDENT AND HEALTH

INSURANCE POLICIES

S. F. CONROD

Volume XXXII, Page 27

Written Discussion

JARVIS FARLEY

Mr. Conrod has performed a service by preparing these tables and setting forth in detail formulae for their use. Mr. Conrod warned that the Conference modification of Class 3 was designed as a minimum standard for reserves and not as a basis for premium computation. It might be well to point out that there is no inconsistency in this warning. The active life reserve depends not on the absolute level of the net one-year-term premium but upon the relationship which exists among the one-year-term premiums--that is, on the slope of the line rather than on the level of the line. The Conference Committee was concerned with reserves, not with premiums, and found it expedient to limit its attention to the slope of the line rather than to the level of the line.

This warning does not necessarily limit the usefulness of Mr. Conrod's tables. It has been common in analyzing disability experience to express the results of the analysis in terms of a mod-

ification of Class 3--either a straight multiplication or one multiple of an initial disability period and a second multiple of the period following the initial period. Mr. Conrod's paper discusses this aspect (Multiple Reserve Standards, page), and by applying that concept the tables could be useful in premium calculations as well as in reserve calculations.

REVIEWS OF BOOKS AND PUBLICATIONS

CLARENCE A. KULP, BOOK REVIEW EDITOR

Health Protection. Herbert D. Simpson, National Physicians Committee for the Extension of Medical Service, Chicago, Ill., 1946 Pp. 78.

This report, giving results of a study of prepayment medical plans in 6 states, provides a valuable history of their development. Dr. Simpson recognizes that a consideration of medical care for short and long illnesses, as well as medical care of the preventive type, involves a rather complicated program of potential services, which from the economic and social viewpoint is accentuated by differences in family composition. He suggests that future plans may well take lessons from the experiences of the earlier plans. Some plans began with too ambitious a program, as for example Michigan Medical Service, which changed from a fairly comprehensive plan to one providing surgical benefits, maternity care and physician's services in hospitals only, except in cases of emergency. Dr. Simpson shows a familiarity with his subject and has not only visualized the essential elements of a medical service plan but also the problems.

The evolution of prepayment plans will involve such problems as:

1. Central vs. local organization
2. Service vs. indemnity benefits
3. Relationship of medical service plans and hospitals
4. Actuarial
5. Scope of coverage

The author does not attempt to answer the question whether plans should give limited or full benefits; if the latter are offered in an attempt to meet popular demand, the matter of cost may result in a choice of benefits for the more serious situations.

The book closes on an optimistic note for the future. As medical service plans are extended, there will result:

1. A wider distribution of medical service without a decrease in general practitioners' income.
2. An improvement in general health, with the emergence of a "morbidity reserve," analogous to the mortality reserve of the life insurance companies. (This means not too good an analogy, since the reserves of the life insurance companies result from a level premium for an increasing risk. The same can scarcely be said of medical care plans.)

Dr. Simpson is convinced that, unless the issue is forced before alternative solutions have developed, voluntary plans may demonstrate that government medicine is not needed. A genuine problem is that of the development of the awareness of physicians of the "necessity for urgent efforts," with leadership that will translate such efforts into constructive achievement. The evolution of the plans may well call for expansion in the area of "cooperation with public agencies."

Weltha M. Van Eenam*

Survey of Accident and Health Insurance. Ralph H. Blanchard. Bureau Memorandum No. 62, Bulletins No. 1-6. Bureau of Research and Statistics, Federal Security Agency, Washington, 1945-1946. Various pagings.

These studies were conducted by Ralph H. Blanchard for the Social Security Board "to investigate the scope and extent of private insurance against wage loss and medical cost incident to disabilities resulting from diseases and non-industrial accidents." The studies are based on information supplied by companies writing sickness and accident insurance and covering the years 1938 through 1942. War conditions caused some narrowing of the original plans and some delay in publication.

The studies were undertaken primarily to provide information for use by social security researchers, who presumably are interested in such questions as

1. How good is the protection provided by private agencies?
2. How extensively is that protection used by the citizens of the country?
3. What is the cost of administering private insurance?

As a by-product of the study the companies are interested in all the foregoing questions, and

4. Information that may improve the quality of coverage, the extent of coverage, and the cost of coverage under private voluntary insurance methods.

The report provides an indirect answer to the first question. The statistics are arranged *inter alia*, by class of business, as follows: commercial; hospitalization and care (excluding group);

* Guest Reviewer

group (including blanket); non-cancellable; franchise; monthly premium; weekly premium; limited. The classes, while not exhaustively defined in the report, are reasonably clear cut. The first five classes contributed 73 per cent of total premium volume in 1938, 78 per cent in 1942.

The survey answers the second question -- on extent of coverage -- in terms of premium volume only. No attempt is made to estimate the number of people covered but the increasing trend in the use of voluntary facilities is indicated by a comparison of 1938 and 1942 volumes. The increase for all classes combined is reported to be 78 per cent. The most significant entry is for group insurance, which increased very nearly 200 per cent, growing from 24 per cent of the 1938 to 40 per cent of the 1942 premium volume, to become the largest single class.

No attempt was made to include in the survey the operations of fraternal associations, "non-profit" hospitalization or medical care plans, medical payments in connection with liability insurance contracts, or the volume of employer or employee benefit associations.

The survey includes tables of expense ratios (all expenses, including claim adjustments) and of acquisition expense ratios. Although no statistics are given separately for expenses other than acquisition, such ratios can be taken (for each class as a whole) as the difference between the two ratios given. Such a comparison shows remarkably little difference in the administrative expenses of the different classes. As must be expected, the weekly premium policies show the highest ratio and group the lowest.

The statistics for group insurance are among the most interesting in the survey, inasmuch as this class of sickness and accident insurance is designed specifically to provide high quality coverage at low cost to great numbers of wage earners. The survey includes tables of total expense ratios and of acquisition expense ratios by class of business. These show, as the "mass production" methods lead one to expect, that group insurance operated at lower acquisition expense and lower administrative expense than any other line. The total expense of group insurance over the 5 year period was less than 20 per cent of premiums written.

In presenting its statistics the survey subdivides each class of business into 4 groups. Each group represents 25 per cent of the premium volume, ranked according to the size of the ratio being considered. In the table showing acquisition expense ratios, for example, group 1 shows the experience of carriers writing the 25 per cent of the premium volume at the lowest average acquisition expense ratio; group 2 the experience of carriers writing the 25 per cent at the next lowest average expense ratio; and so on. A given company will not necessarily fall into the same group for different classes of business.

These tables give interesting results, which should however be interpreted with caution. For example, despite the expected economies which are a part of the justification of franchise insurance, the acquisition expense ratio of the lowest quarter of franchise premiums (25 per cent) was double the corresponding ratio for commercial policies (12 per cent). Practical knowledge of the business is required to realize that commissions paid on the continued renewal of older policies are sometimes decreased, so that the acquisition expense ratio for the lowest-cost group of commercial policies reflects the difference in the age of the policies more than a real difference in acquisition cost over the life of the policies. In addition, group 1 of the commercial class includes some low cost mail order policies. Franchise insurance, on the other hand, is a relatively new class which had not had time to work down the current acquisition expense ratio, and which contains nothing corresponding to the low cost mail order business. A more realistic comparison between franchise and commercial is given by the second and third groups, which reflect the lower cost expected of franchise insurance. The questionnaires on which the survey was based did not make it possible to separate the effect of age of business, or the effect of using, for some commercial policies, the life-insurance-type schedule of high first year and lower renewal commissions.

The differences in the acquisition expense ratios of the various classes reflect differences in the sales resistance to be overcome—the measure of the effort required to place and maintain the policies in force and to provide adequate field service to policyholders. The very low acquisition expense ratio of group insurance reflects the effectiveness of mass sales methods. The higher acquisition costs associated with other classes suggest the possibility that more widespread education as to the costs of disability, and as to the desirability and availability of disability insurance, would reduce the degree of sales resistance, permitting the agent's time to be used more effectively and thereby permitting a reduction in the unit cost of the policies that he sells. An interesting sidelight, demonstrating the need for an active type of missionary work if the use of facilities is to be broadened, is found in Bulletin No. 2. The premium volume of commercial travelers companies which write primarily by mail without an agency organization, increased 2 per cent over the 5 year period compared with a 105 per cent increase for the agency-written commercial business of accident and health specialists. The salesman, it seems, is worthy of his hire.

The foreword of the survey says "Even though the volume of business has increased considerably since 1942 ... the over-all-relationships between premiums and losses, premiums and operating costs, etc. have probably remained substantially unchanged, so that

the analysis presented is still valid." As suggested, the original "validity" of the expense ratios -- particularly the acquisition expense ratios -- depends on the care of analysis. The loss ratios shown in the survey are probably more nearly representative than ratios would be for the years since the survey. The correlation between business activity and accident and health experience is well recognized, and the intense economic activity of the war years resulted in extraordinarily low loss ratios for those years. Though less intense than the war period, the 5 years covered by the survey were not inactive, and the experienced accident and health man would hesitate to accept even the more reasonable loss ratios of those years as reflecting average experience to be expected over the long period for which the accident and health policy is kept in force. The tables are very interesting, however, as an approximate measure of the relative loss ratios to be expected of different classes of insurance.

This survey provides much information which has been lacking. Accident and health men have come to realize the value of such information. Surveys by the Insurance Department of the Chamber of Commerce of the United States have continued, on less ambitious scale, the gathering of information about the business; and the companies themselves are moving toward an expansion of their information service.

Jarvis Farley

Insurance. Its Theory and Practice in the United States. Albert H. Mowbray. McGraw-Hill Book Company, Inc., N. Y., 1946. 3rd Edition. Pp. xxiii - 694.

This is the second revision of Mowbray's book, first published in 1930 and revised in 1937. A review of this edition should perhaps concern itself solely with the changes which have been made. These of course will be emphasized. But this reviewer cannot forego the opportunity to comment on the book as a whole.

In his first edition Mowbray set out to correlate the broad general principles which underlie the different branches of the insurance business and thereby to dispel the illusion that each branch is unique and has little in common with the other branches. His text was designed to be used in introductory courses in insurance as a foundation for those intending subsequently to specialize in some branch of the field as well as for those seeking merely an understanding of the insurance institution in our economic and social environment. The widespread acceptance of his work during the past 17 years offers convincing evidence of the substantial success with which he has attained these objectives. It was to be

expected therefore that, as stated in the preface to this edition, "the basic plan of treatment has not been changed."

The tremendous difficulty involved in an attempt to bring together the common principles of the various fields of insurance, each marked with its many important peculiarities, and to do so in a fashion which is not confusing to beginning students, is readily apparent to anyone who has taught a survey course in insurance. In fact, there are probably many who either consider it virtually impossible or believe that the benefit of unification is more than counterbalanced by a lesser understanding of any particular field of insurance. While Mowbray has chosen well both the principles he discusses without reference to any particular line of insurance and principles and practices he considers separately for each line in Part II, one cannot help but feel that supplementary discussion is necessary at a number of places if the beginner is not to be confused. For example, throughout a large part of Chapter V, *Fundamentals of Insurance Contracts*, the discussion is developed around property insurance contract principles with only brief statements or footnotes to mention the important divergence of life insurance contracts. Incorrect impressions gained at this point may be difficult to dispel when the chapter on *Life Insurance and Annuity Contracts* is reached later. Likewise in Chapter XX, *Problem of Rates*, especially in the completely revised section on *Statistics and Rate Making*, the discussion seems to be beyond the capacity and beyond the needs of beginning students, so that confusion is likely to be its end-product. Furthermore, there is too little discussion of rate-making practices in any field of insurance for a student really to understand them.

The care with which this revision has been done will be apparent to even the casual reader. References to practices which have changed have been deleted or brought up to date almost without exception. One exception is found on page 9. A statement is carried over from the earlier edition that "More recently they (lending banks) have been demanding the elimination from such fire insurance policies of the fallen-building clause . . ." By the time of Mowbray's revision the only standard fire policy in use which still included the "fall clause" was that of California.

Although mistakes are difficult to find, there are several statements of some consequence to which exception should be taken. On page 53 insurable interest is referred to as determining the legal capacity of an insured to make a contract, whereas insurable interest is not concerned with capacity of the parties but with the legality of the object of a contract. On page 70 the statement appears that the new standard fire policy "covers the insured while he has the interest named," whereas the requirement of continuity without change of an insured's interest was abandoned in the new standard contract so that it has become truly an "interest"

contract. On page 175 we read that "There are usually three or more parties to a life insurance contract," whereas there are ordinarily only two, the beneficiary and contingent beneficiaries not being parties to the contract. Although Mowbray emphasizes properly that reserves are liabilities and not funds, he falls into error on page 453 by stating with reference to life insurance that "Formerly the companies were not allowed to hold higher reserves than those produced by using the American Experience Table with interest at 3 per cent."

There are a number of topics which Mowbray has seen fit to omit but which this reviewer believes have a definite and valuable place in a book of insurance principles, especially one to be used in a survey course in which a large proportion of the students will pursue instruction in insurance no further. First, the discussion of the economic theory of risk and the place of insurance in economics could well be expanded. More specifically, the chapter on hazards might well be enlarged to include a discussion of the characteristics which determine the insurability or uninsurability of risks growing out of various hazards. Also there is need for an analysis of the principles by which one faced with a number of risks may choose those against which to insure and those to assume himself where insurance against all is impossible or impractical. Another desirable addition would be an analysis of the multiple line principle with its attendant problems, advantages and disadvantages. Also, there should be discussion of the specific factors creating needs for insurance, developed for all lines, and much more extensively for life insurance, in the fashion followed on pages 173 and 174. And finally a presentation of the accepted concept of policyholders' surplus with an analysis of the financial basis of selection among insurance carriers would be quite worth while.

Lest the reader of this review feel that the reviewer is unfavorably disposed toward the book, he hastens to add that the extent of Mowbray's contribution to insurance literature both in the original edition and its revisions is so great that in his judgment shortcomings of the sort referred to detract from its value in only a minor way. This revision has been improved by the rearrangement of certain sections, by extensive rewriting of a number of chapters and by the addition of new sections. The rearrangement of Part III, so that the discussion of *Self Insurance--State Funds--Saving Bank Life Insurance* precedes the comparison of carriers, improves the logic of this Part. Likewise the change in order of the first chapters of Part IV adds to the logic of the presentation. The chapter on *Fire Insurance Contracts* has been rewritten to center around the 1943 New York standard form which has been so widely adopted as to constitute virtually a national standard contract. So too the chapters covering accident and

health insurance and liability insurance contracts have been extensively revised to account for important changes in contract forms. Especially significant new sections have been added on the coverage of additional expenses incurred as the result of fire or other hazards, on the extended coverage endorsement, hospitalization insurance, surety bond forms, insurance buyers, research and educational organizations operating in the insurance field and state versus federal regulation of the business. The chapter on *Social Insurance* has been added to and materially strengthened. In fact, it provides an excellent background for students without overemphasis on its insurance aspects. The second chapter in the section on *Types of Carriers* has had added to it material on United States Government Life Insurance, National Service Life Insurance, Federal Crop Insurance and War-Risk Insurance. Unfortunately the section on National Service Life Insurance was written and the book was in process of publication just before the important amendments of August, 1946 were enacted, so that this section is already out of date.

In conclusion Mowbray's book should be high on the list of required readings for all those interested in any field of insurance, whether as student or as one actively engaged in the business.

C. M. Kahler*

PUBLICATIONS RECEIVED

Bond Value Tables. Joh. Hage. Martinus Nijhoff, The Hague. Pp. XII, 242.

Law's State Chart. Fire and Marine Insurance Companies, 1947. Harrison Law, Nutley, N. J. Pp. 16.

*Guest reviewer

STATISTICAL NOTES

WORKMAN'S COMPENSATION LOSS RESERVES

BY

ALBERT H. MOWBRAY

The subject of this paper was prominent in the discussion of the Society until the report of its committee on Compensation and Liability Losses Reserves in May, 1931, but has since received little attention. The two salient principles in that report were:

The loss reserve should be based upon individual estimates of outstanding claims (and suits).

A minimum reserve based upon a pure loss ratio check should be applied for losses under policies issued in the three latest policy years.

Other language in the report seemed to indicate the feeling was fairly general that the proposed minimum basis was not highly satisfactory as to workmen's compensation, but no better was found. This basis is now embodied in the law of most, if not all, states on the assumption that 65% of the earned premiums represents for workmen's compensation fairly well the pure premium plus expense loading. It is worked out in Schedule P of the annual statement. It keyed in with the standard rate making procedure with a uniform expense loading. To the extent that rate making procedure departs from that uniform expense loading, its theoretical foundation is weakened. It would, therefore, seem that some modification should be made to meet changed and changing conditions. The time seems opportune to consider this now when, due to the requirements of Public Law 15, state laws regulating insurance are generally being scrutinized with a view to revision.

A general adoption of graduated expense loadings seems to mean inevitably that the average combined loss and expense ratio must rise tending to make the excess of 65% of the earned premiums over loss and loss expense payment too low a minimum standard assuming its correctness under former conditions. We all know from experience that in good times it has tended to be redundant and in poor times the reverse, except for the latest policy year when it is generally if not always too low because the recorded earned premiums are not the true earned premiums.

It might appear that a simple correction would be to raise the percentage to the effective average loss ratio anticipated under lower expense loadings. One strong objection to this is that probably the effective loss ratio change will not be uniform but will depend upon the distribution of each carrier's business between large and small risks. It would be too laborious to try to find the earned pure premiums from payroll exposures and there are other

objections to this procedure. If the present formula is to be continued, it would be consistent to apply it to standard premiums, but this should also be laborious and it would be impossible to check from other data in the statement. Whatever its merits as regards liability loss reserves, the present formula minimum is in the writer's opinion faulty for compensation loss reserves. The point where a minimum check formula is most needed, if at all, is on the most recent cases when the direct claim estimate must rest on the least dependable basis. It is here that, due to the excess of true earned premiums over recorded earned premiums, it generally brings out a lower reserve than the companies' direct estimates.

