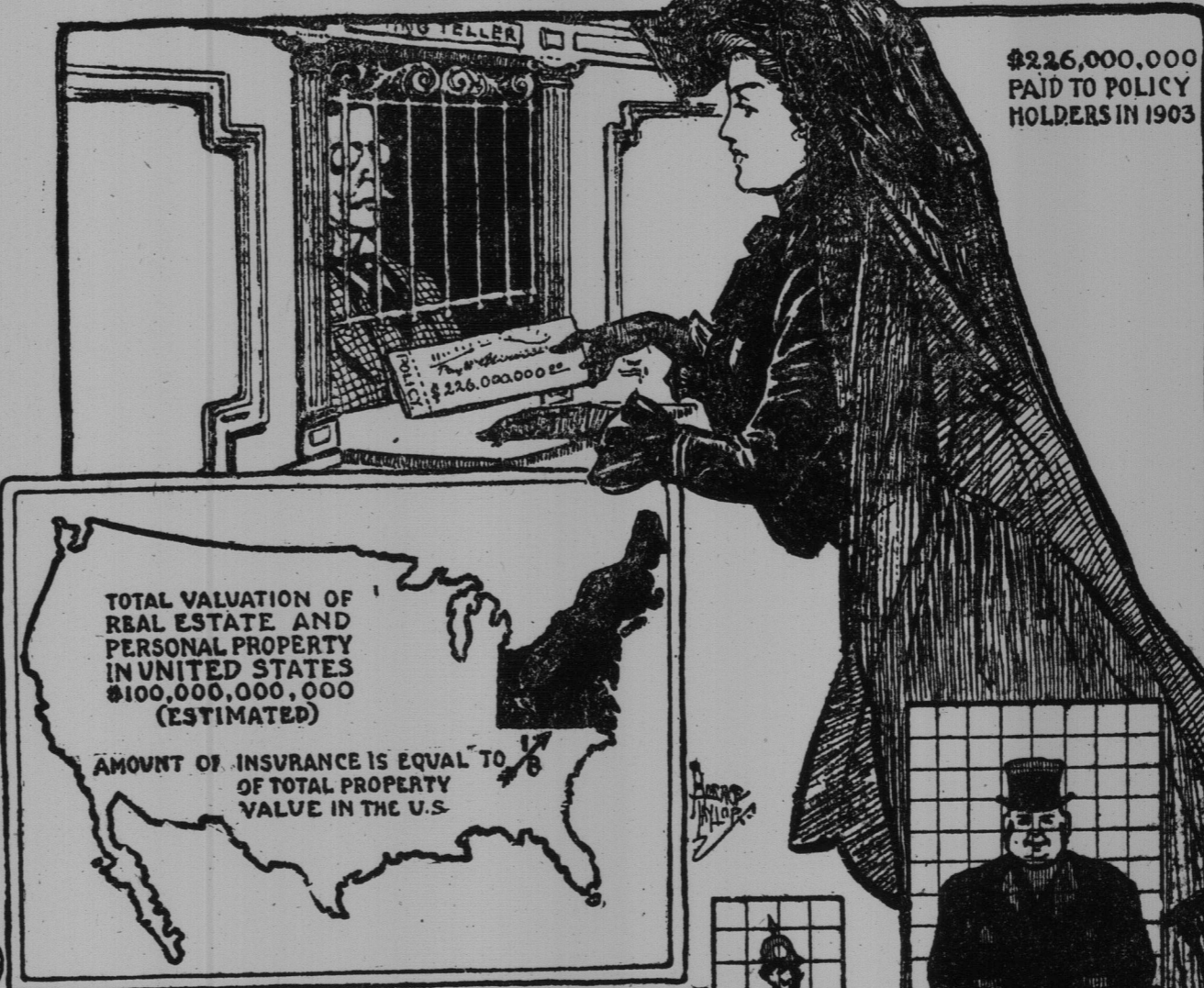


ST. JOHN STAR, SATURDAY, U. Y. 15, 1905.

