

WORKMEN'S COMPENSATION CLAIM RESERVES.

MILES M. DAWSON.

The claim or loss reserves, which should be held under workmen's compensation policies, fall under the following general heads:

I. Reserves to provide for the payment of sums to become due in future under awards already made.

II. Reserves to provide for the payment of sums to become due under claims already filed for which no award has yet been made.

III. Reserves to provide for the payment of sums to become due under claims which may be filed because of accidents that have already occurred, notice of which (*a*) has been received or (*b*) has not been received.

Unearned premium or reinsurance reserve is not here discussed, it being assumed that sufficient provision is made in that form to assure the payment of claims that will arise from accidents occurring during the unexpired portions of the terms of policies in force.

I. RESERVES TO PROVIDE FOR THE PAYMENT OF SUMS TO BECOME DUE IN FUTURE UNDER AWARDS ALREADY MADE.

It will be observed, of course, that under each of the three classes of claim or loss reserves, enumerated above, all kinds of claims will be included as, for instance, death claims, permanent total and temporary total disability, etc. These must, therefore, be carefully considered, which can best be done, first of all, under the first of the three enumerated general classifications, because all claims falling under it may be treated as fixed and definite by reason of which the distinctive characteristics of the kind of claims clearly appear, free from any involvement with contingencies or uncertainties regarding whether or not there will be a claim. It will be found, likewise, that, once these distinctive characteristics are well taken care of in computations free of such involvement, the effect of the contingencies and uncertainties in the two other enumerated classes can be dealt with, as a separate matter, quite simply and effectively.

Claims appear to fall by natural cleavage under the following heads, by kinds:

1. Death, leaving
 - (a) No dependents.
 - (b) Widow (or dependent widower):
 - (1) Without children, also claimants.
 - (2) With children, also claimants.
 - (c) No widow (or dependent widower) but children, claimants.
 - (d) Other dependents entitled to claim:
 - (1) Dependent parents or grandparents.
 - (2) Dependent grandchildren, brothers or sisters.
2. Dismemberment and mutilation.
3. Permanent total disability.
4. Permanent partial disability.
5. Temporary total disability.
6. Medical expenses.

Taking these up in turn, we have:

1. (a) *Death, Leaving No Dependents.*—Under this head, as regards awards already made, there is no reserve called for to provide for sums *to fall due in future*.

For the amount payable under workmen's compensation laws in such cases, a lump sum, applicable to pay expense of funeral and burial, with remainder perhaps to apply on expenses of last sickness; accordingly it is due the moment award is made. If unpaid, it should be included in "Losses due and unpaid" in the statement and not in claim or loss reserves.

1. (b) (1) *Death Leaving Widow, without Children, Also Claimants.*—There are various forms for this compensation, the main sorts of which must be separately considered as follows:

I. If the widow's compensation is payable in one lump sum, no claim or loss reserve, because due at once upon being awarded and if not paid to be entered in "Losses due and unpaid" in the statement.

II. If the widow's compensation is payable for a fixed period as m years (as in Massachusetts) irrespective of death or survival, of which period n years* have elapsed, the reserve is for each dollar per annum payable

$$a_{m-n}^{(12)}$$

* Of course m and n may, each of them, be integral or fractional.

For convenience, it is, in my opinion, best to use continuous functions which are near enough correct, viz.:

$$\bar{a}_{\overline{m-n}|}$$

This brings up the question at once: *At what rate of interest should this computation be made?*

Several companies—perhaps most of them—have hitherto entered the gross amount, yet to be paid, without allowing for the interest the fund would earn until paid out.

Much could be said in these days in favor of assuming 4 per cent. or even a higher rate; but are not the following considerations decisive?

3½ per cent. is the maximum rate used in valuing all future payments in life insurance.

The rate here adopted should be applicable to all such benefits, whether of long or short duration; if of long duration it would be unwise to assume a high rate and if of short, the inconvenience of investing and realizing would perhaps prevent a high rate being actually realized.

Several of the larger companies, supplying workmen's compensation insurance, are also life insurance companies and could not afford to assert that the security behind these annuities should be on a higher interest assumption than the security behind their other annuities; neither could the other companies afford to be less secure than these companies.

It certainly should not be the policy of a State Insurance Department to use a higher rate of interest in valuing annuities to be paid workmen and their families and thereby cause lower reserves to be held to secure the same than the legislature provides for in requiring reserves to secure other annuitants.*

Therefore, it seems clear that the present value should be computed upon the assumption that the funds will earn 3½ per cent. per annum.

III. If the widow's compensation is payable for a limited period of m years but terminable in event of her prior death, n years having already elapsed, the reserve is for each dollar per annum payable (writing the same as if payable continuously):

$$\bar{a}_{\overline{+n\overline{m-n}|}}$$

* The New York Insurance Department has adopted 3½ per cent.

The question now arises as to the mortality which should be assumed in computing this value.