The use of tabular values from a standard accident distribution was early suggested, but these values were to be based on type of case and this cannot readily be determined on recent cases. Tabular values based on duration have been prepared for indeterminate cases for use in experience rating, but the writer has been only one suggestion for the use of such values based on all cases. This was in a paper, "Temporary and Permanent Disability Reserves" by M.M. Dawson at the October 1916 meeting, ¹ setting out the claim valuation tables of the Dutch State Insurance Fund. This paper was not discussed at that meeting, perhaps because of its brevity and particularity, and has not been referred to since. This seems to the writer unfortunate for the principle underlying the tables seems to be sound, reasonably adaptable and well suited to our present situation. Once suitable tables have been prepared, it does not appear laborious to apply. The valuation is of the losses directly and not indirectly through pure premiums or percentages of gross premiums.

To prepare the necessary tables the existing American Accident Table should be reviewed and brought up to date. Then taking a liberal standard law as the initial base the cases other than death cases could be evaluated in terms of indemnity durations. ² This could then be expressed in a series of numbers of claims persisting, say, at monthly intervals since the date of accident which would be similar to the l_x column of a mortality table. Using an assumed rate of interest, the present value per dollar of deferred weekly indemnity could be worked out for each duration of claim blending into an annuity at an average age calculated on the new disabled life mortality table after a duration of, say, five years.

¹ Proc. III. P. 49

² It is desirable to use a liberal law at the outset in order to get the maximum durations. The tables for the less liberal laws could then be derived by reducing the numbers at the longer durations before computing monetary values.

Since some fatal accidents do not cause instant death, the deaths in the standard accident distribution would need to be segregated into those in which death was instantaneous and those in which there was an intervening period of disability. The latter should be further set up in a table of duration of such intervening disability. A reasonable average value for a death case in terms of weekly benefits could then be adopted and the numbers surviving on disability at each period multiplied by this value. This amount expressed in terms of 1 of weekly benefit should then be added to the present value for the disability cases at the corresponding duration. This would furnish a table for valuing all but known death cases. Known death cases can be valued on the basis of accepted mortality and remarriage tables by standard methods.

In practical operation if, as I think is usual, the company punches cards for open claims to prepare its direct estimate reserves, it could punch on those cards the month of the accident and the rate of weekly indemnity. Sorting these out by month of accident, the total weekly indemnity for each set could then be multiplied by the tabular value and the products totaled to get the reserve in the same manner as in a group valuation of a life insurance company. This would give the minimum indemnity reserve for disability cases. To this would, of course, be added the reserve for survivors' benefits in fatal cases.

There remains to determine the reserve for deferred medical payments. For this, it would seem that a study of medical costs for a set of cases similar in composition to the standard accident distribution could be made tracing the payments by lapse of time since the accident. In this way a similar set of unit present values of remaining costs per case of each duration could be worked out. In making up the reserve these values should be applied to the number of cases outstanding rather than amount of weekly benefit. The reason for this is obvious.

Theoretically, it would be necessary to have a set of such valuation tables for each state to conform to the benefits of its law. Practically, it seems probable that groups of laws are sufficiently alike that one set of tables would serve several states.

Two supplementary reserves would be needed to provide for the full liability, a reserve for deferred claim expense which might be a fixed percentage of the loss reserve as recommended by the committee in 1931,³ and a reserve for unreported and reopened cases. These would have to be based on an examination of experience in that regard.

The writer has not now a company's data or staff to try out these principles. There may be found difficulties which he does not foresee that will make their adoption not feasible. He hopes not.

³ Proc. XVII. P. 334.

Certain advantages would appear to flow from the adoption of such a plan.

1. The reserve so calculated should blend smoothly into the ultimate reserve without the abrupt break that now comes when a policy year passes its third anniversary and a substantial reserve is usually automatically released to surplus.
2. The participating company, stock or mutual, would not need to defer determination of final dividend until the period of formula reserve is passed or, alternatively to accumulate surplus to meet an excess reserve required.
3. There should be a closer, or at least more stable, relation between the direct estimate reserve and the statutory minimum.
4. The reserve would be divorced from rates and in the consideration of rates and rating plans their effect upon the probable adequacy of reserves would not need to be constantly in mind. With the expressed desire for more flexibility in the state supervision of rates under the new federal-state relation that is an important point. It hardly seems likely, however, that regulation of reserves by such a plan would avoid the necessity of direct rate regulation as in the case of life insurance, a dream once expressed to the writer by the late Albert Whitney.

If a system of *minimum* loss reserves along the lines herein outlined is deemed feasible and desirable, the specification in the law would be quite simple. It would only be necessary to any that the liability for deferred payments on compensation losses shall be not less than the present value of the future compensation on cases for which the company is liable computed on the basis of such tables of disability, mortality and remarriage as may be approved by the commissioner and on an assumed rate of interest not exceeding (e.g.) 3%. It would seem better to leave the table unspecified in the law to permit easy change as experience indicates to be desirable. Some body such as the National Council representing both the commissioners and the carriers should be charged with the duty of continuously studying developments and making recommendations for modification of standards and, in the interest of uniformity it would be desirable that it make regular reports to the Association of Commissioners on the apparent appropriateness of the existing reserve standard tables. It would probably be desirable to have a standing committee of the association in charge of this work though perhaps the provision for general supervision of the Council would be sufficient.

The offering of these observations has been inspired by the facts that in California there is not, as in New York, a general

fund to take over the liabilities of insolvent carriers, but there is required of each carrier a deposit of securities or a surety bond to cover its deferred liabilities based on the usual minimum loss reserve but at a higher fraction (70%) of the earned premium and that under the comprehensive plan for war contracts and perhaps under proposed rating plans based on graduated expense loadings the reserve so computed may prove inadequate. At least this possibility must be considered by the Commissioner if such plans come before him for approval.

A PROPOSED CHANGE IN EXCESS RATIO TABLE FORM

BY

R. V. SINNOTT

Revised table "M", which is shown below, is merely a restatement of the New York (.598) table for excess ratios for compensation. The change in the table was made to facilitate its use in forming Compensation Retrospective Rating Plans where the permissible loss ratio was other than .598.

In experimenting with the conventional type of excess ratio table attempting its adaptation to premiums with other than a .598 permissible loss ratio, certain questions arose.

Should selected loss ratio be modified in any way before entering the table?

Is the standard premium as produced by Manual or experience adjusted rates the correct standard premium for table entry?

The obvious answer is that both should be modified. The standard premium used in entering the table should be modified by the ratio of the permissible loss ratio of the premium used to the permissible loss ratio upon which the table is based. The selected loss ratio should be modified by the reciprocal of this ratio before entering the table.

It has been found that the latter procedure has been followed in actual rating practice but that no modification of the entering standard premium was made probably because such a procedure would not make a significant difference in the result.

After one or both of these modifications is made, it is customary to enter the table to determine the proportion of the total loss in excess of the selected loss ratio. This was then converted to a ratio to premium by multiplying it by the permissible loss ratio for the true Standard Premium (not the standard premium used in entering the table).

If a minimum premium restriction was involved in the rating plan, the same procedure was followed except that the complement of the excess ratio was used. A final step here involved the subtraction of this ratio from the ratio to true standard premium of the loss necessary to produce the minimum premium.

A consideration of these complexities and of the array of ratios led to the recognition that the problem was one of measuring experienced deviations from an expected loss and that premium had no place in the calculation except as a means of determining the expected loss and as a final reference to which the charge for excess losses was to be attached.

It was recognized that if a table were to be constructed using "Expected Losses" instead of "Standard Premiums", and "Ratio of

Selected Experienced Loss to Expected Loss" instead of "Selected Loss Ratio", such a table could be used without regard to the expense loading used in producing the Standard Premium.

A sample of the revised New York (.598) table is reproduced herewith in an "Expected Loss" form. Straight line interpolation was employed to produce entering ratios in even hundredths. It was suggested that second degree interpolation be employed in getting the "Expected Loss" sizes in even thousandths. A complete check of this indicated a maximum difference in table readings of only .003 when compared with the result of first degree interpolation. Accordingly, first degree interpolation was employed throughout.

The figures shown in parentheses are the "Savings in the Minimum Premium" expressed as a ratio to Expected Losses. These were obtained by subtracting the complement of the Excess Ratio from the Selected Ratio.

The procedure in using the table to determine the net charge for losses in excess of the losses contemplated by the Maximum Premium is to subtract the appropriate "Savings in Minimum" table reading from the appropriate "Excess Ratio" reading. The result after adding an increment for loss expense may be expressed as a ratio to premium by dividing by the permissible loss ratio.

This table is recommended to the Society in the hope that it will be found easy of application and that its use will facilitate in some degree the solution of rating problems of the future.

TABLE "M"

Ratio: Aggregate Losses in Excess of Selected Losses Per Risk
Total LossesFigure in Brackets = Ratio: Aggregate Savings Within Selected Losses Per Risk
Total Losses

(Figures in thousands)

Based on N. Y. Compensation Excess Loss Tables (No Limitation on Individual Losses)

Ratio A		RISK EXPECTED LOSSES							
		\$3,000	\$4,000	\$5,000	\$6,000	\$7,000	\$8,000	\$9,000	\$10,000
A - Ratio Risk Selected Losses to Expected Losses	.01	990 (000)	990 (000)	990 (000)	990 (000)	990 (000)	990 (000)	990 (000)	990 (000)
	.02	980 (000)	980 (000)	980 (000)	980 (000)	980 (000)	980 (000)	980 (000)	980 (000)
	.03	970 (000)	970 (000)	970 (000)	970 (000)	970 (000)	970 (000)	970 (000)	970 (000)
	.04	960 (000)	960 (000)	960 (000)	960 (000)	960 (000)	960 (000)	960 (000)	960 (000)
	.05	950 (000)	950 (000)	950 (000)	950 (000)	950 (000)	950 (000)	950 (000)	950 (000)
	.06	941 (001)	940 (000)	940 (000)	940 (000)	940 (000)	940 (000)	940 (000)	940 (000)
	.07	931 (001)	931 (001)	930 (000)	930 (000)	930 (000)	930 (000)	930 (000)	930 (000)
	.08	922 (002)	921 (001)	921 (001)	921 (001)	921 (001)	921 (001)	921 (001)	921 (001)
	.09	912 (002)	911 (001)	911 (001)	911 (001)	911 (001)	911 (001)	911 (001)	911 (001)
	.10	903 (003)	902 (002)	901 (001)	901 (001)	901 (001)	901 (001)	901 (001)	901 (001)
	.11	894 (004)	893 (003)	892 (002)	892 (002)	892 (002)	892 (002)	892 (002)	891 (001)
	.12	885 (006)	884 (004)	883 (003)	882 (002)	882 (002)	882 (002)	882 (002)	882 (002)
	.13	876 (006)	874 (004)	873 (003)	872 (002)	872 (002)	872 (002)	872 (002)	872 (002)
	.14	867 (007)	865 (005)	864 (004)	862 (002)	862 (002)	862 (002)	862 (002)	862 (002)
	.15	858 (008)	856 (006)	854 (004)	853 (003)	853 (003)	852 (002)	852 (002)	852 (002)
	.16	849 (009)	846 (006)	844 (004)	843 (003)	843 (003)	842 (002)	842 (002)	842 (002)
	.17	840 (010)	837 (007)	835 (005)	833 (003)	833 (003)	832 (002)	832 (002)	832 (002)
	.18	832 (012)	828 (008)	826 (006)	824 (004)	823 (003)	823 (003)	822 (002)	822 (002)
	.19	824 (014)	820 (010)	817 (007)	815 (005)	814 (004)	813 (003)	812 (002)	812 (002)
	.20	816 (016)	811 (011)	808 (008)	806 (006)	805 (005)	804 (004)	803 (003)	803 (003)
	.21	807 (017)	802 (012)	798 (008)	796 (006)	795 (005)	794 (004)	793 (003)	793 (003)
	.22	799 (019)	793 (013)	789 (009)	786 (006)	785 (005)	784 (004)	783 (003)	783 (003)
	.23	791 (021)	785 (015)	781 (011)	778 (008)	776 (006)	775 (005)	774 (004)	773 (003)
	.24	783 (023)	777 (017)	772 (012)	769 (009)	767 (007)	766 (006)	764 (004)	764 (004)
	.25	776 (026)	769 (019)	764 (014)	760 (010)	758 (008)	757 (007)	755 (005)	754 (004)
	.26	768 (028)	761 (021)	756 (016)	752 (012)	750 (010)	748 (008)	746 (006)	745 (005)
	.27	760 (030)	753 (023)	747 (017)	743 (013)	741 (011)	739 (009)	737 (007)	736 (006)
	.28	751 (031)	744 (024)	738 (018)	734 (014)	732 (012)	730 (010)	728 (008)	727 (007)
	.29	744 (034)	736 (026)	730 (020)	725 (015)	723 (013)	721 (011)	719 (009)	718 (008)
	.30	737 (037)	729 (029)	722 (022)	717 (017)	715 (015)	713 (013)	711 (011)	710 (010)

OBITUARY

HARRY FURZE

1854 - 1945

Harry Furze, First Treasurer of the Globe Indemnity Company of New York, died at his home in Glen Ridge, New Jersey on Wednesday, December 26th after a short illness. He was 91.

Mr. Furze joined the Globe as Treasurer when the Company was formed in 1911 and retained that position until his retirement in 1934.

A native of England, Mr. Furze came to the United States in 1900, making his home in Glen Ridge, New Jersey, where he resided for 45 years. In addition to taking an active interest in community affairs, he was a member and former Treasurer and Vestryman of Christ Episcopal Church in Glen Ridge, also a member of the First Boy Scout Council of Glen Ridge.

Outside of his wide acquaintance and popularity as Treasurer of the Globe, he was perhaps most widely known as an outstanding exponent of lawn bowling, being a pioneer in introducing the sport in this country. A member of the Essex County Lawn Bowling Association, he was also President of the American Lawn Bowling Association in 1928. In 1929 he went to England with the American Team of International bowlers.

Mr. Furze was a charter member of the Society and took a very personal interest in its affairs, particularly during the Society's early years. Later, although he was not so active in the Society, his interest continued and manifested itself as those who were close to him knew, by continued encouragement not only of those prominent in the Society but of the younger members of the profession. Many members of the Society will always remember with gratitude the encouragement he gave them and the profession.

Mr. Furze leaves his wife, Mrs. Ida Jane Rankin Furze; two sons, George of Huntington, Long Island and Howard of Glen Ridge; two daughters, Mrs. Harold L. Jones and Mrs. Nathaniel G. Randall of Glen Ridge and four grandchildren.

OBITUARY

THOMPSON B. GRAHAM

1879 - 1946

Thompson Bertrand Graham, a Fellow of this Society for thirty years, died suddenly on July 24, 1946, in New York City. He is survived by two sisters and a brother, William J. Graham, Vice-President of the Equitable Life Assurance Society of New York and a charter member of the Casualty Actuarial Society.

He was born in Louisville, Kentucky, on June 21, 1879, and educated in Louisville and in New York City, where he was graduated from St. Francis Xavier College. He also attended the Louisville Law School and the Hospital College of Medicine, Louisville.

Mr. Graham entered the insurance business with the Sun Life Insurance Company of Kentucky, and when that company was reinsured by the Metropolitan Life Insurance Company in 1902, he joined the latter company. He was active in improving Field and Home Office service and relations. In 1922 he became an Assistant Secretary of Metropolitan, and was made a Fourth Vice-President in 1941.

He was a Fellow of the Insurance Institute of America, and a member of the Life Underwriters Association of New York and of the National Association of Life Underwriters. His other memberships included the American Economic Association, the American Management Association, and the American Statistical Association. A veteran of World War I, Mr. Graham was a member of the Officers of Foreign Wars and of the American Legion, and was a major in the United States Army Reserve Corps.

He took a great interest in civic matters and was for a time a Director of the New York County Grand Jury Association. He was very active in the charitable work of his church and of many non-sectarian organizations, and he was decorated by the Pope as a Knight Commander of the Equestrian Order of the Holy Sepulchre. For many years he made it his practice to dedicate one evening a week to charitable activities.

OBITUARY

FREDERICK LUDWIG HOFFMAN

1865 - 1946

Dr. Hoffman lecturer and authority on health statistics died on February 23, 1946 while in retirement. He was born in Germany on May 2, 1865, and came to this country in 1884. After a short mercantile career he took a position in 1887 with the industrial department of the Metropolitan Life Insurance Company. He later was connected with the Life Insurance Company of Virginia.

In 1894 he joined the Prudential Insurance Company and later became statistician and in 1902 he was elected an officer of the company. For many years Dr. Hoffman traveled widely lecturing in every part of the country and in countries abroad on insurance mortality and public health problems.

In 1915 he conducted a course for Yale students and was on the faculty of that institution during 1916 and 1917.

Dr. Hoffman was the author of many articles and books on statistics and other subjects notably in the health field. He was widely known for his periodic reports on death, murder, and suicide rates in the United States. He devoted much of his time to the study of cancer and published many analytical treatises on the subject. In 1913 he read an address, "Menace of Cancer," before the New Jersey Academy of Medicine, which address was later enlarged and published under the title of, "The Mortality from Cancer Throughout the World."

In 1943 Dr. Hoffman received the Clement Cleveland Medal, awarded annually for outstanding service in the cause of cancer control.

Dr. Hoffman was formerly president of the American Statistical Assn., a fellow of the Royal Statistical Society of London, a member of the German Society for Insurance Science, an associate fellow of the American Medical Assn., an associate member of the American Academy of Medicine, and an honorary member of the Essex County Anatomical and Pathological Society. He was also a member of the American Economic Assn., the American Academy of Social and Political Science in the City of New York, the National Institute of Social Sciences, the American Sociological Society, the Southern Sociological Congress, the National Conference on Charities and Corrections, and the American Assn. for the Advancement of Science.

He was a charter member of this society and a charter member of several medical and health societies.

In 1901 he was a member and speaker at the British Congress on

Tuberculosis in London. In 1903 he was a member and a speaker at the International Actuarial Congress in New York and subsequently he attended the same organization in Berlin, Vienna, and Amsterdam. In 1935, he retired from the Prudential Insurance Company and later as consulting statistician of the Biochemical Research Foundation of Franklin Institute.