Obviously it should not be the American Experience table, for that, it is well known, shows a higher death rate than is really experienced and so would bring out inadequate values for these annuities.

Obviously, also, it should not be McClintock's Annuitants' Table, because that, it is well known, shows a lower death rate than is experienced, except among persons who, thinking they will live long, purchase annuities; and so would bring out excessive values for these annuities.

The State Workmen's Compensation Commission of New York has adopted the Survivorship Annuitants' Table,* deduced from the experience of the Danish State Insurance Fund. This table is fairer, because it represents death rates among widows who are living on annuities, payments upon which commence after the deaths of their husbands.

This table, also, has been so constructed that the most complex combinations can be dealt with simply and easily and it also comprises safe mortality rates for valuing children's compensation.

A copy of my paper read before the Actuarial Society of America at its October, 1914, meeting, describing its usefulness for the purpose of valuing workmen's compensation, has been furnished each member of this Society.

IV. If the widow's compensation is payable for m years but to terminate upon prior remarriage or death, the reserve is for each dollar per annum payable:

$$\bar{a}''_{x+n \overline{m-n}}$$

in which the " signifies that *both* death and remarriage are involved.

The computation of these values will require the use of a remarriage, as well as a mortality, table. No remarriage table has hitherto been used in the United States.

The State Workmen's Compensation Commission of New York has adopted the remarriage table deduced from the experience of the Dutch State Insurance Fund* as regards the remarriage of widows in receipt of compensation.

As fully set forth in my paper, already referred to, this remar-

* Now also adopted by the New York Insurance Department.

riage table has been combined with the Survivorship Annuitants' Mortality Table, in such a manner that these annuity values can be computed very readily.

V. If the widow's compensation is payable until death or remarriage, the reserve is for each dollar per annum payable:

$$\bar{a}''_{x+n},$$

in which as before the chances of death and remarriage are both taken into account.

VI. If the widow's compensation is as in V but with two years' annuities paid in one sum upon remarriage, the reserve is for each dollar per annum payable:

$$\bar{a}''_{x+n} + 2A'_{x+n},$$

in which A'_{x+n} is the value of \$1.00 payable upon remarriage.

1. (b) (2) *Death Leaving Widow with Children, Also Claimants.*—This case has already been discussed in Mr. Greene's paper read before this Society at its last meeting and also in my paper before the Actuarial Society of America, already mentioned; likewise, in my article "Mortality and Remarriage Tables for Valuing Compensation to Widows and Other Dependents" published in the *Market World and Chronicle* of November 21, 1914.

Formulas, annuities, commutation columns and other facilities for making these computations have been prepared, and will soon be ready for distribution.

1. (c) *Death Leaving No Widow, but Children Claimants.*—If there are no other claimants the reserve is for each such child, in case compensation of one dollar per annum is payable until age 18 is reached, n years having already elapsed.

$$\bar{a}_{w+n \overline{18-(w+n)}}.$$

The most suitable table is the Survivorship Annuitants' Table, already referred to, which covers infantile ages, as well as adult, and is throughout so constructed as to enable complex problems to be solved quickly and conveniently.

If there are several children of ages w_1 , w_2 , w_3 , etc., the total reserve for compensation of one dollar per annum each, is:

$$\bar{a}_{w_1+n \overline{18-(w_1+n)}} + \bar{a}_{w_2+n \overline{18-(w_2+n)}} + \dots$$

If for a limited term, say m years, n having elapsed, these become, respectively:

$$\bar{a}_{w+n \overline{m-n}|}$$

and

$$\bar{a}_{w_1+n \overline{m-n}|} + \bar{a}_{w_2+n \overline{m-n}|} + \dots$$

If limited both to a given age, say 18, and to a term, m years, the reserve for each must be selected according as $m - n$ or $18 - (w + n)$ is the smaller.

But if the aggregate exceeds some limitation in the law, these values will be modified in a manner for which formulas have been prepared, as stated.

1. (d) (1) *Death Leaving Other Dependents Entitled to Claim, viz., One or More Dependent Parents or Grandparents.*—In such case, if not complicated by "limits," the reserve per dollar per annum if payable for life, n years having elapsed is:

$$\bar{a}_{y+n},$$

or if there be more than one, aged y_1, y_2, y_3 , etc.:

$$\bar{a}_{y_1+n} + \bar{a}_{y_2+n} + \bar{a}_{y_3+n} + \dots$$

If payable for m years, these become

$$\bar{a}_{y+n \overline{m-n}|}$$

and

$$\bar{a}_{y_1+n \overline{m-n}|} + \bar{a}_{y_2+n \overline{m-n}|} + \dots$$

How combinations with widow's or children's compensation or both and the complexities due to limits are dealt with, is shown in the formulas referred to.

The probability of dependence ceasing during life is so slight that it should be disregarded.

1. (d) (2) *Death Leaving Other Dependents Entitled to Claim, viz., One or More Dependent Grandchildren, Brothers or Sisters.*—If compensation is payable to age 18—or any other age—these reserves are computed precisely like those for children.

Likewise if payable for a limited term.

The probability of dependence ceasing before the age is reached or the term expires, is slight and should be disregarded.

The combinations with compensation payable to others and the

complexities due to limits are dealt with in the formulas referred to.

2. *Permanent Total Disability*.—This may have been provided for by compensation limited to m years; in such case the reserve for each dollar per annum is, n years having elapsed:

$$\bar{a}_{x+n \overline{m-n}|}$$

Or if the compensation is during the entire period of disability, if it has been adjudged permanent, the possibility of recovery had best be disregarded, as very remote, and the reserve for each dollar per annum be taken, after n years have elapsed, as:

$$\bar{a}_{x+n},$$

allowing for termination by death only, i. e., computing by a mortality table only and not taking account of possible recovery.

The question arises: *What mortality table should be employed in such cases?*

The Survivorship Annuitants' Table has, for this purpose, no particular claim, arising from its derivation which is (except as regards infantile ages) from experience of female survivorship annuitants.

If it should be used to compute reserves for permanent total disability, this can only be because it *chances* to be suitable. In such case, it ought to be used in order to avoid employing two mortality tables in these computations.

At first blush, it seems, of course, as if a table deduced from mortality experience among the totally disabled should be employed—such, for instance, as that which is printed on p. 51 of Vol. XII of the *Transactions* of the Actuarial Society.

But precisely such an assumption as that caused the Norwegian State Insurance Fund to underestimate its liabilities for several years and occasioned much embarrassment. It was found, instead, that the mortality among those receiving compensation for permanent disability on account of accident had been, after a preliminary period of a few months, actually lower than the population mortality rates in Norway at the same ages. It must be remembered that the population mortality in Norway is the lowest of all the countries of Europe, except Sweden and Denmark, and nearly the same as in those countries.

The Norwegian population table is so low as to indicate that it will not be unduly conservative to use the Survivorship Annuitants'

Table for this purpose also after, say, six months have elapsed;* although it should, of course, be discarded for a more suitable table if there are reasons for doing so which outweigh the advantages of keeping to one table in computing compensation reserves.

During the first weeks or months, there may often be a much greater probability of death, for which some allowance should be made; but only in case reserve is also made for the contingency of a death claim, for these early deaths are nearly always due to the consequences of the accident.

III. *Permanent Partial Disability.*—As dismemberments and mutilations are usually separately provided for in American compensation laws, they are separately considered under the next head.

When permanent partial disability has once been established and an award made, one of three things will afterwards be true, regarding the amount, viz.:

The impairment of earning power will not change; therefore, the compensation also.

The impairment will increase, resulting in increase of compensation.

The impairment will improve, resulting in decrease of compensation.

Taken one case with another, it is safe and conservative to assume that on the average they will neither increase nor decrease. This is, however, to assume that decreases will balance increases, which will perhaps not be fully realized. Yet, with conservative interest and mortality assumptions, I consider that

$$\bar{a}_{x+n}$$

is a fair expression for a dollar per annum of such compensation if payable throughout disability and

$$\bar{a}_{x+n \overline{m-n}|}$$

if payment is limited to m years.

IV. *Dismemberment and Mutilation.*—Under American compensation laws, these are always, unless classed as permanent total disability, compensated by instalments through a fixed or limited term.

* It has been adopted by the State Workmen's Compensation Commission and the New York Insurance Department for this purpose.

If a fixed term of m years, the reserve, n years having elapsed, is for each dollar per annum:

$$\bar{a}_{m-n}.$$

If for a limited term of m years:

$$\bar{a}_{x+n \overline{m-n}}.$$

V. *Temporary Total Disability*.—Our president, Dr. Rubinow, reports in his table, "Standard Distribution of Accidents," that, out of 100,000 accidents reported, only 932 result in death, 2,323 in dismemberment, 110 in permanent total disability and 2,442 in permanent partial disability, in all only 5,808 cases, leaving no less than 94,192 of temporary disability.

Therefore, though the more difficult cases mathematically and also those involving the heaviest reserve per case have been provided for in the foregoing, much the greatest number yet remain.

The following is Dr. Rubinow's distribution of temporary disabilities according to duration:

TEMPORARY DISABILITY.

Not over 1 week	37,112
1- 2 weeks	23,925
2- 3 weeks	12,433
3- 4 weeks	6,970
4- 5 weeks	4,427
5- 6 weeks	2,732
6- 7 weeks	1,695
7- 8 weeks	1,130
8- 9 weeks	942
9-10 weeks	565
10-11 weeks	471
11-12 weeks	377
12-13 weeks	283
13-26 weeks	933
Over 26 weeks	197
	94,192

So far as disabilities of less than two weeks' duration go, the proportion given is large if compared with the number of notices of accident which result in claims. This is no doubt due to failure to give notice when the injuries are so trivial that it is plain that a disability extending into third week is not to be expected. But after the second week, these figures are pretty likely to prove reliable for reserve purposes.