Dr. Hoffman represented the United States Government officially in 1909 during the International Actuarial Congress in Vienna and at the International Statistical Institute at Paris. He also represented this Government in the Congress on Tuberculosis and the International Congress on Hygiene and Demography, which was held in Washington.

In 1915 he was a member and speaker at the World's Insurance Congress at San Francisco and in the next year he was a speaker at the second Pan-American Scientific Congress in Washington.

He served during the first World War as Chairman of the National Committee on Statistics and Information of the Advisory Commission on Labor and Welfare of the Council of National Defense and was a member of the Committee on Anthropology of the National Research Council.

In addition to all of his activities both in the field of statistics and medicine, he found time to investigate the hazards of aviation and in 1925, he made many flights in the west at the request of the government aviation authorities who sought a liberalization of insurance rates so that aviators might be regarded as insurable risks.

OBITUARY

ALFRED McDUGALD

1861 - 1944

By the death of Alfred McDougald on July 28, 1944 the Society lost one of its oldest European members.

Born in 1861, Mr. McDougald entered the service of the British Empire Mutual Life Assurance Company in 1875. He became an Associate of the Institute of Actuaries in 1882, and passed three of the four parts of the Fellowship examinations before change in his major interest led him to abandon the traditional actuarial field. In 1896 he was transferred to Montreal, Canada but after a few years he returned to England. In 1911 he became Accident Manager of the Phoenix Assurance Company.

Early in 1919, he was sent to the United States by his company to study conditions in the casualty field which it was then considered entering in this country. An actuary, he naturally gave considerable attention to the problems of workmen's compensation insurance rates and conferred about them with several leading members of our then young society. His first impression was one of amazement on two accounts, 1) the elaborateness of our procedure, and 2) the frankness of our exhibition and exchange of data. Commenting on the former, he said to one of our members, "When I get back and tell them in London about this, they will say, 'Now we know what is the matter with the States.'" But as he saw the problem of making rates for many different states with different major industries, each with its own compensation law which was apt to be amended at any session of its legislature, and of justifying those rates to state officials, he realized the necessity of our elaborate procedure and combination and exhibition of data which contrasted so strangely with the bargaining type of rate conferences with which he had become familiar in London.

His competence and personality so impressed the members of the Society who met him on this visit that he was elected a Fellow under the constitutional provision for such election without examination. Shortly after his return his company did enter the casualty field in the United States. He did not, however, again visit us. That he followed our Proceedings with interest is evident from his interesting and informative discussion of Mr. Cowles early paper on "Aircraft Insurance" (Proc. VI, 328). He retired from active service in 1923 after 48 years in life and casualty insurance.

OBITUARY

FRITZ MÜLLER

1891 - 1945

Fritz Müller, an Associate of this Society, was born February 10, 1891 in Berlin, Germany; and there he died on April 27, 1945 from wounds received during an air attack.

After leaving public school Mr. Müller was employed in the German branch office of the New York Life Insurance Company. In 1911, upon recommendation of his superior, Professor Georg Bohlmann, Actuary of that branch, he was transferred to the Actuary's Department of home office in New York, where he was employed for nine years.

In 1920 Mr. Müller returned to Germany to visit his parents, and he found it impracticable to return to the United States. Although he obtained satisfactory employment immediately, the next few years were fraught with considerable hardship owing to the low purchasing power of even a relatively high salary.

When in 1922 the Allianz, one of the largest German insurance companies, founded the Allianz Life Insurance Company, Mr. Müller, on account of his wide experience in all phases of life insurance, especially in the actuarial and medical departments, was called upon to organize this new company. Again in 1923 Mr. Müller organized the Agrippina Life Insurance Company of Berlin, belonging to the very old Agrippina Insurance Group of Cologne. With this Company Mr. Müller continued until his death, having been successively Secretary-Treasurer (Prokurist) and Director.

Mr. Müller became an Associate of this Society by examination on November 19, 1929. He was also a member of the German Actuarial Society. He is survived by his wife and by a daughter. His only son was killed in 1944 at the age of 21.

Fritz Müller will be remembered by his American friends, as a capable insurance man, a staunch friend and a gentleman of the highest integrity. That he did not survive to assist in the reconstruction of Germany is one of the countless tragedies of the war.

OBITUARY

EMIL P. SCHEITLIN

1885 - 1946

Emil P. Scheitlin, A Fellow and Charter Member of this Society, died May 2, 1946 at the Orange Memorial Hospital, Orange, New Jersey after a long illness.

Mr. Scheitlin was born in St. Gall, Switzerland July 29, 1885. Following his education he joined La Preservatrice, oldest and largest French Casualty Company in Paris, serving for five years in the Actuarial and Statistical Departments.

He came to the United States in 1909 and was employed for about three years by a firm of importers.

Mr. Scheitlin became associated with the Globe Indemnity Company in 1912, shortly after it began business, and served as the Company's Chief Statistician until 1927 when he was made Assistant Treasurer. In 1935 he was appointed Treasurer.

Mr. Scheitlin was a member of the Association of Casualty and Surety Accountants and Statisticians. For many years he served as a member of the Actuarial and Statistical Committees of various Boards and Bureaus, giving unselfishly of his time and talents. His careful study of all the available data and equipment in the field of modern accounting and tabulating methods, together with his detailed knowledge of the Company's operations, enabled him to install many improvements which not only reduced operating expenses without loss of efficiency but also improved working conditions. Many of the methods and systems installed by him have undergone little change, attesting to the basic soundness of their conception.

He gave generously of his time to others outside his own organization gladly sharing his own ideas in the solution of their problems.

His broad knowledge of the Casualty insurance business, gained through years of zealous work and close study, earned for him the respect of associates and friends.

He is survived by his widow, a daughter and a son.

OBITUARY

JAMES HERMAN WASHBURN

1874 - 1946

James Herman Washburn was born on December 14, 1874, at La Fayette, Indiana. He was educated at Purdue University, where he pursued the electrical engineering course for three years until 1905, when he entered the actuarial department of the Metropolitan Life Insurance Company, remaining there until 1906. He then became the actuary of La Latina-Americana Life Insurance Company of Mexico City, Mexico. The 1911 revolution in Mexico terminated this connection. By reason of his knowledge of Spanish and Portuguese, Mr. Washburn became the manager of the industrial department of one of the largest life insurance companies in Brazil, the Garantia Da Amazonia at Rio de Janeiro, where he spent several years.

Returning to the United States, Mr. Washburn became the actuary of the Pan American Life Insurance Company in 1916. He was engaged as a consulting actuary for a number of years, was actuary of the Tennessee Insurance Department for several years and then resumed practise as a consulting actuary until his death. He died from a heart attack at his home in Nashville, Tennessee on August 19, 1946.

Mr. Washburn became an Associate of the Actuarial Society of America in 1902, a Fellow of the American Institute of Actuaries in 1917 and an Associate of this Society in 1925. His professional services covered companies and countries other than those above mentioned, and he contributed substantially in promoting sound actuarial principles for insurance companies in this Hemisphere.

CASUALTY ACTUARIAL SOCIETY

NOVEMBER 22, 1946

THE COUNCIL

<i>*Officers:</i>	CHARLES J. HAUGH.....	<i>President</i>
	JAMES M. CAHILL.....	<i>Vice-President</i>
	HARRY V. WILLIAMS.....	<i>Vice-President</i>
	RICHARD FONDILLER.....	<i>Secretary-Treasurer</i>
	EMMA C. MAYCRINK.....	<i>Editor</i>
	THOMAS O. CARLSON.....	<i>Librarian</i>
<i>†Ex-Presidents:</i>	RALPH H. BLANCHARD.....	1948
	HAROLD J. GINSBURGH.....	1949
<i>†Ex-Vice-Presidents:</i>	ALBERT Z. SKELDING.....	1949
<i>†Elected:</i>	NELS M. VALERIUS.....	1947
	WILLIAM R. WILLIAMSON.....	1947
	THOMAS F. TARBELL.....	1947
	ARTHUR E. CLEARY.....	1948
	RUSSELL P. GODDARD.....	1948
	RAINARD B. ROBBINS.....	1948
	HARMON T. BARBER.....	1949
	JOHN S. MILLS.....	1949
	FRANCIS S. PERRYMAN.....	1949

**Terms expire at the annual meeting in November 1947*

†Terms expire at the annual meeting in November of the year given.

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 GUSTAV F. MICHELBACHER
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CLARENCE A. KULP
WILLIAM R. WILLIAMSON
JARVIS FARLEY

ABSTRACT FROM THE MINUTES OF THE MEETING

NOVEMBER 22, 1946

The annual meeting of the Casualty Actuarial Society was held at the Hotel Biltmore, New York, on Friday, November 22, 1946.

President Haugh called the meeting to order at 10:20 A.M., the roll was called, showing the following forty-six Fellows and seventeen Associates present:

FELLOWS

Ainley	Eppink	McConnell
Ault	Farley	Mills
Barber	Fondiller	Oberhaus
Barter	Goddard	Perryman
Berkeley	Graham, Wm.J.	Pickett
Blanchard	Haugh	Ross
Cahill	Hughes	Silverman
Carleton	Johnson	Skelding
Carlson	Kardonsky	Skillings
Cogswell	Kormes	Smick
Comstock	Kulp	Smith, S.E.
Corcoran	Linder	Tarbell
Crouse	Marshall	Valerius
Davies	Nasterson	Van Tuyl
Elliott	Matthews	Williams
	Maycrink	

ASSOCIATES

Bailey, A.L.	Grossman	Rosenberg
Bittel	Hart	Rowell
Conrod	Holzinger	Uthhoff
Dowling	Montgomery, J.C.	Wieder
Eger	Nicholson	Woolery
Gildea	Rodermund	

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

Mr. Haugh read his Presidential Address.

The minutes of the meeting held November 16, 1945 were approved as printed in the Proceedings.

The Secretary-Treasurer (Richard Fondiller) read the report of the Council and upon motion it was adopted by the Society. Charles W. Crouse, an Associate, had passed the necessary examination in 1946 and had been admitted as a Fellow. A diploma was presented to

him by the President. Loring M. Barker, M. Stanley Hughey, Matthew Rodermund, John H. Rowell, Ruth Salzmann, and John W. Wieder, Jr. had passed the necessary examinations and had been admitted as Associates. The paper covered number of the Proceedings will be eliminated and members will receive only the bound volume.

The President announced the deaths, since the last meeting of the Society, of five Fellows: Harry Furze, Thompson B. Graham, Frederick L. Hoffman, Alfred McDougald, and Emil Scheitlin and two Associates, Fritz Muller and James H. Washburn. Obituary notices appear in this volume of the Proceedings.

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

CASUALTY ACTUARIAL SOCIETY
ANNUAL REPORT ON FINANCES

Cash receipts and disbursements from October 1, 1945 to September 30, 1946.

Income

On deposit Oct. 1, 1945 in Marine Midland Trust Co.		\$2,046.84
Members' Dues	\$2,270.00	
Sale of Proceedings	987.70	
Examination Fees	405.30	
Luncheons & Dinners	181.50	
Michelbacher Fund	206.00	
Sale of Hobbs' Reprint	5.00	
Miscellaneous	-14.37	4,041.13
Total		\$6,087.97

Disbursements

Printing & Stationary	\$1,083.78
Postage, Tel., Express, etc.	132.91
Secretarial Work	428.00
Examination Fee Refund	6.00
Examination Expense	248.98
Luncheons & Dinners	227.51
Library	8.49
Insurance	5.00
Storage	20.00
Miscellaneous	25.15
Total	\$2,185.82
On deposit Sept. 30, 1946 in Marine Midland Trust Co.	3,902.15
Total	\$6,087.97

Assets

Cash in Bank	\$3,902.15
Bonds Owned	*3,750.00

*Present Redemption Value
is \$4,460.00

Total Assets \$7,652.15

Liabilities

Unpaid Bills:

Fire Ins. Premium	\$ 24.00	
Globe Printing Co.		
Proceedings	3,284.00	
Reprint -		
Mortality Tables	46.00	
Postage on Proceedings	35.00	
Examination Expense	30.00	
Editorial Expense	11.00	3,430.00
Michelbacher Fund		1,904.86
Fondiller Prize		100.00
Surplus		2,217.29

Total Liabilities \$7,652.15

The Auditing Committee (H.G.Crane, Chairman) reported that the books of the Secretary-Treasurer has been audited and his accounts verified.

The examination Committee (John A. Mills, Chairman) submitted a report of which the following is a summary:

1946 EXAMINATIONS - SUCCESSFUL CANDIDATES

The following is a list of those who passed the examinations held by the Society on April 3 and 4, 1946:

ASSOCIATESHIP EXAMINATIONS

PART I:	Robert Begin	Francis J. Hope	Stanley L. Olds
	T.T.Chamberlain	E.S. Jackson	George A. Reynolds
	B.N. Coates, Jr.	Grace Leight	Fred W. Tallman
	John E. Freund	William Leslie, Jr.	Richard J. Wolfrum

ABSTRACT FROM THE MINUTES

PART II:	Loring M. Barker W. R. Burns T. T. Chamberlain B. N. Coates, Jr.	John E. Freund M. Stanley Hughey E. S. Jackson G. B. Oakland	Fred W. Tallman A. M. Sutherland John C. Woody
PART III:	Coleman Bloomfield B. N. Coates, Jr. Wendell W. Cooke A. V. Fairbanks	John E. Freund James B. Gardiner Francis J. Hope Grace Leight	R. A. Nix M. Rodermund Harold Thompson Richard J. Wolfrum
PART IV:	Robert D. Acker Edward S. Allen Coleman Bloomfield T.T. Chamberlain	B. N. Coates, Jr. John E. Freund James B. Gardiner H. J. George M. Stanley Hughey	Grace Leight Olan T. McMillan R. A. Nix J. W. Wieder, Jr.
PART V:	H. J. George	John H. Rowell Ruth Salzmann	J. W. Wieder, Jr.

FELLOWSHIP EXAMINATIONS

PART I:	John H. Rowell	D. R. Uthhoff	
PART II:	Charles W. Crouse	Norman Rosenberg	D. R. Uthhoff
PART III:	Charles W. Crouse		

The Council's re-election of Emma C. Maycrink as Editor, and of Thomas O. Carlson as Librarian, was announced.

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

President	Charles J. Haugh
Vice President	James M. Cahill
Vice President	Harry V. Williams
Secretary-Treasurer	Richard Fondiller
Editor	Emma C. Maycrink
Librarian	Thomas O. Carlson

Members of Council (terms expire in 1949):

John A. Mills, Harmon T. Barber, Francis S. Perryman

In accordance with Constitutional requirements, notice of the following proposed amendment to the By-Laws was given. This amendment was, on motion, adopted to read as follows:

ARTICLE IV - DUES - First Paragraph

The Council shall fix the annual dues for Fellows and Associates. The payment of dues will be waived in the case of Fellows or Associates who have attained the age of seventy years or who, having been members for a period of at least twenty years, shall have attained the age of sixty-five years. Fellows and Associates who have become totally disabled while members may upon approval of the Council be exempted from the payment of dues during the period of disability.

The papers appearing in this Volume were presented.

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

1. It is represented by certain persons advocating further limitation for payroll in the compensation rating structure that such action will avoid the feast and famine swings that seem to be produced by fluctuations in wage levels. Is this the complete answer to the variation of loss ratios resulting from the swing of economic cycle?
2. (a) What are the practical difficulties which may arise out of the adoption of uniform classification of accounts by Casualty Insurance Companies?
(b) What are the advantages and disadvantages of a uniform annual statement for both Casualty and Fire Companies?

The papers presented at the last meeting were discussed. Upon motion, the meeting adjourned at 4:30 P.M.

1947 EXAMINATIONS OF THE SOCIETY

EXAMINATION COMMITTEE

GEORGE B. ELLIOTT - - - - GENERAL CHAIRMAN

IN CHARGE OF
ASSOCIATESHIP EXAMINATIONS
PARTS I TO IVSAMUEL M. ROSS, CHAIRMAN
JOHN W. CARLETON
CHARLES W. CROUSEIN CHARGE OF
FELLOWSHIP EXAMINATIONS
AND ASSOCIATESHIP EXAMINATION PART VSEYMOUR E. SMITH, CHAIRMAN
ERNEST T. BERKELEY
ROGER A. JOHNSON, JR.

EXAMINATION FOR ENROLLMENT AS ASSOCIATE

PART I

April 9, 1947

Time 9:30 to 12:30 o'clock

1. (a) The ratio of the premium rate for risks of class A to the premium rate for risks of class B, is R . If the rate for risks of class A were to be increased x per cent and the rate for risks of class B increased y per cent, then the arithmetic mean of the two rates would be increased z per cent. But if the class A rate were increased y per cent and the class B rate increased x per cent, then the arithmetic mean would be increased kz per cent. Find the ratio of x to y in terms of k and R .
- (b) Find the sum of the first n terms of the series in which $(1 + a + a^2 + a^3 + \cdots + a^{k-1}) B^{k-1}$ is the k^{th} term.
2. (a) $1, \omega,$ and ω^2 are the three cube roots of unity. Evaluate $[2 + 2\omega + 5\omega^2]^6$
- (b) Using the binomial theorem, find $\frac{\sqrt[4]{401.2}}{\sqrt[3]{7.984}}$ to 4 significant figures.
- (c) If the number of combinations of 17 things taken r at a time plus the number of combinations of 17 things taken $(r - 1)$ at a time equals the number of combinations of 18 things taken $(r + 2)$ at a time, what is the number of combinations of r things taken 5 at a time?
3. (a) Solve the following equations for x and y :
 - (1) $y^2 = 5xy - 4x^2$
 - (2) $x^2 y^2 + 400 = 41xy$
- (b) If x is real, between what values must $\frac{x}{x^2 - 5x + 9}$ lie?