From Dr. Rubinow's table, I have deduced the following table of average further durations of disabilities just commencing, of disabilities one week old, etc.:

TABLE OF AVERAGE FURTHER DURATIONS OF TEMPORARY DISABILITIES.

(Deduced from Dr. Rubinow's Table of Standard Distribution.)

Period of Disability Already Elapsed.	Average Further Period of Disability.
1 day to 1 week	2.07 weeks
1 week to 2 weeks	2.42 weeks
2 weeks to 3 weeks	3.16 weeks
3 weeks to 4 weeks	4.05 weeks
4 weeks to 5 weeks	5.11 weeks
5 weeks to 6 weeks	6.53 weeks
6 weeks to 7 weeks	8.24 weeks
7 weeks to 8 weeks	10.09 weeks
8 weeks to 9 weeks	12.11 weeks
9 weeks to 10 weeks	15.15 weeks
10 weeks to 11 weeks	17.93 weeks
11 weeks to 12 weeks	21.65 weeks
12 weeks to 13 weeks	26.43 weeks
13 weeks to 26 weeks	29.55 weeks
Over 26 weeks	176 weeks less the term elapsed.

The term beyond 26 weeks was interpolated by reference to British Government Friendly Societies' (Sutton's) Tables.

By listing the aggregate amounts of compensation awarded by weeks already disabled, multiplying those aggregate amounts by the average respective number of weeks further disabled and adding up the result, the required reserve for temporary disability compensation to become due in future under claims already awarded is found.

The ease and convenience of this method, as well as its theoretical soundness, should render it acceptable; the table can be modified later as experience may indicate.

Special Reserves for Suspended Death Claims.—This completes reserves for compensation to become due in future, except a special contingency reserve which should be maintained in order to cover the risk of death claims resulting from injuries under which disability claims are now awarded.

This is a risk which is at its greatest, perhaps, when the two

weeks' waiting period has expired and the disability claim begins to run, and which rather rapidly subsides.

Suppose it were considered that *all* the deaths have an antecedent period of disability.* This is not quite true because some are instantaneous, but some of the disabilities are also over almost immediately.

How many would result from the 110 cases of permanent total disability? I am not at the present moment aware of statistics bearing on this matter of how many of those who are adjudged totally and permanently disabled, die of their injuries nor of the respective years after the injury such deaths take place. Such statistics doubtless exist somewhere and the facts can be ascertained.

Pending obtaining this information, how would it do to assume that one-third of these 110 would die ultimately as the result of their injuries—say 37 of them—but that of those who die within three years, one-half die of their injuries.

On this basis, putting X for the amount of the death claim (present value), the special reserve to cover the contingency of a future death claim in a permanent total disability case would be, n years having elapsed:

$$X(1/3A_{x+n})$$

in which A_x should (after six months) be computed by the Survivorship Annuitants' Table or (during such six months) by the American Experience Table.

If the law prescribes a period—say m years—after the expiration of which death will not be compensated, this might well be:

$$X(1/2A_{(1+x+n)^{\overline{m-n}}}).$$

This would leave 932 less 37, that is 895 deaths which are assumed to follow temporary total disability of which there are 94,192 cases, i. e., about 95 per 10,000—practically 1 in 100.

The foregoing is suggested, to call out discussion.

VI. *Medical Expense*.—The reserve for this item, if limited in time or amount or both, should be provided for by ascertaining as nearly as possible the average cost of this service per case.

This would also apply to temporary disabilities, even though neither amount nor time limited; but in such case, if disability

* This may seem to violate the basis of Dr. Rubinow's Table; but it is not, I think, really 100,000 accidents but 100,000 cases, counting those which appear twice, a second time, etc.

is total and permanent, 10 per cent. ought perhaps to be added to the present value of the annuity, to cover such expenses if payable throughout disability.

II. RESERVES TO PROVIDE FOR THE PAYMENT OF SUMS TO BECOME DUE UNDER CLAIMS ALREADY FILED, FOR WHICH NO AWARD HAS YET BEEN MADE.

The claims having been filed, the company can compute from the data at hand, what the awards will probably be.

These are of the same nature as any other claims of which notice has been received; such should be charged up as liabilities at their probably maximum amount.

The course which should be taken if the company considers that there is no liability depends upon its degree of confidence; if it is reasonably likely that award will be made, the claim should be counted.

It would be wise, indeed, in my opinion, if all claims filed were valued and reserves charged for maximum possible awards, because thus this reserve is certainly ample and also because if a claim is disallowed, there is or may be liability in damages for negligence.

III. RESERVES TO PROVIDE FOR THE PAYMENT OF SUMS TO BECOME DUE UNDER CLAIMS WHICH MAY BE FILED BECAUSE OF ACCIDENTS THAT HAVE ALREADY OCCURRED.