4. (a) Prove that if there be N sets containing m things, $2m$ things, $3m$ things . . . Nm things, respectively, then the number of ways in which a selection can be made consisting of exactly m things from each set, is

$$|Nm \div \{ |m \}^N$$

- (b) Given $\log_{10} 2 = .30$, solve the following equation:

$$\sqrt{5^a} + \sqrt{5^{-a}} = 5/2.$$

5. (a) What is the force of interest corresponding to an effective rate of 6%?
- (b) The amount of an ordinary annuity certain of \$100 per annum, payable annually, is \$6,667 and the present value is \$2,000. What is the effective rate of interest?
6. (a) A man leaves a perpetuity of \$1,000 annual rent to be equally divided between two hospitals. One is to receive the full annuity until it has received its share, after which the other will receive a perpetuity. Money is worth 4% effective. In what year must the payment be divided between the two hospitals?
- (b) A man borrows A dollars at $y\%$ interest, payable annually. He intends to build up a sinking fund to pay the debt off in n years by annual payments into a savings bank paying $x\%$ interest compounded semi-annually. Express in terms of A , x , y and n what the reduction in his total annual payment would be if the debt could be amortized (as to both principal and interest) by a series of n equal payments, the first to be made one year after the date of the loan.
7. A mortgage dated March 31, 1947 is to be retired by the payment of a fixed sum, S , at the end of each month for 20 years, the first payment to be made April 30, 1947. For each of the following questions, give an entirely numerical expression *indicating* the operations of addition, subtraction, multiplication, division, involution or evolution which would have to be performed if the answer to the question had to be determined without the use of any table whatsoever.
- (a) What should be the value of S if the mortgage secures a loan of \$10,000 bearing interest at the effective rate of 5% per annum?

7. (b) How much of the principal will remain unpaid on December 31, 1960, after the payment due on that date has been made?
8. (a) A \$1,000, 4 per cent bond, with dividends payable annually, is issued redeemable at par in 20 years. Fifteen years before this bond issue matures a man purchases one of these bonds at a price to yield him 3%. Seven years before maturity he purchases another of these bonds at a price to yield him 2%. What is the difference between the purchase prices of the two bonds?
- (b) A property costing \$10,000 has a scrap value of \$1,000 after 10 years of use. Compute the book value at the end of the seventh year, if depreciation charges are made according to the constant percentage of book value method.

Note: The following values will be useful in solving problems 5 to 8 inclusive:

$\log_{10} 1.06$	=	.0253
$\log_{10} e$	=	.434
$\log_{10} 1.995$	=	.3000
$(1.04)^{17}$	=	1.95
$(1.04)^{18}$	=	2.03
$a_{\overline{15} }$ (at 3%)	=	11.938
$a_{\overline{7} }$ (at 2%)	=	6.472

PART II

April 9, 1947

Time 1:30 to 4:30 o'clock

1. Determine the coördinates of the maximum, minimum and inflectional points of the curve

$$y = xe^{-x^2}$$

and draw a rough sketch of the curve.

2. (a) Given $\cos^2 U = \frac{1}{2} + \frac{1}{2} \cos 2U$, find the area bounded by the circle $\rho = a \cos \theta$ and the lines $\theta = 0$ and $\theta = 60^\circ$.
- (b) Expand $\log \left(\frac{1+x}{1-x} \right)$ in powers of x to three terms and determine the interval of convergence for this expansion.

3. (a) Find a function, $f(x)$, whose first derivative is

$$\frac{8x + 2}{x^3 - x^2 - 2x}$$

How many such functions are there and in what respect do they differ from each other?

(b) Find $\int_0^\pi (\sin^2 \phi + \cos \phi)^2 d\phi$.

4. (a) The strength of a rectangular beam varies as the product of the breadth and the square of the depth. Find the dimensions of the strongest beam that can be cut from a log whose cross section is an ellipse of semi-axes a and b .

(b) Find the limit of $(\sin x)^{\tan x}$ as x approaches $\frac{\pi}{2}$.

5. (a) Prove the following identity by the method of separation of symbols:

$$U_0 + x_{(1)} \Delta U_1 + x_{(2)} \Delta^2 U_2 + x_{(3)} \Delta^3 U_3 + \dots \\ = U_x + x_{(1)} \Delta^2 U_{x-1} + x_{(2)} \Delta^4 U_{x-2} + \dots$$

- (b) Given $f(3)=100$; $f(7)=448$; $f(11)=652$; $f(15)=776$; and $f(19)=884$; interpolate values of $f(4)$, $f(5)$ and $f(6)$ and state the assumption upon which your interpolation is based.

6. (a) Prove that $\Delta_{\frac{1}{\sqrt{x}}}^2 x^3 = x + y + z$.

- (b) Apply Lagrange's formula to find U_5 , given that

$$U_1 = 2, U_2 = 4, U_3 = 8 \text{ and } U_0 = 64$$

and explain why the results differ from those obtained by the series of powers of 2.

7. (a) From Newton's divided difference formula, derive the Gauss "forward" formula for the case in which $U_{-2}, U_{-1}, U_0, U_{+1}$ and U_{+2} are known.

- (b) Prove that the sum to infinity of the series

$$\frac{1^2}{2} + \frac{2^2}{3} + \frac{3^2}{4} + \dots \text{ is } e - 1,$$

8. (a) Prove that $[5] U_x = (5 + 5\delta^2 + \delta^4) U_x$.

$$\text{Where } \delta U_x = U_{x+\frac{1}{2}} - U_{x-\frac{1}{2}}.$$

- (b) Derive Simpson's rule for approximate integration from $U_x = (1 + \Delta)^x U_0$.

PART III

April 10, 1947

Time 9:30 to 12:30 o'clock

1. The value of a certain continuous variate, X , has been observed in each of 100 cases drawn at random from an indefinitely large class of cases in every one of which X has some one determinable value. The observed values are distributed as shown in the following table:

		<i>Number of Cases</i>	
12.5	$\leq X <$	17.5	0
17.5		22.5	1
22.5		27.5	4
27.5		32.5	12
32.5		37.5	20
37.5		42.5	25
42.5		47.5	21
47.5		52.5	11
52.5		57.5	5
57.5		62.5	1

- (a) Compute the arithmetic mean, the standard deviation and the skewness, α_3 , of the observations. Final operations of involution and division in the computation of α_3 , may be indicated without being performed.
- (b) State the probable error corresponding to each of the three results required in (a).
- (c) What is the meaning (in terms of the class from which the observed cases were drawn) of each of the statements of probable error required in (b)?
2. Suppose that you have available a table of values of

$$\phi(t) = \frac{1}{\sqrt{2\pi}} \cdot e^{-\frac{t^2}{2}}, \text{ and of } \int_0^u \phi(t) dt,$$

from $t = 0$ to $t = \varepsilon$, and that on the basis of the data in Question 1, you have been asked to estimate for *each* of the intervals 12.5 to 17.5, 17.5 to 22.5, etc., the number of cases in which the value of X will be found to lie within that interval, out of any 1,000 cases drawn at random from the class from which the observed cases in Question 1 were drawn. Outline the procedure you would follow; and state the assumptions upon which your procedure would be based.

3. By the Method of Least Squares, determine the values of the constants in the equation of a curve fitted to the following data. State the reason for your choice of the form of the equation.

t :	0	1	2	3	4	5	6
u :	2	6	15	28	46	68	95

4. (a) Prove that $r_{xy} = \frac{\sigma_x^2 + \sigma_y^2 - \sigma_{x-y}^2}{2\sigma_x\sigma_y}$

- (b) If A is the simple arithmetic mean and H is the simple harmonic mean of a group of relatives, show that the geometric mean of these two means fulfills the time reversal test.

5. From the following data prepare a profit and loss statement for the A B C Company for the period beginning April 1, 1946 and ending June 30, 1946.

Inventory 4/1/46	\$15,000.	Office Salaries	\$1,200.
Sales Allowances	100.	Advertising	500.
Purchases	10,000.	Rent	500.
Sales	20,000.	Sales Salaries	1,000.
In Freight	1,000.	Sales Travel	500.
Inventory 6/30/46	14,000.	Bad Debts	800.
Purchase Returns	700.	Purchase Discounts	400.
Sales Discounts	700.	Interest Expense	300.
Office Expense	300.	Shipping Expense	1,000.
Depreciation	200.	Interest Income	100.

6. Suppose the following additional data were available for the A B C Company as of June 30, 1946 prior to the making of any adjusting or closing entries:

Capital Stock	\$20,000.
Surplus	1,900.
Cash	7,000.
Accounts Payable	4,000.
Accounts Receivable	5,000.
Equipment	3,000.
Accrued Salaries	100.
Unexpired Insurance	150.
Interest Accrued on Investments	150.
Interest Expense Accrued	200.

- (a) Would the addition of the above data make any difference in the net operating profit and if so, how much?
- (b) Prepare a balance sheet for the A B C Company as of June 30, 1946 from the information contained above and in problem 5.
7. (a) A partnership maintains a Purchase Journal and a Cash Journal. How should purchases for cash be handled so that duplicate entries are not posted to the Ledger?
- (b) The X Company has been authorized to issue 3000 shares of \$100 par value stock. It has issued 2000 shares of this stock at a 5% discount. At the end of the first year the surplus of \$15,000 is considered too small for the discount to be charged off. Indicate how the net worth section of the balance sheet will appear.
8. Two proprietors, A and B, owning similar businesses decide to merge and form a corporation. Their balance sheets are as follows:

Assets:	<i>A</i>	<i>B</i>
Cash	\$ 20,000	\$ 50,000
Accounts Receivable	100,000	50,000
Merchandise	30,000	20,000
Plant	50,000	80,000
Total	<u>\$200,000</u>	<u>\$200,000</u>
Liabilities:		
Accounts Payable	\$ 10,000	\$ 25,000
Mortgage	90,000	95,000
Total	<u>\$100,000</u>	<u>\$120,000</u>
Proprietor	100,000	80,000

The authorized capitalization is \$200,000. A and B each subscribe for one half the stock. The corporation purchases the assets of the two proprietorships paying therefor with stock. B buys the rest of his stock for cash. Make the opening entries for the new corporation and close the books of A's business.

PART IV

April 10, 1947

Time 1:30 to 4:30 o'clock

1. (a) A party of n persons is seated at random at a round table. Find the probability that 3 specified persons will not be seated in adjacent chairs.

(b) Players of equal skill, A and B, were playing a set of games in which the first player to win 10 games wins the set. A had won 8 games and B had won 6 when they were obliged to stop playing. How should the stakes be divided?

2. (a) Two of a pack of 52 cards have been lost. From the remainder of the pack two cards are drawn and are found to be spades. What is the probability that neither of the two missing cards is a spade?

(b) A bag contains $\frac{n(n+1)}{2}$ counters, one of which is marked 1, two of which are marked 4, three of which are marked 9, etc. A person draws out a counter at random and is to receive as many dollars as the number marked upon it. What is his expectation?

3. (a) On a straight line of length L , two points are selected at random. Find the probability that the distance between them is greater than M , where M is less than L .

(b) From a box containing n tickets numbered 2, 4, 6, 8, \dots , $2n$, respectively, k tickets are to be drawn one at a time, each one being replaced before another is withdrawn. What is the probability that the sum of the numbers on the k tickets is exactly $2(n+k)$?

4. A wallet contains 2 five dollar bills and 3 one dollar bills; a second wallet contains 3 five dollar bills and 2 one dollar bills. A bill is drawn from the first and placed in the second and then a bill is drawn from the second and placed in the first. In the drawings, each available bill has an equal chance of being selected.

(a) What is the most probable value of the bills in the first wallet after the second operation?

(b) What is the expectation of a person who is to receive the second wallet after the second operation?

5. (a) Find in commutation symbols an expression for a_{30} where the interest rate is to be 4% for the first ten years and 5% thereafter.
- (b) Prove that $C_x = v \cdot D_x - D_{x+1}$ and from this equation deduce the relation between A_x , a_x and the rate of discount.
6. (a) A life annuity contract, issued at age 30, provides for the payment of \$1,000 a year, first payment at age 60. The annuity is to be purchased by annual premiums payable for 30 years. In event of the death of the annuitant prior to age 60, the net premiums already paid are to be returned to his estate, without interest. Express the annual net premium in commutation symbols.
- (b) Develop by the retrospective method an expression in commutation symbols for the fifth terminal reserve on a twenty payment, thirty year endowment policy issued at age 35.
7. (a) An insurance policy issued to a man aged 20 pays \$10,000 if death occurs during the first year, \$9,000 if death occurs during the second year, etc., with coverage ceasing at the end of the 10th year. What is the net single premium for this policy?

7. (b) Evaluate $a_{\overline{25}|40}$, given

$\mu_{25} = .00804$	$N_{35,35} = 313072.$
$\mu_{35} = .00888$	$N_{36,36} = 292975.$
$\mu_{36} = .00902$	$D_{25} = 37674.$
$\mu_{40} = .00977$	$D_{40} = 19727.$
$N_{25} = 770113.$	$D_{35,35} = 20097.$
$N_{40} = 344167.$	$D_{36,36} = 19073.$

Note: The answer may be expressed in terms of the numerical values of the commutation symbols without performing the final arithmetical operations.

8. (a) State in words the meaning of the symbol ${}_nE_x|y\bar{z}$ and derive an expression of its value in terms of pure endowments.
- (b) Write out the formula for the share of z in the case of an annuity $a_{x:\overline{y}|z}$, assuming y and z share the annuity equally throughout their joint lives after the death of x .

Note: The following values will be useful in solving problems 5 to 8 inclusive:

$$M_{20} = 13267$$

$$D_{20} = 46556$$

$$R_{21} = 384016$$

$$R_{31} = 268760$$

EXAMINATION FOR ENROLLMENT AS FELLOW

PART I

April 9, 1947

Time 1:30 to 4:30 o'clock

1. Name the various types of United States Government bonds and discuss the factors which determine the investment quality of these bonds.
2. (a) What are the various factors that should be considered before investing in a particular issue of municipal bonds?
(b) Discuss the relative desirability of equipment trust certificates and railroad first mortgage bonds in the portfolio of a casualty insurance company.
3. Do you believe the entry of the Federal government into the field of electrical power seriously impairs the value of investments in utilities of that nature on the part of casualty insurance companies? Discuss.
4. (a) What are the essentials of an insurance contract?
(b) Distinguish between breach of warranty and misrepresentation in an insurance contract. What are the possible effects of each in the event of loss?
5. (a) What are the four qualifications given in the New York Insurance Law which must be met by rating organizations in the making of rates?
(b) Outline briefly the steps which are being taken in the various states to meet the requirements of Public Law 15.
6. Outline briefly the provisions of the New York Insurance Law relating to the establishment of loss and loss expense reserves by casualty insurance and surety companies.

7. (a) Why are the following two cases decided by the United States Supreme Court in 1946 important to the insurance industry?
- a. Prudential *vs.* Benjamin
 - b. Robertson *vs.* California
- (b) Discuss the reward for risk taking.
8. The Comprehensive Rating Plan for National Defense Projects provides for combining workmen's compensation, automobile liability and property damage and other liability and property damage insurance for the rating of individual risks. From the standpoint of the economic theory of risk, do you think this rating method should be carried over to regular risks? Do you think that it would be desirable to include other lines of insurance? Discuss.

PART II

April 10, 1947

Time 9:30 to 12:30 o'clock

1. Explain the function of Schedule P and outline briefly how it operates. Limit your answer to Parts 1, 2, 5 and 5A.
2. (a) In the case of those lines of casualty insurance to which the claim or notice-average basis is applicable for the determination of known loss reserves, outline a method that might be used for determining a reserve for incurred but not reported losses.

(b) Describe and illustrate four situations that may cause a casualty insurance company to establish a voluntary underwriting reserve.
3. (a) Automobile policies are ordinarily written for a one year term and sometimes provide for the payment of premium on a quarterly installment basis. What, in your opinion, is the best method of handling the premium installments as respects the determination of unearned premium reserve? Give reasons.

(b) Outline the essential features of the Automobile Statistical Plan of the National Bureau of Casualty and Surety Underwriters.
4. Give the advantages of the information obtained from the

reporting of workmen's compensation experience under the Unit Statistical Plan as opposed to the Schedule Z method whereby each carrier submits its own experience by classification.

5. Explain why the rate changes that have taken place during the past year or so in automobile insurance invalidate the use of calendar period loss ratios for the evaluation of current underwriting results. What adjustment should be made in such data to render it useful for a proper evaluation of current results?
6. Outline briefly a method that might be used by a casualty company for the compilation of classification statistics on liability lines other than automobile that must be filed annually with external agencies for ratemaking purposes. Include a design of the premium and loss punch cards.
7. Outline briefly a method of distributing casualty administration expense by line of insurance for the following departments:
 - a. Actuarial and Statistical
 - b. Accounting
 - c. Compensation and Liability Underwriting
8. (a) What items are known as Non-Ledger Assets in the asset and liability pages of the annual statement blank of the N. A. I. C.? What items are considered Non-Admitted Assets?
- (b) Outline briefly a method that might be used by a casualty company to determine its administration and payroll audit expense by size of risk for workmen's compensation insurance.

EXAMINATION FOR ENROLLMENT AS FELLOW

PART III

April 10, 1947

Time 1:30 to 4:30 o'clock

1. (a) Outline the burglary experience rating plan, giving the principal features.
- (b) What purpose is served by the "B" and "W" values in the National Council experience rating plan for workmen's compensation risks? Give the modification formula and explain the effect of the "B" and "W" values.

2. Outline a program for interstate prospective experience rating for workmen's compensation insurance.
3. Discuss the merits of making the Retrospective Rating Plan available to assureds for a term of three or five years as an additional alternative to the present one-year basis.
4. Some of the cash sickness fund plans being considered for presentation to state legislatures contain provisions permitting the use of at least part of the large unemployment reserves built up during the war. Do you think these reserves should be used for cash sickness funds? Discuss.
5. Extensive consideration is being given currently to the problem of providing hospital and medical care, and accident and health coverage for the majority of the people. Are all of these areas in which casualty insurance companies can function effectively, or do you think some of them should be the responsibility of state or federal government? Discuss.
6. (a) Discuss the growing need for Product Public Liability insurance.
(b) Discuss the effect of business cycles upon the Casualty Insurance business.
7. In view of current conditions, outline an underwriting and production program for the balance of this year which you would recommend to a company writing all lines of casualty insurance.
8. A company not wishing to increase its relative volume of automobile business is faced with the problem of dealing with new business being offered as a result of the passage of financial responsibility laws in additional states. How would you advise this company to handle the situation thus created without seriously impairing its reputation for providing the public with adequate insurance facilities?

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CASUALTY ACTUARIAL SOCIETY

ORGANIZED 1914

1947 YEAR BOOK

Foreword

Officers, Council and Committees

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Constitution and By-Laws

Examination Requirements

(Addendum to Volume XXXIII of the *Proceedings*)

Corrected to February 1, 1947

No. 26

FOREWORD

The Casualty Actuarial Society was organized November 7, 1914 as the Casualty Actuarial and Statistical Society of America, with 97 charter members of the grade of Fellow. The present title was adopted on May 14, 1921. The object of the Society is the promotion of actuarial and statistical science as applied to the problems of casualty and social insurance by means of personal intercourse, the presentation and discussion of appropriate papers, the collection of a library and such other means as may be found desirable.

Prior to 1914 little technical study was given to the actuarial and underwriting problems of most of the branches of casualty insurance. The organization of the Society was brought about through the suggestion of Dr. I. M. Rubinow, who became the first president. The problems surrounding workmen's compensation were at that time the most urgent, and consequently many of the members played a leading part in the development of the scientific basis upon which workmen's compensation insurance now rests.

The members of the Society have also presented original papers to the *Proceedings* upon the scientific formulation of standards for the computation of both rates and reserves in accident and health insurance, liability, burglary, and the various automobile coverages. The presidential addresses constitute a valuable record of the current problems facing the casualty insurance business. Other papers in the *Proceedings* deal with acquisition costs, pension funds, legal decisions, investments, claims, reinsurance, accounting, statutory requirements, loss reserves, statistics, and the examination of casualty companies. The Committee on Compensation and Liability Loss Reserves submitted a report which has been printed in *Proceedings* No. 35 and No. 36. The Committee on Remarriage Table submitted a report including tables, printed in *Proceedings* No. 40. The Special Committee on Bases of Exposure submitted a report which is printed in *Proceedings* No. 43. The "Recommendations for Study" appear in *Proceedings* No. 54 and are in effect for the 1947 examinations. The Report of the Committee on Mortality for Disabled Lives together with commutation tables and life annuities has been printed in *Proceedings* No. 62.

The lower grade of membership in the Society is that of Associate. Examinations have been held every year since organization; they are held on the first Wednesday and following Thursday in April, in various cities in the United States and Canada. The membership of the Society consists of actuaries, statisticians, and executives who are connected with the principal casualty companies and organizations in the United States and Canada. The Society has a total membership of 275, consisting of 150 Fellows and 125 Associates. The annual meeting of the Society is held in New York in November.

The Society issues a publication entitled the *Proceedings* which contains original papers presented at the meetings. The *Proceedings* also contain discussions of papers, reviews of books and current notes. This Year Book is published annually and "Recommendations for Study" is a pamphlet which outlines the course of study to be followed in connection with the examinations for admission. These two booklets may be obtained free upon application to the Secretary-Treasurer, 90 John Street, New York 7, N. Y.

CASUALTY ACTUARIAL SOCIETY

NOVEMBER 22, 1946

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	HARMON T. BARBER.....	1949
	JOHN S. MILLS.....	1949
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**Terms expire at the annual meeting in November 1947*

†Terms expire at the annual meeting in November of the year given.

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MEMBERSHIP OF THE SOCIETY, NOVEMBER 22, 1946

FELLOWS

Those marked (†) were Charter Members at date of organization, November 7, 1914.

Those marked (*) have been admitted as Fellows upon examination by the Society.

Admitted	
*Nov. 21, 1930	AINLEY, JOHN W., Supervising Underwriter, The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
*Nov. 13, 1931	AULT, GILBERT E., Actuary, Church Pension Fund and Church Life Insurance Corporation, 20 Exchange Place, New York 5, N. Y.
May 23, 1924	BAILEY, WILLIAM B., Economist, The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
*Nov. 20, 1924	BARBER, HARMON T., Associate Actuary, Casualty Department, The Travelers Insurance Co., 700 Main Street, Hartford 15, Conn.
*Nov. 20, 1942	BART, ROBERT D., West Bend Aluminum Co., West Bend, Wis.
*Nov. 18, 1932	BARTER, JOHN L., Vice-President, Hartford Accident & Indemnity Co., Hartford 15, Conn.
*Nov. 13, 1931	BATHO, ELGIN R., Assistant Actuary, Berkshire Life Insurance Co., Pittsfield, Mass.
†	BENJAMIN, ROLAND, Treasurer, Fidelity & Deposit Company of Maryland and American Bonding Company, Baltimore 3, Md.
*Nov. 22, 1934	BERKELEY, ERNEST T., Actuary, Employers Liability Assurance Corporation and American Employers Insurance Company, Boston 7, Mass.
†	BLACK, S. BRUCE, President, Liberty Mutual Insurance Company, 175 Berkeley Street, Boston 16, Mass.
Apr. 20, 1917	BLANCHARD, RALPH H., Professor of Insurance, School of Business, Columbia University, New York 27, N. Y.
†	BREIBY, WILLIAM, Vice-President, Pacific Mutual Life Insurance Company, Los Angeles 55, Cal.
*Nov. 18, 1927	BROWN, F. STUART, Secretary, Carolina Casualty Insurance Co., Burlington, N. C.
Oct. 22, 1915	BROWN, HERBERT D., (Retired), Glenora, Yates County, New York.
†	BUCK, GEORGE B., Consulting Actuary for Pension Funds, 150 Nassau Street, New York 7, N. Y.

FELLOWS

Admitted	
Apr. 20, 1917	BURHOP, WILLIAM H., Executive Vice-President, Employers Mutual Liability Insurance Company, Wausau, Wis.
*Nov. 23, 1928	BURLING, WILLIAM H., Assistant Actuary, The Travelers Insurance Company, 700 Main Street, Hartford 15, Conn.
*Nov. 19, 1929	CAHILL, JAMES M., Secretary, National Bureau of Casualty & Surety Underwriters, 60 John Street, New York 7, N. Y.
*Nov. 18, 1932	CAMERON, FREELAND R., Executive Vice President and General Manager, Public National Insurance Co., Miami Beach, Florida
†	CAMMACK, EDMUND E., Vice-President and Actuary, Aetna Life Insurance Company, Hartford 15, Conn.
*Nov. 17, 1938	CARLETON, JOHN W., Assistant Actuary, Liberty Mutual Insurance Company, 175 Berkeley Street, Boston 16, Mass.
*Nov. 21, 1930	CARLSON, THOMAS O., Actuary, National Bureau of Casualty & Surety Underwriters, 60 John Street, New York 7, N. Y.
†	CARPENTER, RAYMOND V., (Retired), 66 Park Avenue, New York 16, N. Y.
*Mar. 20, 1941	CARVER, HARRY C., Professor of Mathematics, University of Michigan, Ann Arbor, Michigan.
*Nov. 13, 1936	CLEARY, ARTHUR E., Actuary, Massachusetts Hospital Service Inc., Blue Cross Building, 38 Chauncey Street, Boston 11, Mass.
*Nov. 15, 1918	COATES, BARRETT N., Coates and Herfurth, Consulting Actuaries, 660 Market Street, San Francisco 4, Calif.
*Nov. 17, 1922	COATES, CLARENCE S., Assistant Secretary, Lumbermens Mutual Casualty Company, Mutual Insurance Bldg., Chicago 40, Ill.
Oct. 27, 1916	COGSWELL, EDMUND S., First Deputy Commissioner of Insurance, 100 Nashua Street, Boston 14, Mass.
Feb. 19, 1915	COLLINS, HENRY, Manager and Attorney, Ocean Accident & Guarantee Corporation and President, Columbia Casualty Company, 1 Park Avenue, New York 16, N. Y.
*Nov. 23, 1928	COMSTOCK, W. PHILLIPS, Statistician, London Guarantee & Accident Company, 55 Fifth Avenue, New York 3, N. Y.
*Nov. 22, 1934	CONSTABLE, WILLIAM J., Manager, New England Department Lumbermens Mutual Casualty Company, 260 Tremont Street, Boston Mass.
*Nov. 22, 1934	COOK, EDWIN A., Assistant Secretary, Interboro Mutual Indemnity Insurance Company, 270 Madison Avenue, New York 16, N. Y.
†	COPELAND, JOHN A., Consulting Actuary, Candler Building, Atlanta, Ga.
*Nov. 18, 1925	CORCORAN, WILLIAM M., Consulting Actuary, Wolfe, Corcoran & Linder, 116 John Street, New York 7, N. Y.
*Nov. 19, 1926	CRANE, HOWARD G., Vice President and Treasurer, General Reinsurance Corporation, and North Star Reinsurance Corporation, 90 John Street, New York 7, N. Y.
*Nov. 22, 1946	CROUSE, CHARLES W., Actuary, Manufacturers Casualty Insurance Company, 16th St. and Pennsylvania Boulevard, Philadelphia 3, Pa.
*Nov. 18, 1932	DAVIES, E. ALFRED, Associate Comptroller, Liberty Mutual Insurance Company, 175 Berkeley Street, Boston 16, Mass.
*Nov. 18, 1927	DAVIS, EVELYN M., Woodward, Ryan, Sharp & Davis, Consulting Actuaries, 41 Park Row, New York 7, N. Y.

FELLOWS

Admitted	
†	DEARTH, ELMER H., (Retired), 1409 Clark St., Des Moines, Iowa.
†	DEKAY, ECKFORD C., President, DeKay & Company, 84 William Street, New York 7, N. Y.
*Nov. 17, 1920	DORWEILER, PAUL, Actuary, Aetna Casualty & Surety Company, Hartford 15, Conn.
*Nov. 24, 1933	EDWARDS, JOHN, Casualty Actuary, Ontario Insurance Department, 91 Arundel Avenue, Toronto 6, Ontario, Canada.
*Nov. 15, 1940	ELLIOTT, GEORGE B., Compensation Actuary, Pennsylvania Insurance Department, 938 Public Ledger Bldg., Philadelphia 6, Pa.
*Nov. 17, 1922	ELSTON, JAMES S., Assistant Actuary, Life Department, The Travelers Insurance Co., 700 Main Street, Hartford 15, Conn.
*Nov. 15, 1935	EPPINK, WALTER T., Vice-President, Merchants Mutual Casualty Co., Casualty Insurance Building, Buffalo 5, New York.
†	FACKLER, EDWARD B., Consulting Actuary, Fackler & Company, 8 West 40th Street, New York 18, N. Y.
†	FALLOW, EVERETT S., Actuary, Accident Department, The Travelers Insurance Co., 700 Main Street, Hartford 15, Conn.
*Nov. 15, 1940	FARLEY, JARVIS, Actuary and Asst. Treasurer, Massachusetts Indemnity Co., 632 Beacon Street, Boston 15, Mass.
†	FARRER, HENRY, Insurance Company of North America, 99 John Street, New York 7, N. Y.
*Nov. 15, 1935	FITZHUGH, GILBERT W., Asst. General Manager, Canadian Office, Metropolitan Life Insurance Co., 180 Wellington Street, Ottawa, Ontario, Canada.
Feb. 19, 1915	FONDILLER, RICHARD, Woodward and Fondiller, Consulting Actuaries, 90 John Street, New York 7, N. Y.
†	FRANKLIN, CHARLES H., (Retired), 4319 43rd Avenue, N. E., Laurelhurst, Seattle 5, Washington.
*Nov. 18, 1927	FREDRICKSON, CARL H., Actuary, Canadian Underwriters Association, 55 York Street, Toronto, Canada.
*Nov. 22, 1934	FULLER, GARDNER V., Manager, Special Risk Department, Lumbermens Mutual Casualty Co., Mutual Insurance Bldg., Chicago 40, Ill.
Feb. 19, 1915	GARRISON, FRID S., Secretary, The Travelers Indemnity Co., 700 Main Street, Hartford 15, Conn.
*Nov. 20, 1924	GINSBURGH, HAROLD J., Vice-President, American Mutual Liability Insurance Co., 142 Berkeley Street, Boston 16, Mass.
*Nov. 21, 1930	GLENN, J. BRYAN, 5214 First Street, N. W., Washington 11, D. C.
*Nov. 13, 1931	GODDARD, RUSSELL P., Assistant Actuary, American Mutual Liability Insurance Company, 142 Berkeley Street, Boston 16, Mass.
†	GOODWIN, EDWARD S., 750 Main Street, Hartford 3, Conn.

FELLOWS

Admitted	
*Nov. 19, 1926	GRAHAM, CHARLES M., Chief Self-Insurance Examiner, Workmen's Compensation Board of N. Y., 80 Center Street, New York 13, N. Y.
†	GRAHAM, WILLIAM J., Vice-President, Equitable Life Assurance Society, 393 Seventh Avenue, New York 1, N. Y.
†	GREENE, WINFIELD W., Executive Vice-President, General Reinsurance Corporation and North Star Reinsurance Corporation, 90 John Street, New York 7, N. Y.
†	HAMMOND, H. PIERSON, Actuary, Life Department, The Travelers Insurance Co., 700 Main St., Hartford 15, Conn.
Oct. 27, 1916	HARDY, EDWARD R., Secretary-Treasurer, Insurance Institute of America, Inc., 80 John Street, New York 7, N. Y.
Oct. 22, 1915	HATCH, LEONARD W., (Retired), 425 Pelham Manor Road, Pelham Manor, New York.
*Nov. 19, 1926	HAUGH, CHARLES J., Secretary, Compensation and Liability Dept., The Travelers Insurance Co., Hartford 15, Conn.
Oct. 22, 1915	HODGKINS, LEMUEL G., (Retired), 5 Whitman Road, Worcester 5, Mass.
Oct. 22, 1915	HOLLAND, CHARLES H., Suite 2001, 165 Broadway, New York 6, N. Y.
*Nov. 22, 1934	HOOKEE, RUSSELL O., Actuary, Connecticut Insurance Department, Hartford 2, Conn.
Nov. 18, 1932	HUEBNER, SOLOMON S., Professor of Insurance, University of Pennsylvania, Philadelphia 4, Pa.
†	HUGHES, CHARLES, (Retired), 285 Smith St., Freeport, N. Y.
Nov. 19, 1929	HULL, ROBERT S., Unemployment Compensation Division, Social Security Board, Washington, D. C.
†	HUNTER, ARTHUR, (Retired), 124 Lloyd Road, Montclair, N. J.
Feb. 25, 1916	JACKSON, CHARLES W., Consulting Actuary, Woodward and Fondiller, 90 John Street, New York 7, N. Y.
*Nov. 19, 1929	JACKSON, HENRY H., Vice President & Actuary, National Life Insurance Co., Montpelier, Vt.
*Nov. 14, 1941	JOHNSON, ROGER A., Actuary, Compensation Insurance Rating Board, 125 Park Avenue, New York 17, N. Y.
*Nov. 16, 1939	JONES, HAROLD M., John Hancock Mutual Life, Boston 17, Mass.
*Nov. 17, 1938	KARDONSKY, ELSIE, 66 Corbin Place, Brooklyn, 29, N. Y.
Nov. 17, 1938	KELLY, GREGORY C., General Manager, Pennsylvania Compensation Rating & Inspection Bureau, 938 Public Ledger Bldg., Philadelphia 6, Pa.
*Nov. 19, 1926	KELTON, WILLIAM H., Assistant Actuary, Life Department, The Travelers Insurance Co., 700 Main Street, Hartford 15, Conn.
*Nov. 21, 1919	KIRKPATRICK, A. LOOMIS, Manager Insurance Department, Chamber of Commerce of the U. S. A., 1615 H Street, N.W., Washington 6, D. C.
*Nov. 14, 1941	KOLODITZKY, MORRIS, State Insurance Fund, 625 Madison Avenue, New York 22, N. Y.
*Nov. 24, 1933	KORMES, MARK, Consulting Actuary, 341 Madison Avenue, New York 17, N. Y.

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FELLOWS

Admitted	
Nov. 23, 1928	KULP, CLARENCE A., Professor of Insurance, University of Pennsylvania, Logan Hall, 36th Street and Woodland Avenue, Philadelphia 4, Pa.
Nov. 13, 1931	LA MONT, STEWART M., (Retired), Hotel Claremont, Berkeley, Cal.
*Nov. 24, 1933	LANGE, JOHN R., Chief Actuary, Wisconsin Insurance Department, State House, Madison 3, Wis.
†	LEAL, JAMES R., Vice-President and Secretary, Interstate Life and Accident Co., Interstate Building, 540 McCallie Avenue, Chattanooga 3, Tenn.
†	LESLIE, WILLIAM, General Manager, National Bureau of Casualty & Surety Underwriters, 60 John Street, New York 7, N. Y.
*Nov. 20, 1924	LINDER, JOSEPH, Consulting Actuary, Wolfe, Corcoran & Linder, 116 John Street, New York 7, N. Y.
*Nov. 13, 1936	LYONS, DANIEL J., Associate Actuary, Guardian Life Insurance Co., 50 Union Square, New York 3, N. Y.
†	MAGOUN, WILLIAM N., (Retired), 33 Fearing Road, Hingham, Mass.
*Nov. 23, 1928	MARSHALL, RALPH M., Assistant Actuary, National Council on Compensation Insurance 45 East 17th Street, New York 3, N. Y.
*Nov. 18, 1927	MASTERTON, NORTON E., Vice-President and Actuary, Hardware Mutual Casualty Co., and Hardware Dealers Mutual Fire Insurance Co., Stevens Point, Wis.
*Nov. 19, 1926	MATTHEWS, ARTHUR N., Asst. Actuary, Casualty Department, The Travelers Insurance Co., 700 Main Street, Hartford 15, Conn.
May 19, 1915	MAYCRINK, EMMA C., Secretary-Treasurer, Association of New York State Mutual Casualty Companies, 60 East 42nd Street, New York 17, N. Y.
*Nov. 16, 1923	MCCLURG, D. RALPH, Secretary and Treasurer, National Equity Life Insurance Co., Little Rock, Ark.
*Nov. 15, 1935	MCCONNELL, MATTHEW H., Underwriter, Employers Mutual Liability Ins. Co., 12 S. 12th Street, Philadelphia 7, Pa.
*Oct. 31, 1917	MCMANUS, ROBERT J., Statistician, Casualty Department, The Travelers Insurance Co., 700 Main Street, Hartford 15, Conn.
†	MICHELbacher, GUSTAV F., Vice-President and Secretary, Great American Indemnity Co., 1 Liberty Street, New York 5, N. Y.
*Nov. 17, 1938	MILLER, JOHN H., Vice President and Actuary, Monarch Life Insurance Company, Springfield, Mass.
†	MILLIGAN, SAMUEL, Vice-President, Metropolitan Life Insurance Co., 1 Madison Avenue, New York 10, N. Y.
*Nov. 18, 1937	MILLS, JOHN A., Vice President and Actuary, Lumbermens Mutual Casualty Co., and American Motorists Insurance Co., Mutual Insurance Bldg., Chicago 40, Ill.
*Nov. 18, 1921	MONTGOMERY, VICTOR, President, Pacific Employers Insurance Co., 1033 So. Hope Street, Los Angeles 15, Calif.
Nov. 19, 1926	MOONEY, WILLIAM L., (Retired), 4 Pleasant Street, West Hartford 8, Conn.