These fall into two classes, (*a*) notice received and (*b*) no notice received. Apparently since notices contain some information concerning the character of the injury, these could be treated differently, i. e., the first by estimating up the claims and the second by making a percentage addition to these reserves to cover those for which no notice has been received. But this seems to me unwise because leaving too much room for individual discretion in estimating the reserves because the information available will be too scanty.

The number of such cases for which no notice has been received can be arrived at with reasonable accuracy, if the combined experience is studied with care. When this number is added to the number for which notices have been received, the resulting aggregate can be operated upon to obtain the total reserves for both.

In my opinion, the simplest and safest policy would be to utilize

again Dr. Rubinow's Standard Table of Distribution, which is here reproduced:

STANDARD DISTRIBUTION OF ACCIDENTS AS COMPUTED IN A MEMORANDUM
ATTACHED ON A BASIS OF 100,000 ACCIDENTS.

FATAL CASES	932
DISMEMBERMENTS:	
1. Loss of left arm	64
2. Loss of right arm	95
3. Loss of left hand	50
4. Loss of right hand	61
5. Loss of left thumb	29
6. Loss of right thumb	30
7. Loss of left index	59
8. Loss of right index	69
9. Loss of left middle finger	26
10. Loss of right middle finger	31
11. Loss of left ring finger	14
12. Loss of right ring finger	17
13. Loss of left little finger	32
14. Loss of right little finger	34
15. Loss of left thumb and one or more fingers left hand	14
16. Loss of thumb and one or more fingers right hand ..	17
17. Loss of two or more fingers left hand	63
18. Loss of two or more fingers right hand	66
19. Loss of one phalanx of finger of left thumb	55
20. Loss of one phalanx of finger of right thumb.....	62
21. Loss of phalanx of left index	83
22. Loss of phalanx of right index	93
23. Loss of phalanx of left middle finger	52
24. Loss of phalanx of right middle finger	53
25. Loss of phalanx of ring finger left hand	25
26. Loss of phalanx of ring finger right hand	19
27. Loss of phalanx of left little finger	18
28. Loss of phalanx of right little finger	17
29. Loss of fingers accompanied by injuries of other fingers left hand	172
30. Loss of fingers accompanied by injuries of other fingers right hand	173
31. Loss of one leg	129
32. Loss of both legs	3
33. Loss of toes	57
34. One eye	465
35. Loss of one eye with injury to the other	62
36. Loss of both eyes	24
Total	<hr/> 2,323

WORKMEN'S COMPENSATION CLAIM RESERVES. 103

Total permanent disability other than dismemberments..	110	110
Partial permanent disability other than dismemberments, leading to disability of.....	2,442	2,442
1-10 per cent.	672	
11-20 per cent.	728	
21-30 per cent.	378	
31-40 per cent.	265	
41-50 per cent.	179	
51-60 per cent.	92	
61-70 per cent.	92	
71-80 per cent.	36	
Total		2,442

Temporary Disability.

Not over 1 week	37,112	
1- 2 weeks	23,925	
2- 3 weeks	12,433	
3- 4 weeks	6,970	
4- 5 weeks	4,427	
5- 6 weeks	2,732	
6- 7 weeks	1,695	
7- 8 weeks	1,130	
8- 9 weeks	942	
9-10 weeks	565	
10-11 weeks	471	
11-12 weeks	377	
12-13 weeks	283	
13-26 weeks	933	
Over 26 weeks	197	
Total		94,192
		<u>100,000</u>

Since this table embraces *all* accidents, whether considerable or not, if it is found to be defective, it is likely chiefly to be in underestimating the proportion of the temporary disabilities, *of which notice* is given, which will become compensatable. The fact that compensation is not payable for the first two weeks will be found to make a material difference in the number of trivial accidents for which notice will be received.

The checking of the first three months' experience of the State Workmen's Compensation Commission with this table, the results of which Mr. Woodward, Actuary of the Commission, has kindly supplied me, is strongly confirmatory of the Rubinow distribution in all regards but this. It runs as follows:

	No. Cases (Rubinow).	No. Cases (Actual).
Fatal	16	16
Dismemberments	42	44
Total permanent—not dismemberments ..	2	1
Partial permanent—not dismemberments.	44	0
Temporary total—not compensatable	1,098	1,014
Temporary total—compensatable	598	725
	<u>1,800</u>	<u>1,800</u>

Should this prove, upon further test, to call for modifications of the Standard Table in this regard, of course Dr. Rubinow will introduce them; and, indeed, they should be made as early as practicable and if possible before the table comes into use. It will not in my opinion modify the average further durations beyond two weeks but only the proportion of the disabilities of which notice is received, which reach the third week.

The use to which this table can be put, I am confident, under the compensation law of a given state, is to estimate the average amount of claim per accident, irrespective of kind, for which notice is received.

The process would be as follows: Enter opposite "Fatal cases—932," the aggregate claims thereunder, i. e., 932 times the average claim; opposite "Loss of left arm—64," the aggregate claims thereunder, i. e., 64 times the average claim; and so on. The sum of these aggregate claims would then be the cost per 100,000 accidents noticed under the law and, when divided by 100,000, the average cost per accident.

Then, for reserve purposes, this can be multiplied by the number of notices received, no claims filed, increased by the computed number for which no notice is received, which will yield the reserve to provide for the payment of awards because of such accidents.

Reserve for medical services should be computed according to actual experience and added to this total.

SPECIAL COMMENTS.

The foregoing, except as regards pensions to widows, children and other dependents, is not presented as definitive, though I am of the opinion that the method of using average further durations for reserves for temporary disabilities should be adopted without further delay than is unavoidable.

To the end that no insurance company by failing may bring discredit upon all, it is of the highest importance that claim reserves be ample. The British makeshifts in this regard will not

answer; much less will the makeshifts which we have been compelled to use in employers' liability insurance for want of anything better.

American companies must not permit the insufficiency of their reserves to shake the confidence of the public; unlike in Great Britain, there is here a strong tendency to substitute public insurance.

That one who is, on principle, in favor of a public way of dealing with this matter, should give utterance to this warning, may seem singular; but no one desires, less than myself, a victory for public insurance by reason of claim-reserves being insufficient and thereby disabled workmen, widows, children and other dependents being deprived of support.

To avoid even a single instance of this should be the care of all the members of this Society, of managers of companies and of state insurance and compensation officials. It can only be avoided:

1. By making sure that the claim-reserves are ample and the method of computing them free from the exercise of discretion by the company or the valuer.
2. By obtaining legislation making this claim reserve fund a trust fund for the claimants and either separately invested or otherwise a first lien on all assets.

At the present time, under an opinion of the Attorney General, the *premium-reserve* is now held to have such a prior claim upon the assets and only the surplus of assets over such premium reserve can, in event of insolvency, be applied to pay these and other debts of the company. Certainly this must be reversed as regards workmen's compensation claims or a great scandal will one day come which will prejudice all the companies, sound as well as unsound, with the public, irredeemably.

THE NEW YORK STATE STANDARDS FOR 1915.*

Since the foregoing was written, the announcement by the New York Insurance Department of the standards for computing reserves as of December 31, 1914, has come to my notice.

* EDITOR'S NOTE: Mr. Dawson refers to the following circular of the New York State Insurance Department, issued under date of January 12, 1915.

"CIRCULAR TO
MUTUAL LIABILITY AND WORKMEN'S COMPENSATION
INSURANCE CORPORATIONS

I. LOSS RESERVES

"The workmen's compensation loss reserves for mutual employers' liability and workmen's compensation insurance corporations are to be determined on the basis of an analysis of the accidents which have occurred up to and including December 31st, 1914. All references to the law refer to the Workmen's Compensation Act of New York State.

"All notices of accidents shall be classified as follows:

1. *Death*.—This requires no explanation.
2. *Permanent Total Disability*.—As per subdivision 1 of Section 15 of the law.
3. *Permanent Partial Disability (Dismemberment)*.—As per subdivision 3 of Section 15 of the law.
4. *Permanent Partial Disability (Not Dismemberment)*.—This covers cases where the injured has suffered a partial loss of earning power which probably will be permanent in character.
5. *Temporary Total Disability*.—Include in this class those accidents causing total disability lasting more than two weeks.
6. *Temporary Partial Disability*.—Include in this class accidents resulting in a temporary loss of earning power in accordance with subdivision 4 of Section 15 of the law.
7. *Medical*.—Eliminate cases arising under policies which do not provide medical aid. The remaining cases should be divided into two groups:
 - (a) cases entitled to compensation.
 - (b) cases not entitled to compensation.

"In arriving at the amounts of reserve to be held in respect to each of the foregoing classes of accidents, the following method is to be used:

"1. *Death*.—The present value of death cases is to be computed on the basis of the Danish Survivorship Annuitants Table of Mortality, the remarriage rate of the Dutch Royal Insurance Institution, and 3½ per cent. interest. In cases known not to involve dependency, a funeral benefit of \$100 is to be carried into the reserve unless the benefit has already been paid in cash. The department will furnish present values in death cases upon receipt of the necessary data as to each such case. This must include a statement of the name and wages of the deceased, together with the age and relationship of dependents.

"2. *Permanent Total Disability*.—Where the description of the injury indicates that total permanent disability will probably result, the amount to be set aside as reserve is the present value of a life annuity for the amount of annual compensation, computed according to the Danish Survivorship Table of Mortality with 3½ per cent. interest. The department will furnish present values upon receipt of information with reference to the name and wages of the injured employee and the age at date of injury.

"3. *Permanent Partial Disability (Dismemberment)*.—These cases are to be valued in accordance with subdivision 3 of Section 15 of the law.