FELLOWS

Admitted	
†	MOORE, GEORGE D., Comptroller, Aero Insurance Underwriters, 111 John St., New York 7, N. Y.
†	MOWBRAY, ALBERT H., Consulting Actuary, 806 San Luis Road, Berkeley 7, Calif.
*Nov. 17, 1920	MUELLER, LOUIS H., President, Associated Insurance Fund, 332 Pine Street, San Francisco 4, Calif.
†	MULLANEY, FRANK R., Vice-President and Secretary, American Mutual Liability Insurance Co., and American Policyholders' Insurance Co., and Vice-President, Allied American Mutual Fire Insurance Co., 142 Berkeley Street, Boston 16, Mass.
May 28, 1920	MURPHY, RAY D., Vice-President and Actuary, Equitable Life Assurance Society, 393 Seventh Avenue, New York 1, N. Y.
*Nov. 15, 1935	OBERHAUS, THOMAS M., Associate Actuary, Woodward and Fondiller, Consulting Actuaries, 90 John Street, New York 7, N. Y.
†	OLIFIERS, EDWARD, Consulting Actuary, Caixa Postal 8 Perto- polis, Rio, Brazil.
†	ORR, ROBERT K., 226 S. Logan Street, Lansing, Mich.
*Nov. 21, 1919	OUTWATER, OLIVE E., Actuary, Benefit Association of Railway Employees, 901 Montrose Avenue, Chicago 13, Ill.
*Nov. 21, 1930	PERRYMAN, FRANCIS S., Vice President and Actuary, Eagle Indemnity Co., Globe Indemnity Co. and Royal Indemnity Co., 150 William Street, New York 8, N. Y.
*Nov. 14, 1941	PETERS, STEFAN, 1207 Peralta Avenue, Berkeley 5, Calif.
Nov. 19, 1926	PHILLIPS, JESSE S., Chairman of Board, Great American Indemnity Co., 1 Liberty Street, New York 5, N. Y.
*Nov. 24, 1933	PICKETT, SAMUEL C., Rating Supervisor, Connecticut Insurance Department, Hartford 2, Conn.
*Nov. 17, 1922	PINNEY, SYDNEY D., 290 Wolcott Hill Road, Wethersfield 9, Conn.
*Nov. 13, 1931	PRUITT, DUDLEY M., Actuary, General Accident Fire & Life Assurance Corp., Fourth & Walnut Sts., Philadelphia 5, Pa.
May 23, 1919	RICHARDSON, FREDERICK, Chairman of the Board, General Accident Fire and Life Assurance Corporation, Perth, Scotland.
*Nov. 19, 1926	RICHTER, OTTO C., Actuary, American Telephone & Telegraph Co., 195 Broadway, New York 7, N. Y.
May 24, 1921	RIEGEL, ROBERT, Professor of Statistics and Insurance, University of Buffalo, Buffalo 14, New York.
*Nov. 16, 1939	ROBBINS, RAINARD B., Pension Counsellor, also Vice-President, Teachers Insurance and Annuity Association, 19 West 44th Street, New York 18, N. Y.

FELLOWS

Admitted	
*Nov. 16, 1923	ROEBER, WILLIAM F., General Manager, National Council on Compensation Insurance, 45 East 17th Street, New York 3, N. Y.
*Nov. 17, 1943	ROSS, SAMUEL M., Asst. Actuary, National Bureau of Casualty and Surety Underwriters, 60 John Street, New York 7, N. Y.
*Nov. 20, 1942	SATTERTHWAITE, FRANKLIN E., General Electric Company, 4110 Bowser Avenue, Fort Wayne, Ind.
*Nov. 18, 1937	SHAPIRO, GEORGE I., First Vice President and General Manager, Public Service Mutual Insurance Co., 342 Madison Avenue, New York 17, N. Y.
*Nov. 13, 1931	SILVERMAN, DAVID, c/o Wolfe, Corcoran & Linder, 116 John Street, New York 7, N. Y.
*Nov. 24, 1933	SINNOTT, ROBERT V., Assistant Secretary, Hartford Accident and Indemnity Company, 690 Asylum Ave, Hartford 15, Conn.
*Nov. 19, 1929	SKELDING, ALBERT Z., Actuary, National Council on Compensation Insurance, 45 East 17th Street, New York 3, N. Y.
*Nov. 19, 1929	SKILLINGS, E. SHAW, Actuary, Allstate Insurance Co., 20 North Wacker Drive, Chicago 6, Ill.
*Nov. 18, 1932	SMICK, JACK J., Associate Actuary, Woodward and Fondiller, Consulting Actuaries, 90 John Street, New York 7, N. Y.
*Nov. 15, 1940	SMITH, SEYMOUR E., Casualty Department, The Travelers Insurance Co., Hartford 15, Conn.
*Nov. 24, 1933	ST. JOHN, JOHN B., Associate Actuary, Towers, Perrin, Forster & Crosby, Inc., 12 South 12th Street, Philadelphia 7, Pa.
Nov. 18, 1927	STONE, EDWARD C., U. S. General Manager and Attorney, Employers' Liability Assurance Corporation, Limited, and President, American Employers' Insurance Company, 110 Milk Street, Boston 7, Mass.
Oct. 22, 1915	STRONG, WILLIAM RICHARD, No. 4 "Sheringham," Cotham Road, Kew, Victoria, Australia.
*Nov. 17, 1920	TARBELL, THOMAS F., Actuary, Casualty Department, The Travelers Insurance Co., 700 Main Street, Hartford 15, Conn.
†	THOMPSON, JOHN S., President, Mutual Benefit Life Insurance Co., 300 Broadway, Newark 4, N. J.
†	TRAIN, JOHN L., President and General Manager, Utica Mutual Insurance Co., 185 Genesee Street, Utica 1, New York.
Nov. 17, 1922	TRAVERSI, ANTONIO T., Consulting Actuary and Accountant, Bank of Adelaide Chambers, Margaret St., Sydney, Australia.
*Nov. 23, 1928	VALERIUS, NELS M., Aetna Casualty and Surety Co., Hartford 15, Conn.
*Nov. 21, 1919	VAN TUYL, HIRAM O., Supt., Accounts Department, London Guarantee & Accident Co., 55 Fifth Avenue, New York, 3 N. Y.
*Nov. 17, 1920	WAITE, ALAN W., Secretary, Aetna Casualty and Surety Co., Hartford 15, Conn.
*Nov. 15, 1935	WAITE, HARRY V., Actuary, The Travelers Fire Insurance Co., 700 Main Street, Hartford 15, Conn.

FELLOWS

Admitted	
*Nov. 18, 1925	WARREN, LLOYD A. H., Professor of Actuarial Science, University of Manitoba, 64 Niagara Street, Winnipeg, Manitoba, Canada.
*Nov. 15, 1935	WILLIAMS, HARRY V., Assistant Secretary, Hartford Accident and Indemnity Co., Hartford 15, Conn.
Nov. 14, 1941	WILLIAMSON, WILLIAM R., Actuarial Consultant, Social Security Board, Washington 25, D. C.
*Nov. 13, 1931	WITTICK, HERBERT E., Secretary, Pilot Insurance Co., 199 Bay Street, Toronto, Canada.
†	WOLFE, LEE J., Consulting Actuary, Wolfe, Corcoran & Linder, 116 John Street, New York 7, N. Y.
May 24, 1921	WOOD, ARTHUR B., President and Managing Director, Sun Life Assurance Company of Canada, Montreal, Canada.

ASSOCIATES

Those marked (*) have been enrolled as Associates upon examination by the Society.

Numerals indicate Associateship Part V and Fellowship examination parts credited.

Admitted	
May 23, 1924	ACKER, MILTON, Manager, Compensation and Liability Division, National Bureau of Casualty and Surety Underwriters, 60 John Street, New York 7, N. Y.
*Nov. 15, 1918	ACKERMAN, SAUL B., Professor of Insurance, New York University, 90 Trinity Place, New York 6, N. Y.
*Nov. 16, 1939	AIN, SAMUEL N., Office of George B. Buck, Consulting Actuary, 150 Nassau Street, New York 7, N. Y.
Apr. 5, 1928	ALLEN, AUSTIN F., President and General Manager, Texas Employers Insurance Association and Employers Casualty Co., Dallas 1, Texas.
Nov. 15, 1918	ANKERS, ROBERT E., Secretary and Treasurer, Continental Life Insurance Co., Investment Building, Washington 5, D. C.
*Nov. 21, 1930	ARCHIBALD, A. EDWARD, Vice President and Actuary, Volunteer State Life Insurance Company, Chattanooga 1, Tenn. (V, I.)
*Nov. 16, 1939	BAILEY, ARTHUR L., Statistician, American Mutual Alliance, 60 E. 42nd Street, New York 17, N. Y.
*Nov. 22, 1946	BARKER, LORING M., Fireman's Fund Indemnity Company, 401 California Street, San Francisco 20, Cal.
*Nov. 24, 1933	BARRON, JAMES C., Asst. Treasurer, General Reinsurance Corporation, 90 John Street, New York 7, N. Y. (V, I, III.)
*Nov. 23, 1928	BATEMAN, ARTHUR E., 121 Raymond Street, Cambridge, Mass. (V, I.)
*Nov. 15, 1940	BATHO, BRUCE, Associate Actuary, Industrial Life and Health Insurance Company, Atlanta 1, Georgia.
*Nov. 18, 1925	BITTEL, W. HAROLD, Actuary, Department of Banking and Insurance, Trenton 7, New Jersey.
Nov. 17, 1920	BLACK, NELLAS C., Manager, Statistical Department, Maryland Casualty Co., Baltimore 3, Md.
*Nov. 15, 1940	BLACKHALL, JOHN M., Monarch Life Insurance Co., Springfield, Mass.
*Nov. 22, 1934	BOMSE, EDWARD L., Supt. New York Met. Special Risks, Royal Indemnity Co., 150 William Street, New York 8, N. Y.
*Nov. 23, 1928	BOWER, PERRY S., Great West Life Assurance Company, Winnipeg, Manitoba, Canada.
*Nov. 15, 1918	BRUNNQUELL, HELMUTH G., Assistant Actuary, The Northwestern Mutual Life Insurance Co., Milwaukee 2, Wis.
*Oct. 22, 1915	BUFFLER, LOUIS, Director, Underwriting Department, State Insurance Fund, 625 Madison Avenue, New York 22, N. Y.
*Nov. 20, 1924	BUGBEE, JAMES M., Manager, Automobile Department, Maryland Casualty Co., Baltimore 3, Md.
Mar. 31, 1920	BURT, MARGARET A., Office of George B. Buck, Consulting Actuary, 150 Nassau Street, New York 7, N. Y.
Nov. 17, 1922	CAVANAUGH, LEO D., President, Federal Life Insurance Co., 168 N. Michigan Avenue, Chicago 1, Ill.

ASSOCIATES

Admitted	
*Nov. 18, 1927	CHEN, S. T., Actuary, China United Assurance Society, 104 Bubbling Well Road, Shanghai, China.
*Nov. 18, 1927	CONROD, STUART F., Actuary and Assistant Treasurer, Loyal Protective Life Insurance Co., 19 Deerfield Street, Boston 15, Mass.
*Nov. 24, 1933	CRAWFORD, WILLIAM H., Secretary, Fireman's Insurance Co. of Newark, N. J. & Affiliated Fire & Casualty Co's Pacific Dept., 220 Bush Street, San Francisco 4, Cal. (V, I.)
*Nov. 18, 1932	CRIMMINS, JOSEPH B., Metropolitan Life Insurance Co., 1 Madison Avenue, New York 10, N. Y. (V, I.)
*Nov. 18, 1925	DAVIS, MALVIN E., Actuary, Metropolitan Life Insurance Co., 1 Madison Avenue, New York 10, N. Y.
*Nov. 24, 1933	DAVIS, REGINALD S., Assistant Comptroller, State Compensation Insurance Fund, San Francisco 2, Calif. (V, I.)
*Nov. 14, 1941	DOWLING, WILLIAM F., Asst. Treasurer, Lumber Mutual Casualty Co., 41 E. 42nd Street, New York 17, N. Y.
May 25, 1923	ECONOMIDY, HARILAUS E., 2402 Boulevard, Galveston, Texas.
June 5, 1925	EGER, FRANK A., Secretary, Indemnity Insurance Co. of North America, 1600 Arch Street, Philadelphia 3, Pa.
*Nov. 16, 1923	FITZ, L. LEROY, Group Department, John Hancock Mutual Life Insurance Company, Boston 17, Mass. (V, I.)
*Nov. 18, 1927	FITZGERALD, AMOS H., Assistant Actuary, The Prudential Insurance Company of America, Newark 1, N. J. (V, I.)
*Nov. 16, 1923	FLEMING, FRANK A., Actuary, American Mutual Alliance, 60 East 42nd Street, New York 17, N. Y.
Nov. 20, 1924	FROBERG, JOHN, Manager, California Inspection Rating Bureau, 500 Sansome Street, San Francisco 11, Calif.
*Nov. 13, 1936	FRUECHTEMEYER, FRED J., Liberty Mutual Insurance Co., 175 Berkeley Street, Boston 16, Mass. (V, I.)
*Nov. 19, 1929	FURNIVALL, MAURICE L., Assistant Actuary, Accident Department, The Travelers Insurance Co., 700 Main Street, Hartford 15, Conn. (V, I.)
*Nov. 18, 1932	GETMAN, RICHARD A., Life Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford 15, Conn. (V, I.)
*Nov. 17, 1922	GIBSON, JOSEPH P., JR., Vice President, and General Manager, Excess Insurance Company of America, 99 John Street, New York 7, N. Y.
*Nov. 16, 1923	GILDEA, JAMES F., The Travelers Insurance Co., 700 Main Street, Hartford 15, Conn.
Nov. 19, 1929	GORDON, HAROLD R., Managing Director, Health & Accident Underwriters Conference, 176 West Adams Street, Chicago 3, Ill.
*Nov. 18, 1927	GREEN, WALTER C., Consulting Actuary, 211 West Wacker Drive, Chicago 6, Ill.
*Nov. 15, 1940	GROSSMAN, ELI A., Administrator (Actuarial), United States Life Insurance Co., 84 William St., New York 7, N. Y.
*Nov. 15, 1935	GUERTIN, ALFRED N., Actuary, American Life Convention, 230 N. Michigan Ave., Chicago 1, Ill. (V, I.)
*Nov. 16, 1939	HAGEN, OLAF E., Metropolitan Life Insurance Company, 1 Madison Avenue, New York 10, N. Y.

ASSOCIATES

Admitted	
*Nov. 18, 1921	HAGGARD, ROBERT E., Superintendent, Permanent Disability Rating Department, Industrial Accident Commission, State Building, San Francisco, Calif.
*Nov. 17 1922	HALL, HARTWELL L., Associate Actuary, Connecticut Insurance Department, Hartford 2, Conn.
*Nov. 13, 1936	HAM, HUGH P., Automobile Manager & Asst. Secretary, British America Assurance Co., 22 Wellington St. E., Toronto Ontario, Canada. (V, I.)
Mar. 24, 1932	HARRIS, SCOTT, Vice-President, Joseph Froggatt & Co., 74 Trinity Place, New York 6, N. Y.
*Mar. 25, 1924	HART, WARD VAN BUREN, Assistant Actuary, Connecticut General Life Insurance Co., Hartford 2, Conn. (V, I.)
Nov. 21, 1919	HAYDON, GEORGE F., General Manager, Wisconsin Compensation Rating & Inspection Bureau, 715 N. Van Buren Street, Milwaukee 2, Wis.
Nov. 17, 1927	HIPP, GRADY H., Executive Vice-President, Liberty Life Insurance Co., Greenville, S. C.
*Nov. 16, 1945	HOLZINGER, ERNEST, Actuary, Pension Planning Company, 527 Fifth Avenue, New York 17, N. Y.
*Nov. 22, 1946	HUGHEY, M. STANLEY, Lumbermens Mutual Casualty Company, Mutual Insurance Building, Chicago 40, Ill.
Nov. 19, 1929	JACOBS, CARL N., President, Hardware Mutual Casualty Co., Stevens Point, Wis.
*Nov. 18, 1921	JENSEN, EDWARD S., Supt., Group Department, Occidental Life Insurance Co., Los Angeles 55, Calif. (II, III.)
Nov. 21, 1930	JONES, H. LLOYD, Deputy General Attorney, of Phoenix-London Group, Vice-President, Phoenix Indemnity Company, and Deputy United States Manager, London Accident & Guarantee Co., 55 Fifth Avenue, New York 3, N. Y.
*Nov. 21, 1919	JONES, LORING D., (Retired) 64 Raymond Ave., Rockville Centre, Long Island, N. Y.
*Nov. 15, 1940	KELLY, ROBERT G., 2127 California St., Washington 8, D. C.
*Nov. 17, 1922	KIRK, CARL L., Assistant U. S. Manager, Zurich General Accident & Liability Insurance Co., 135 South LaSalle Street, Chicago 3, Ill.
*Nov. 15, 1935	KITZROW, ERWIN W., Vice-President, Hardware Mutual Casualty Co., Stevens Point, Wis. (V, I.)
*Nov. 16, 1939	KNOWLES, FREDERICK, 5724 Mountain Sights Ave., N. D. G., Montreal, Canada.
*Nov. 18, 1937	LASSOW, WILLIAM, 185 206th St., Bronx 58, New York. (V.)
*Nov. 17, 1938	LIEBLEIN, JULIUS, 2710-29th, Street, S. E., Washington 20, D. C.
*Nov. 13, 1931	MACKEEN, HAROLD E., The Travelers Insurance Co., 700 Main Street, Hartford 15, Conn. (V, I.)
Mar. 24, 1932	MAGRATH, JOSEPH J., Executive Assistant, Chubb & Sons, 90 John Street, New York 7, N. Y.
*Nov. 18, 1925	MALMUTH, JACOB, Examiner, New York Insurance Department, 61 Broadway, New York 6, N. Y.
Mar. 24, 1927	MARSH, CHARLES V. R., Comptroller and Assistant Treasurer, Fidelity & Deposit Co. and American Bonding Co., Baltimore 3, Md.
*Nov. 13, 1936	MAYER, WILLIAM H., JR., Actuarial Department, Metropolitan Life Insurance Co., 1 Madison Avenue, New York 10, N. Y.
*Nov. 17, 1922	McIVER, ROSSWELL A., Actuary, Washington National Insurance Co., 610 Church Street, Evanston, Ill.

ASSOCIATES

Admitted	
*Nov. 17, 1922	MICHENER, SAMUEL M., Actuary, Columbus Mutual Life Insurance Co., 303 East Broad Street, Columbus 15, Ohio. (V, I.)
*Nov. 13, 1931	MILLER, HENRY C., Comptroller and Actuary, State Compensation Insurance Fund, 450 McAllister Street, San Francisco 2, Calif. (V, I.)
*Nov. 19, 1926	MILNE, JOHN L., Actuary, Philadelphia Life Insurance Company, 111 North Broad Street, Philadelphia 7, Pa.
Nov. 17, 1922	MONTGOMERY, JOHN C., Secretary and Treasurer, Bankers Indemnity Insurance Co., 15 Washington Street, Newark 2, N. J.
May 25, 1923	MOORE, JOSEPH P., President, North American Accident Insurance Co., 455 Craig Street, W., Montreal, Canada.
*Nov. 21, 1919	MOTHERSILL, ROLLAND V., Chairman of the Board, Anchor Casualty Co., Anchor Insurance Building, 2700 University Avenue, St. Paul 4, Minn. (II, III.)
*Nov. 18, 1937	MYERS, ROBERT J., Actuarial Mathematician, Social Security Board, Washington 25, D. C.
*Nov. 15, 1935	NELSON, S. TYLER, Actuary, Utica Mutual Insurance Co., 185 Genesee Street, Utica 1, New York.
*Oct. 27, 1916	NEWELL, WILLIAM, Secretary, Assigned Risk Pool, 60 John Street, New York 7, N. Y. (V, I.)
*Nov. 18, 1925	NICHOLSON, EARL H., Actuary, Joseph Froggatt & Co., 74 Trinity Place, New York 6, N. Y.
May 23, 1919	OTTO, WALTER E., President, Michigan Mutual Liability Co., 163 Madison Avenue, Detroit 26, Mich.
*Nov. 19, 1926	OVERHOLSER, DONALD M., Office of George B. Buck, Consulting Actuary, 150 Nassau Street, New York 7, N. Y.
Nov. 20, 1924	PENNOCK, RICHARD M., Actuary, Pennsylvania Manufacturers' Association Casualty Insurance Co., Finance Building, Philadelphia 2, Pa.
Nov. 19, 1929	PHILLIPS, JOHN H., Vice-President and Actuary, Employers' Mutual Liability Insurance Co., Wausau, Wis.
*Nov. 17, 1920	PIKE, MORRIS, Associate Actuary, John Hancock Mutual Life Insurance Co., Boston 17, Mass.
*Nov. 23, 1928	PIPER, KENNETH B., Vice-President and Actuary, Provident Life and Accident Insurance Co., Chattanooga 2, Tenn. (V, I.)
*Nov. 18, 1927	POISSANT, WILLIAM A., The Travelers Insurance Co., 700 Main Street, Hartford 15, Conn.
*Nov. 17, 1922	POORMAN, WILLIAM F., Vice-President and Actuary, Central Life Assurance Society, Fifth and Grand Avenues, Des Moines 6, Iowa. (V, I.)
*Nov. 13, 1936	POTOFSKY, SYLVIA, State Insurance Fund, 625 Madison Avenue, New York 22, N. Y. (V.)

ASSOCIATES

Admitted	
Nov. 17, 1922	POWELL, JOHN M., President, Loyal Protective Life Insurance Co., 19 Deerfield Street, Boston 15, Mass. (V, I.)
*Nov. 15, 1918	RAYWID, JOSEPH, President, Joseph Raywid & Co., Inc., 92 William Street, New York 7, N. Y.
Nov. 19, 1932	RICHARDSON, HARRY F., Secretary-Treasurer, National Council on Compensation Insurance, 45 East 17th Street, New York 3, N. Y.
*Nov. 18, 1932	ROBERTS, JAMES A., Life Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford 15, Conn. (V, I.)
*Nov. 22, 1946	RODERMUND, MATTHEW, Interboro Mutual Indemnity Insurance Company, 270 Madison Avenue, New York 16, N. Y.
*Nov. 15, 1940	ROSENBERG, NORMAN, Actuary, Public Service Mutual Insurance Co., 342 Madison Avenue, New York 17, N. Y. (I, II.)
*Nov. 22, 1946	ROWELL, JOHN H., Group Insurance Actuary, Connecticut General Life Insurance Company, Hartford 2, Conn. (I.)
*Nov. 22, 1946	SALZMANN, RUTH, Hardware Mutual Casualty Company, Stevens Point, Wisc.
*Nov. 18, 1927	SARASON, HARRY M., Associate Actuary, General American Life Insurance Co., 1501 Locust Street, St. Louis 3, Mo.
Nov. 16, 1923	SAWYER, ARTHUR, Globe Indemnity Co., 150 William Street, New York 7, N. Y.
*Nov. 20, 1930	SEVILLA, EXEQUIEL S., Manager, National Life Insurance Co., Regina Building, Manila, Philippines.
*Nov. 20, 1924	SHEPPARD, NORRIS E., Professor of Mathematics, University of Toronto, Toronto 5, Canada. (V, I.)
Nov. 15, 1918	SIBLEY, JOHN L., Assistant Secretary, United States Casualty Co., 60 John Street, New York 7, N. Y.
*Nov. 18, 1921	SMITH, ARTHUR G., Assistant General Manager, Compensation Insurance Rating Board, Pershing Square Bldg., 125 Park Avenue, New York 17, N. Y.
*Nov. 19, 1926	SOMERVILLE, WILLIAM F., Secretary, St. Paul Mercury Indemnity Co., St. Paul 2, Minn. (V, I.)
*Nov. 18, 1925	SOMMER, ARMAND, Supt. of Agencies, Continental Casualty Co., 910 So. Michigan Avenue, Chicago 5, Ill.
*Nov. 15, 1918	SPENCER, HAROLD S., Statistician, Aetna Casualty and Surety Co., Hartford 15, Conn.
Nov. 20, 1924	STELLWAGEN, HERBERT P., Executive Vice-President, Indemnity Insurance Company of North America, 1600 Arch Street, Philadelphia 3, Pa.
*Nov. 16, 1923	STOKE, KENDRICK, Actuary, Michigan Mutual Liability Company, 163 Madison Avenue, Detroit 26, Mich.
*Nov. 21, 1930	SULLIVAN, WALTER F., Asst. Actuary, State Compensation Insurance Fund, 450 McAllister Street, San Francisco 2, Calif. (V, I.)
*Nov. 21, 1919	TRENCH, FREDERICK H., Manager, Underwriting Department, Utica Mutual Insurance Co., 185 Genesee Street, Utica 1, N. Y. (V, I.)
*Nov. 20, 1924	UHL, M. ELIZABETH, National Bureau of Casualty & Surety Underwriters, 60 John Street, New York 7, N. Y. (V, I.)
*Nov. 1, 1944	UHTHOFF, DUNBAR R., Supervisor, Actuarial Department, National Council on Compensation Insurance, 45 East 17th Street, New York 3, N. Y. (I, II.)
May 23, 1919	WARREN, CHARLES S., Secretary, Massachusetts Automobile Rating and Accident Prevention Bureau, 89 Broad Street, Boston 10, Mass.
Nov. 18, 1925	WASHBURN, JAMES H., Actuary, 1501 Gale Lane, Nashville 4, Tenn.

ASSOCIATES

Admitted	
*Nov. 18, 1932	WEINSTEIN, MAX S., Actuary, New York State Employees' Retirement System, 256 Washington Ave., Albany 1, N. Y.
*Nov. 18, 1925	WELLMAN, ALEXANDER C., Vice-President, Protective Life Insurance Co., Birmingham, Ala.
*Nov. 21, 1930	WELLS, WALTER I., Asst. Actuary, State Mutual Life Assurance Co., Worcester 8, Mass. (V, I.)
Mar. 21, 1929	WHEELER, CHARLES A., Chief Examiner of Casualty Companies, New York Insurance Department, 61 Broadway, New York 6, N. Y.
*Nov. 18, 1927	WHITBREAD, FRANK G., Associate Actuary, Great West Life Assurance Co., Winnipeg, Manitoba, Canada.
*Nov. 22, 1946	WIEDER, JOHN W., JR., Aetna Casualty and Surety Company, Hartford 15, Conn.
*Nov. 16, 1939	WITTLAKE, J. CLARKE, Assistant Actuary, Business Men's Assurance Company, Kansas City 10, Mo.
*Oct. 22, 1915	WOOD, DONALD M., Childs & Wood, General Agents, Royal Indemnity Company, 175 W. Jackson Blvd., Chicago 4, Ill.
*Nov. 18, 1937	WOOD, DONALD M., JR., Childs & Wood, 175 West Jackson Blvd., Chicago 4, Ill.
*Nov. 18, 1927	WOOD, MILTON J., Assistant Actuary, Life Actuarial Department, The Travelers Insurance Co., 700 Main Street, Hartford 15, Conn.
*Oct. 22, 1915	WOODMAN, CHARLES E., (Retired), 75 Norman Place, Tenafly, N. J.
*Nov. 22, 1934	WOODWARD, BARBARA H., Hughes, Hubbard & Ewing, 1 Wall Street, New York 5, N. Y.
*Nov. 18, 1925	WOOLERY, JAMES M., Vice-President and Actuary, Occidental Life Insurance Company, Raleigh, North Carolina.

SCHEDULE OF MEMBERSHIP, NOVEMBER 22, 1946

	Fellows	Associates	Total
Membership, November 16, 1945.....	154	123	277
Additions:			
By election.....
By reinstatement.....
By examination.....	1	6	7
	155	129	284
Deductions:			
By death.....	5	2	7
By withdrawal.....	..	1	1
By transfer from Associate to Fellow	1	1
Membership, November 22, 1946.....	150	125	275

OFFICERS OF THE SOCIETY

Since Date of Organization

<i>Elected</i>	<i>President</i>	<i>Vice-Presidents</i>	
1914-1915	*I. M. Rubinow	A. H. Mowbray	*B. D. Flynn
1916-1917	*J. D. Craig	*J. H. Woodward	*H. E. Ryan
1918	*J. H. Woodward	*B. D. Flynn	G. D. Moore
1919	*B. D. Flynn	G. D. Moore	W. Leslie
1920	A. H. Mowbray	W. Leslie	*L. S. Senior
1921	A. H. Mowbray	*L. S. Senior	*H. E. Ryan
1922	*H. E. Ryan	G. F. Michelbacher	E. E. Cammack
1923	W. Leslie	G. F. Michelbacher	E. E. Cammack
1924-1925	G. F. Michelbacher	*S. B. Perkins	R. H. Blanchard
1926-1927	*S. B. Perkins	G. D. Moore	T. F. Tarbell
1928-1929	G. D. Moore	S. D. Pinney	P. Dorweiler
1930-1931	T. F. Tarbell	*R. A. Wheeler	W. W. Greene
1932-1933	P. Dorweiler	W. F. Roeber	*L. S. Senior
1934-1935	W. W. Greene	R. H. Blanchard	C. J. Haugh
1936-1937	*L. S. Senior	S. D. Pinney	F. S. Perryman
1938-1939	F. S. Perryman	H. T. Barber	W. J. Constable
1940	S. D. Pinney	H. J. Ginsburgh	J. M. Cahill
1941	R. H. Blanchard	H. J. Ginsburgh	J. M. Cahill
1942	R. H. Blanchard	Albert Z. Skelding	Charles J. Haugh
1943-1944	H. J. Ginsburgh	Albert Z. Skelding	Charles J. Haugh
1945-1946	C. J. Haugh	J. M. Cahill	H. V. Williams

Secretary-Treasurer

1914-1917. *C. E. Scattergood

1918-1946. R. Fondiller

Editor†

1914.	W. W. Greene
1915-1917.	R. Fondiller
1918.	W. W. Greene
1919-1921.	G. F. Michelbacher
1922-1923.	O. E. Outwater
1924-1932.	R. J. McManus
1933-1943.	*C. W. Hobbs
1944-1946.	E. C. Maycrink

Librarian†

1914.	W. W. Greene
1915.	R. Fondiller
1916-1921.	L. I. Dublin*
1922-1924.	E. R. Hardy
1925-1937.	W. Breiby
1937-1946.	T. O. Carlson

*Deceased.

†The offices of Editor and Librarian were not separated until 1916.

FELLOWS WHO HAVE DIED

The (†) denotes original membership at date of organization, November 7, 1914

Admitted		Died
May 24, 1921	Edward J. Bond	Nov. 12, 1941
May 19, 1915	Thomas Bradshaw	Nov. 10, 1939
June 5, 1925	William Brosmith	Aug. 22, 1937
†	William A. Budlong	June 4, 1934
Nov. 18, 1932	Charles H. Burhans	June 15, 1942
Feb. 19, 1915	F. Highlands Burns	Mar. 30, 1935
Feb. 19, 1915	Gordon Case	Feb. 4, 1920
†	Charles T. Conway	July 23, 1921
†	Walter G. Cowles	May 30, 1942
†	James D. Craig	May 27, 1940
†	James McIntosh Craig	Jan. 20, 1922
May 26, 1916	Frederick S. Crum	Sept. 2, 1921
†	Alfred Burnett Dawson	June 21, 1931
†	Miles Menander Dawson	Mar. 27, 1942
May 19, 1915	Samuel Deutschberger	Jan. 18, 1929
†	Ezekiel Hinton Downey	July 9, 1922
May 19, 1915	Earl O. Dunlap	July 5, 1944
†	David Parks Fackler	Oct. 30, 1924
Feb. 19, 1915	Claude W. Fellows	July 15, 1938
†	Benedict D. Flynn	Aug. 22, 1944
†	Charles S. Forbes	Oct. 2, 1943
May 26, 1916	Lee K. Frankel	July 25, 1931
Feb. 25, 1916	Joseph Froggatt	Sept. 28, 1940
†	Harry Furze	Dec. 26, 1945
†	Theodore E. Gaty	Aug. 22, 1925
May 19, 1915	James W. Glover	July 15, 1941
Oct. 22, 1915	George Graham	Apr. 15, 1937
Oct. 22, 1915	Thompson B. Graham	July 24, 1946
May 25, 1923	William A. Granville	Feb. 4, 1943
†	William H. Gould	Oct. 28, 1936
†	Robert Cowen Lees Hamilton	Nov. 15, 1941
Nov. 21, 1919	Robert Henderson	Feb. 16, 1942
†	Robert J. Hillas	May 17, 1940
Nov. 15, 1918	Frank Webster Hinsdale	Mar. 18, 1932
May 23, 1924	Clarence W. Hobbs	July 21, 1944
Nov. 19, 1926	Charles E. Hodges	Jan. 22, 1937
†	Frederick L. Hoffman	Feb. 23, 1946
Nov. 21, 1919	Carl Hookstadt	Mar. 10, 1924
†	Burritt A. Hunt	Sept. 3, 1943
Nov. 28, 1921	William Anderson Hutcheson	Nov. 19, 1942
May 19, 1915	William C. Johnson	Oct. 7, 1943
Nov. 23, 1928	F. Robertson Jones	Dec. 26, 1941
Nov. 18, 1921	Thomas P. Kearney	Feb. 11, 1928
Oct. 22, 1915	Virgil Morrison Kime	Oct. 15, 1918
†	Edwin W. Kopf	Aug. 3, 1933
Feb. 17, 1915	John M. Laird	June 20, 1942
Feb. 19, 1915	Abb Landis	Dec. 9, 1937
Nov. 17, 1922	Arnette Roy Lawrence	Dec. 1, 1942
Nov. 18, 1921	James Fulton Little	Aug. 11, 1938
Nov. 23, 1928	Edward C. Lunt	Jan. 13, 1941
Feb. 19, 1915	Harry Lubin	Dec. 20, 1920
May 23, 1919	Alfred McDougald	July 28, 1944
Feb. 15, 1915	Franklin B. Mead	Nov. 29, 1933