"4. *Permanent Partial Disability (Not Dismemberment)*.—Cases of this character are to be valued upon the same basis as permanent total disability cases, and in accordance with the last paragraph of subdivision 3 of Section 15 of the law.

"5. *Temporary Total Disability*.—All cases of this nature which have occurred, regardless of whether anything has been paid thereon, are to be valued at \$75.00 each. From the total deduct compensation actually paid up to December 31, 1914. The remainder is the reserve for this class.

"6. *Temporary Partial Disability*.—All cases of this nature which have occurred, regardless of whether anything has been paid thereon, are to be valued at \$25.00 each. From the total deduct compensation actually paid up to December 31, 1914. The remainder is the reserve for this class.

"7. *Medical*.

(a) *Cases Entitled to Compensation*.—Multiply each case in this class by \$30.00. From the total deduct payments actually made up to December 31, 1914. The remainder is the reserve for this class.

(b) *Cases Not Entitled to Compensation*.—Multiply each case in this class, where any or all of the medical cost has not been paid prior to December 31, 1914, by \$5.00. This total is the reserve.

"II. SPECIAL RESERVE.

"Companies which have not made provision for reinsurance of the catastrophe hazard are required to maintain a special reserve, equal to 10 per cent. of their earned premiums.

"III. UNEARNED PREMIUM RESERVES.

"The unearned premium is to be calculated in accordance with section 86 of the Insurance Law, which contemplates an actual pro rata computation based upon actual time during which the policies have been in force on December 31, 1914. The department will accept, however, a statement of the unearned premium reserve calculated upon the monthly pro rata basis. Any policies which may have been dated as of midnight, June 30th, 1914, to cover the employer's liability for workmen's compensation, are to be treated as if such policies had been dated July 1st.

"IV. PUBLIC LIABILITY.

"The loss reserves on public liability policies shall be computed in accordance with the provisions of Section 86 of the Insurance Law.

"V. AUTOMOBILE AND TEAMS PROPERTY DAMAGE AND COLLISION.

"The loss reserves on these classes of business shall be based on specific estimates of the individual outstanding claims."

The foregoing instructions were amended as follows, January 19, 1915.

"Paragraph 5 is changed to read:

"5. *Temporary Total Disability*. Include in this class those accidents which have already caused, or which probably will cause, total disability lasting more than two weeks.

“Insert after Paragraph 7 a new paragraph as follows:

“8. *All Other Notices.* This group should include those notices which do not properly fall into any one of the foregoing groups. These cases will be trivial in character and will not involve payment of medical or compensation benefits, hence there will be no reserve charged against this group.

“Rule 7 (b) is changed to read:

“7. *Medical.*

(b) *Cases Not Entitled to Compensation.* Multiply each case in this class where any or all of the medical cost has not been paid up to December 31, 1914, by \$5.00. From the total deduct medical cost actually paid up to December 31, 1914, on such cases. The remainder is the reserve for this class.”

As regards claim reserves in all cases where awards have been made, the announcement is exactly in accord with the foregoing, as regards reserves on account of claims arising under the New York law because of death, permanent total disability, permanent partial disability other than dismemberment, and dismemberment.

For the temporary total disability, \$75 is charged for each case yet in progress and the aggregate sum already paid upon all these cases is deducted from the aggregate thus charged.

For temporary partial disability, \$25 is charged for each case and the aggregate paid deducted from the aggregate charged.

In view of the fact that the law has been but six months in operation, it is perhaps impracticable to put the more accurate and scientific method for computing these reserves, which has been recommended in this paper, into practice as regards “all notices of accidents,” i. e., “of the accidents which have occurred up to and including December 31, 1914.” It will be recalled that earlier in this paper, a distinction has been made by me between (a) awards, (b) notices of claims, not yet ripened into awards and (c) notices of accidents, notices of claims not yet due or received; and that the method of determining reserves by classes seemed applicable only to the first and (with the precaution of treating the amount claimed, unless clearly mistaken, as the probable award) to the second and not at all to the third,

It may be that \$75 per notice will cover *the entire liability* (other than medical) under notices of accident; but if so (eliminating cases of instant death or dismemberment), it must also provide for death-claims and permanent disability claims, both total and partial, that may follow temporary disability.

The charge per case, ignoring classes, is really not at all justified when awards, determining the weekly compensation, have been made; nor indeed when notices of claim, specifying amounts, have been filed; but for cases of notices of accident, only, it is the reasonable method, except that the determination of the proper amount should be arrived at, by computing the cost of an average claim of every kind that can arise under a notice.

The change to such a system from that which has been adopted, can easily be made next year and will be made, of course, if the present rule is treated as tentative and temporary.

The department deserves credit for taking the matter up so promptly and dealing with it, upon the whole, so successfully.* But why is it implied in the language of the circular that this method is to be used only in valuing claims arising under the New York law? It is true that in other states death-claims are payable only for fixed or limited terms; but the same principles apply precisely as they always do to term and limited annuities alike. Then why not use the same standards? Does not uniformity of reserve standards in general call for this? Will it be assumed that present values to secure annuities to California widows will earn higher interest or that they will die or, if that be involved, remarry at a higher or lower rate than New York widows? Is not the sole difference the term limited to a given number of years?