FELLOWS WHO HAVE DIED—Continued

Admitted		Died
Apr. 20, 1917	Marcus Meltzer	Mar. 27, 1931
†	David W. Miller	Jan. 18, 1936
†	James F. Mitchell	Feb. 9, 1941
†	Henry Moir	June 8, 1937
Feb. 19, 1915	William J. Montgomery	Aug. 20, 1915
May 19, 1915	Edward Bontecou Morris	Dec. 19, 1929
†	Lewis A. Nicholas	Apr. 21, 1940
†	Stanley L. Otis	Oct. 12, 1937
Nov. 13, 1926	Bertrand A. Page	July 30, 1941
Nov. 18, 1921	Sanford B. Perkins	Sept. 16, 1945
Nov. 15, 1918	William Thomas Perry	Oct. 25, 1940
†	Edward B. Phelps	July 24, 1915
†	Charles Grant Reiter	July 30, 1937
†	Charles H. Remington	Mar. 21, 1938
†	Isaac M. Rubinow	Sept. 1, 1936
†	Harwood Eldridge Ryan	Nov. 2, 1930
†	Arthur F. Saxton	Feb. 26, 1927
†	Emil Scheitlin	May 2, 1946
†	Leon S. Senior	Feb. 3, 1940
Apr. 20, 1917	Charles Gordon Smith	June 22, 1938
Feb. 19, 1915	John T. Stone	May 9, 1920
Feb. 25, 1916	Wendell Menville Strong	Mar. 30, 1942
†	Robert J. Sullivan	July 19, 1934
Nov. 22, 1934	Walter H. Thompson	May 25, 1935
Nov. 13, 1921	Guido Toja	Feb. 28, 1933
May 23, 1919	Archibald A. Welch	May 8, 1935
Nov. 19, 1926	Roy A. Wheeler	Aug. 26, 1932
†	Albert W. Whitney	July 27, 1943
†	S. Herbert Wolfe	Dec. 31, 1927
†	Joseph H. Woodward	May 15, 1928
†	William Young	Oct. 23, 1927

ASSOCIATES WHO HAVE DIED

Admitted		Died
Oct. 22, 1915	Don A. Baxter	Feb. 10, 1920
Nov. 22, 1934	John J. Gately	Nov. 3, 1943
Nov. 20, 1924	Leslie LeVant Hall	Mar. 8, 1931
Oct. 31, 1917	Edward T. Jackson	May 8, 1939
Nov. 19, 1920	Fritz Muller	Apr. 27, 1945
Nov. 23, 1928	Karl Newhall	Oct. 24, 1944
Nov. 18, 1927	Alexander A. Speers	June 25, 1941
Mar. 23, 1921	Arthur E. Thompson	Jan. 17, 1944
Nov. 21, 1919	Walter G. Voogt	May 8, 1937
Nov. 18, 1925	James H. Washburn	Aug. 19, 1946
Nov. 17, 1920	James J. Watson	Feb. 23, 1937
Nov. 18, 1921	Eugene R. Welch	Jan. 17, 1945
Nov. 15, 1918	Albert Edward Wilkinson	June 11, 1930

CONSTITUTION

(AS AMENDED NOVEMBER 15, 1940)

ARTICLE I.—*Name.*

This organization shall be called the CASUALTY ACTUARIAL SOCIETY.

ARTICLE II.—*Object.*

The object of the Society shall be the promotion of actuarial and statistical science as applied to the problems of casualty and social insurance by means of personal intercourse, the presentation and discussion of appropriate papers, the collection of a library and such other means as may be found desirable.

The Society shall take no partisan attitude, by resolution or otherwise, upon any question relating to casualty or social insurance.

ARTICLE III.—*Membership.*

The membership of the Society shall be composed of two classes, Fellows and Associates. Fellows only shall be eligible to office or have the right to vote.

The Fellows of the Society shall be the present Fellows and those who may be duly admitted to Fellowship as hereinafter provided. The Associates shall be the present Associates and those who may be duly admitted to Associateship as hereinafter provided.

Any person may, upon nomination to the Council by two Fellows of the Society and approval by the Council of such nomination with not more than one negative vote, become enrolled as an Associate of the Society, provided that he shall pass such examination as the Council may prescribe. Such examination may be waived in the case of a candidate who for a period of not less than two years has been in responsible charge of the Statistical or Actuarial Department of a casualty insurance organization or has had such other practical experience in casualty or social insurance as, in the opinion of the Council, renders him qualified for Associateship.

Any person who shall have qualified for Associateship may become a Fellow on passing such final examination as the Council may prescribe. Otherwise, no one shall be admitted as a Fellow unless recommended by a duly called meeting of the Council, with not more than three negative votes, followed by a three-fourths ballot of the Fellows present and voting at a meeting of the Society.

ARTICLE IV.—*Officers and Council.*

The officers of the Society shall be a President, two Vice-Presidents, a Secretary-Treasurer, an Editor, and a Librarian. The Council shall be composed of the active officers, nine other Fellows and, during the four years following the expiration of their terms of office, the ex-Presidents and ex-Vice-Presidents. The Council shall fill vacancies occasioned by death or resignation of any officer or other member of the Council, such appointees to serve until the next annual meeting of the Society.

CONSTITUTION

ARTICLE V.—*Election of Officers and Council.*

The President, Vice-Presidents, and the Secretary-Treasurer shall be elected by a majority ballot at the annual meeting for the term of one year and three members of the Council shall, in a similar manner, be annually elected to serve for three years. The President and Vice-Presidents shall not be eligible for the same office for more than two consecutive years nor shall any retiring member of the Council be eligible for re-election at the same meeting.

The Editor and the Librarian shall be elected annually by the Council at the Council meeting preceding the annual meeting of the Society. They shall be subject to confirmation by majority ballot of the Society at the annual meeting.

The terms of the officers shall begin at the close of the meeting at which they are elected except that the retiring Editor shall retain the powers and duties of office so long as may be necessary to complete the then current issue of *Proceedings*.

ARTICLE VI.—*Duties of Officers and Council.*

The duties of the officers shall be such as usually appertain to their respective offices or may be specified in the by-laws. The duties of the Council shall be to pass upon candidates for membership, to decide upon papers offered for reading at the meetings, to supervise the examination of candidates and prescribe fees therefor, to call meetings, and, in general, through the appointment of committees and otherwise, to manage the affairs of the Society.

ARTICLE VII.—*Meetings.*

There shall be an annual meeting of the Society on such date in the month of November as may be fixed by the Council in each year, but other meetings may be called by the Council from time to time and shall be called by the President at any time upon the written request of ten Fellows. At least two weeks' notice of all meetings shall be given by the Secretary.

ARTICLE VIII.—*Quorum.*

Seven members of the Council shall constitute a quorum. Twenty Fellows of the Society shall constitute a quorum.

ARTICLE IX.—*Expulsion or Suspension of Members.*

Except for non-payment of dues no member of the Society shall be expelled or suspended save upon action by the Council with not more than three negative votes followed by a three-fourths ballot of the Fellows present and voting at a meeting of the Society.

ARTICLE X.—*Amendments.*

This constitution may be amended by an affirmative vote of two-thirds of the Fellows present at any meeting held at least one month after notice of such proposed amendment shall have been sent to each Fellow by the Secretary.

BY-LAWS

(AS AMENDED NOVEMBER 22, 1946)

ARTICLE I.—*Order of Business.*

At a meeting of the Society the following order of business shall be observed unless the Society votes otherwise for the time being:

1. Calling of the roll.
2. Address or remarks by the President.
3. Minutes of the last meeting.
4. Report by the Council on business transacted by it since the last meeting of the Society.
5. New membership.
6. Reports of officers and committees.
7. Election of officers and Council (at annual meetings only).
8. Unfinished business.
9. New business.
10. Reading of papers.
11. Discussion of papers.

ARTICLE II.—*Council Meetings.*

Meetings of the Council shall be called whenever the President or three members of the Council so request, but not without sending notice to each member of the Council seven or more days before the time appointed. Such notice shall state the objects intended to be brought before the meeting, and should other matter be passed upon, any member of the Council shall have the right to re-open the question at the next meeting.

ARTICLE III.—*Duties of Officers.*

The President, or, in his absence, one of the Vice-Presidents, shall preside at meetings of the Society and of the Council. At the Society meetings the presiding officer shall vote only in case of a tie, but at the Council meetings he may vote in all cases.

The Secretary-Treasurer shall keep a full and accurate record of the proceedings at the meetings of the Society and of the Council, send out calls for the said meetings, and, with the approval of the President and Council, carry on the correspondence of the Society. Subject to the direction of the Council, he shall have immediate charge of the office and archives of the Society.

The Secretary-Treasurer shall also send out calls for annual dues and acknowledge receipt of same; pay all bills approved by the President for expenditures authorized by the Council of the Society; keep a detailed account of all receipts and expenditures, and present an abstract of the same at the annual meetings, after it has been audited by a committee of the Council.

BY-LAWS

The Editor shall, under the general supervision of the Council, have charge of all matters connected with editing and printing the Society's publications. The *Proceedings* shall contain only the proceedings of the meetings, original papers or reviews written by members, discussions on said papers and other matter expressly authorized by the Council.

The Librarian shall, under the general supervision of the Council, have charge of the books, pamphlets, manuscripts and other literary or scientific material collected by the Society.

ARTICLE IV.—*Dues.*

The Council shall fix the annual dues for Fellows and for Associates. The payment of dues will be waived in the case of Fellows or Associates who have attained the age of seventy years or who, having been members for a period of at least twenty years, shall have attained the age of sixty-five years. Fellows and Associates who have become totally disabled while members may upon approval of the Council be exempted from the payment of dues during the period of disability.

It shall be the duty of the Secretary-Treasurer to notify by mail any Fellow or Associate whose dues may be six months in arrears, and to accompany such notice by a copy of this article. If such Fellow or Associate shall fail to pay his dues within three months from the date of mailing such notice, his name shall be stricken from the rolls, and he shall thereupon cease to be a Fellow or Associate of the Society. He may, however, be reinstated by vote of the Council, and upon payment of arrears of dues.

It shall be the duty of the Secretary-Treasurer to notify by mail any Fellow or Associate whose dues may be six months in arrears, and to accompany such notice by a copy of this article. If such Fellow or Associate shall fail to pay his dues within three months from the date of mailing such notice, his name shall be stricken from the rolls, and he shall thereupon cease to be a Fellow or Associate of the Society. He may, however, be reinstated by vote of the Council, and upon payment of arrears of dues.

ARTICLE V.—*Designation by Initials.*

Fellows of the Society are authorized to append to their names the initials F. C. A. S.; and Associates are authorized to append to their names the initials A. C. A. S.

ARTICLE VI.—*Amendments.*

These by-laws may be amended by an affirmative vote of two-thirds of the Fellows present at any meeting held at least one month after notice of the proposed amendment shall have been sent to each Fellow by the Secretary.

EXAMINATION REQUIREMENTS
 SYLLABUS OF EXAMINATIONS
 Effective 1941 and thereafter

ASSOCIATESHIP

<i>Part</i>	<i>Sections</i>	<i>Subjects</i>
I	1	Algebra.
	2	Compound Interest and Annuities Certain.
II	3	Differential and Integral Calculus.
	4	Calculus of Finite Differences.
III	5	Descriptive and Analytical Statistics.
	6	Elements of Accounting, Including Corporate Accounting.
IV	7	Probabilities.
	8	Life Contingencies, Life Annuities and Life Assurances.
V	9	Policy Forms and Underwriting Practice in Casualty Insurance.
	10	Casualty Insurance Rate Making Procedure.

FELLOWSHIP

I	11	Investments of Insurance Companies.
	12	Insurance Law and Legislation.
	13	Insurance Economics.
II	14	Determination of Premium, Loss and Expense Reserves.
	15	Advanced Problems in Casualty Insurance Statistics.
	16	Advanced Problems in Casualty Insurance Accounting.
III	17	Individual Risk Rating.
	18	Social Insurance.
	19	Advanced Problems in the Underwriting and Administration of Casualty Insurance.

EXAMINATION REQUIREMENTS

RULES REGARDING EXAMINATIONS
FOR ADMISSION TO THE SOCIETY**1. Dates of Examination.**

Examinations will be held on the first Wednesday and following Thursday during the month of April in each year, except that if such dates are in the week preceding Easter, the examinations will be held on the second Wednesday and following Thursday of April. The examinations will be held in such cities as will be convenient for three or more candidates.

2. Filing of Application.

Application for admission to examination should be made on the Society's blank form, which may be obtained from the Secretary-Treasurer. No applications will be considered unless received before the fifteenth day of January preceding the dates of examination. Applications should definitely state for what parts the candidate will appear.

3. Fees.

The examination fee is \$2.00 for each part, with a minimum of \$5.00 for each year in which the candidate presents himself; thus for one or two parts, \$5.00, for three parts, \$6.00, etc. Examination fees are payable to the order of the Society and must be received by the Secretary-Treasurer before the fifteenth day of January preceding the dates of examination.

4. Associateship and Fellowship Examinations.

(a) The examination for Associateship consists of five parts and that for Fellowship consists of three parts. A candidate may take any one or more of the five parts of the Associateship Examination. No candidate will be permitted to present himself for

EXAMINATION REQUIREMENTS

any part of the Fellowship Examination unless he has previously passed, or shall concurrently present himself for and submit papers for, all parts of the Associateship Examination and all preceding parts of the Fellowship Examination. Subject to the foregoing requirement, the candidate will be given credit for any part or parts of either examination which he may pass.

(b) A candidate who has passed Associateship Parts I-IV prior to 1941, but who has not been enrolled as an Associate because of lack of the experience qualifications required by the examination rules effective prior to 1941, will be enrolled as an Associate upon passing Part V. Such a candidate may also take Fellowship Examination Parts I-III in the same year as Associateship Part V, subject to the provisions of paragraph (a) above.

(c) An Associate who has passed no part of the Fellowship Examination under the Syllabus effective prior to 1941 is required, in order to qualify for admission as a Fellow, to pass Associateship Examination Part V and Fellowship Examination Parts I-III.

(d) In the case of a candidate for admission as Associate who has served for a period of at least two years in the armed forces of the United States or Canada or services directly connected therewith, and who shall have completed courses in any of the sections included in Parts I, II and III, of the Associate Examinations at a college or university of recognized standards, the examinations in such sections may be waived at the discretion of the Examination Committee subject to the following conditions and limitations.

1. Such courses shall have been completed within 10 years prior to date of application for such waiver.
2. The courses shall have been at least equivalent to those required to qualify the candidate to meet the examination requirements.
3. The grades obtained shall have been satisfactory.

The foregoing waiver of examinations provision shall not apply to candidates applying for admission subsequent to January 15, 1948. Any such waiver made shall lapse if the candidate shall fail to attain Associateship status prior to December 1, 1950.

5. Alternative to Passing of Fellowship Parts II and III.

As an alternative to the passing of Parts II and III of the Fellowship Examination, a candidate may elect to present an

EXAMINATION REQUIREMENTS

original thesis on an approved subject relating to casualty or social insurance. Such thesis must show evidence of ability for original research and the solution of advanced problems in casualty insurance comparable with that required to pass Parts II and III of the Fellowship Examination, and shall not consist solely of data of an historical nature. Candidates electing this alternative should communicate with the Secretary-Treasurer and obtain through him approval by the Examination Committee of the subject of the thesis. In communicating with the Secretary-Treasurer, the candidate should state, in addition to the subject of the thesis, the main divisions of the subject and general method of treatment, the approximate number of words and the approximate proportion to be devoted to data of an historical nature. All theses must be in the hands of the Secretary-Treasurer before the first Wednesday in April of the year in which they are to be considered. Where Part I of the Fellowship Examination is not taken during the same year, no examination fee will be required in connection with the presentation of a thesis. All theses submitted are, if accepted, to be the property of the Society and may, with the approval of the Council, be printed in the *Proceedings*.

6. Waiver of Examinations for Associate.

The examinations for Associate will be waived under Article III of the Constitution only in case of those candidates who meet the following qualifications and requirements:

- (a) The candidate shall be at least thirty-five years of age.
- (b) The candidate shall have had at least ten years' experience in casualty actuarial or statistical work or in a phase of casualty insurance which requires a working knowledge of actuarial or statistical procedure or in the teaching of casualty insurance principles in colleges or universities. Experience limited exclusively to the field of accident and health insurance shall not be admissible. In the case of a candidate who has spent at least one year in the armed forces of the United States or Canada or services directly connected therewith, the period covered by such service shall be included in the ten years experience qualification period provided for above.

EXAMINATION REQUIREMENTS

(c) For the two years preceding date of application, the candidate shall have been in responsible charge of the actuarial or statistical department of a casualty insurance organization or of an important division of such department or shall have occupied an executive position in connection with the phase of casualty work in which he is engaged, or, if engaged in teaching, shall have attained the status of a professor. In the case of a candidate who has spent at least one year in the armed forces of the United States or Canada or services directly connected therewith, the two years requirement stated above shall be reduced to one year.

(d) The candidate shall have submitted a thesis approved by the Examination Committee. Such thesis must show evidence of original research and knowledge of casualty insurance and shall not consist solely of data of an historical nature. Candidates electing this alternative should communicate with the Secretary-Treasurer and obtain through him approval by the Examination Committee of the subject of the thesis. In communicating with the Secretary-Treasurer, the candidate should state, in addition to the subject of the thesis, the main divisions of the subject and general method of treatment, the approximate number of words and the approximate proportion to be devoted to data of an historical nature.

RECOMMENDATIONS FOR STUDY

To assist students in preparation for the examinations, Recommendations For Study have been prepared. This lists the texts, readings and technical material which must be mastered by the candidates. Textbooks are loaned to registered students by the Society. By "registered students" is meant candidates who have signified their willingness to take the examinations by the payment of their examination fees.

LIBRARY

The Society's library contains all of the references listed in the Recommendations for Study with the exception of certain periodicals and publications subject to periodical revision. It also

EXAMINATION REQUIREMENTS

contains numerous other works on casualty actuarial matters. Registered students may have access to the library by receiving from the Society's Secretary the necessary credentials. Books may be withdrawn from the library for a period of two weeks upon payment of a small service fee and necessary postage.

The library is in the immediate charge of Miss Mabel B. Swerig, Librarian of the Insurance Society of New York, 107 William Street, New York 7, N. Y.