In other words, alteration in formulas is of course requisite; but the methods and standards are, *mutatis mutandis*, applicable to claims under the laws of every state.

* The chief want of success may be found, very likely, in the round amount per case charged for reserve for temporary disabilities and yet more in the method. The following is the rule as laid down by the Insurance Department:

“Temporary Total Disability.—All cases of this nature *which have occurred*, regardless of whether anything has been paid thereon, are to be valued at \$75 each. From the total deduct compensation actually paid up to December 31, 1914. The remainder is the reserve for this class.”

Making use of Dr. Rubinow's Table of Standard Distribution of Accidents and of the Table of Average Further Durations of Temporary Disabilities which I have deduced therefrom and given in this paper, I have made the following computations to show the average liability *per continuing notice or claim* (for I assume that the words “*which have occurred*,” in the Department rule, can have no reference to disabilities that are at an end, but only to those in progress) on the basis that the average claim is for \$10 per week, probably a somewhat high average:

COMPUTATION OF AVERAGE RESERVE.

Temporary Disability.

(Assume 94,192 notices of temporary disability at the beginning of each week.)

	Average Liability
At outset 94,192 notices to produce 33,155 claims of \$31.60 each	11.12
End of 1 week also 57,080 disabilities yet in progress, i. e., 151,272 to produce 66,310 of \$31.60 each	13.85
End of 2 weeks also 33,155 claims for same amount, i. e., 184,427 producing 99,465 of \$31.60 each	17.04
End of 3 weeks also 20,722 claims for \$40.50 = 205,149 in all for \$3,982,235 in all	19.42
End of 4 weeks also 13,752 claims for \$51.10 = 218,901 in all for \$4,684,962 in all	21.40
End of 5 weeks also 9,325 claims for \$65.30 = 228,226 in all for \$5,293,885 in all	23.20
End of 6 weeks also 6,593 claims for \$82.40 = 234,819 in all for \$5,837,148 in all	24.86
End of 7 weeks also 4,898 claims for \$100.90 = 239,717 in all for \$6,331,356 in all	26.41
End of 8 weeks also 3,768 claims for \$121.10 = 243,485 in all for \$6,787,661 in all	27.88
End of 9 weeks also 2,826 claims for \$151.50 = 246,311 in all for \$7,215,800 in all	29.30
End of 10 weeks also 2,261 claims for \$179.30 = 248,572 in all for \$7,621,197 in all	30.88
End of 11 weeks also 1,790 claims for \$216.50 = 250,362 in all for \$8,008,732 in all	31.99
End of 12 weeks also 1,413 claims for \$264.30 = 251,775 in all for \$8,382,388 in all	33.29
End of 13 weeks also 1,130 claims for \$295.50 = 252,905 in all for \$8,716,303 in all	34.46
End of 26 weeks also 197 claims for \$1,500.00 = 254,102 in all for \$9,011,803 in all	35.46

That is, after being 26 weeks in operation, the average liability upon each continuing disability would in such case be, under the New York law, \$35.46 instead of \$75.00, the amount named by the Department.

But (which is most important) it would not be a diminishing sum but up to that point a constantly increasing sum and beyond that period a level sum, if an equal number of notices of claim were received each week.

That, if properly computed, the average sum charged should not be reduced by crediting payments is indicated by the following transformation of the Table of Average Further Durations of Temporary Disabilities into a table of "average further costs of compensation at \$10.00 weekly per

case," making suitable changes because no compensation is paid for the first two weeks:

Time Elapsed.	Average Further Cost.
Day of accident	\$ 11.12
1 week	13.85
2 weeks	31.60
3 weeks	40.50
4 weeks	51.10
5 weeks	65.30
6 weeks	82.40
7 weeks	100.90
8 weeks	121.10
9 weeks	151.50
10 weeks	179.30
11 weeks	216.50
12 weeks	264.30
13 weeks	295.50
26 weeks	1,500.00

That is, each disability *averages* to involve a larger, not a smaller, outlay in future, the longer it has continued already, subject to these limits. Probably all claims of more than 26 weeks duration should be valued as life or term annuities as set forth in this paper.

If the amount charged per disability were truly applied to "all cases of this nature that have occurred," including all which have already terminated, the rule would yet be applicable only as a temporary expedient. It could apply as a permanent rule only in case the amount charged were precisely correct for otherwise it would carry forward from cases entirely off the books an accumulated surplus in the reserve if the amount were too large or an accumulated deficiency if it were too small.

The amount charged per case, \$75.00, is not likely, as a temporary expedient, to prove much too large if any, especially as it is reduced by payments already made and as no other provision is made for suspended mortality among the disabled, which will result from the injuries received and for which the insurer will be liable to pay compensation.