WHAT LIFE INSURANCE REALLY IS



GEORGE L. NEWMAN ~ AGE 89
THE OLDEST POLICY HOLDER IN THE U.S.



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A Highly Timely Article That Will Give the Layman a Clear Idea of the Basic Principles Underlying This at Present Much Discussed Social Institution.

Just What the Mortality Table Is.

What the Premium Really Is.

What Constitutes the Reserve; Various Kinds of Policies.

BY ANTHONY J. HENSON.

For some months the entire country has been absorbed in following the amazing revelations concerning the management of one of the largest life insurance companies in the world. Everybody has been intensely interested because in the United States today there is in force nearly fifteen billion dollars' worth of life insurance. This sum is nearly twice as great as the sum which represents the total of life insurance in force in England, Germany, France and Russia, and one American company alone has policies in force aggregating four and a half times as much life insurance as is carried on by all France.

Small wonder that the country has taken a keen interest in the revelations, but there is certainly some room for wonder in the fact that right along the query has been asked on every side: "But what really is life insurance, anyway?" Not that Americans do not know the purpose of life insurance, but that the average man, even though he be a policy holder, does not comprehend the basic principles of the life insurance business, which is engaged in by the great majority of the companies doing business in the world today.

The aim of this article is to tell, as plainly and briefly as possible, what life insurance really is—to answer the question that is being asked on all sides and will be for some time to come, for the agitation over life insurance matters is a vital one in this country, as the few figures already quoted show.

In collecting the material for this exposition, the compiler has gone to various leading life insurance authorities and writers, and repeatedly the exact words of one of these authorities and his illustrations have been used with permission. So let this apology take the place of quotation marks, which otherwise would have to be liberally sprinkled throughout the article.

THE MORTALITY TABLE.

Scientific life insurance is based upon the knowledge that there is a natural law governing the mortality rate by which may be determined the average age of a large number of persons at a given age. True, it cannot be predicted in what year any particular individual will die, but it may be determined with approximate accuracy how many persons out of a given number will die at any specified age.

If the mortality records of any community are studied and the various ages noted at which the several deaths have occurred, it will be found that the yearly mortality is governed by a law which is practically invariable. Suppose, for example, that such an observation covers a period of time sufficient to include the history of 100,000 lives. Of these a certain number will be found dying at age twenty, a larger number at age thirty, and so on at the various ages, the extreme limit of life reached by any one being in the neighborhood of one hundred years.

The mortality records of other communities where conditions were practically the same would give approximately the same number of deaths at each age in 100,000 persons born. The variation would not be great; and the larger the number of deaths the nearer the number of deaths at the several ages would approach to uniformity.

As a result of systematic study of mortality records, life insurance companies have incorporated the results of their computations into what are called mortality tables. These tables reveal at a glance the inexorable workings of the natural law governing the mortality of the race. They show how many in any large number of persons born will live to age thirty, how many to age forty, and how many to any other age. They also show the number that will die at each age, and the average lifetime remaining to those still alive.

By means of these mortality tables, since they contain all the necessary basic data, all the other problems pertaining to life insurance are accurately worked out. The mortality table commonly in use in this country is known as the American Experience Table of Mortality. It was based mainly upon the history of the lives insured in the oldest active American life insurance company. This table begins with 100,000 persons at age ten and fixes the limit of life at ninety-six years, the attained age at which the last three of the original 100,000 will die.

For many years past it has been a comparatively easy matter to construct mortality tables, since all civilized communities see to it that records of births and deaths are rigorously kept; and, in addition, the bigger life insurance companies have elaborated systems of their own by which they keep posted on the workings of the law of mortality in the various communities in which they do business. So it may be said, without fear of contradiction, that the mortality tables of today show with startling accuracy the operation of the law of mortality, and make that life insurance, based upon this law of mortality, an exact science.

Now, let us see how the net premium is computed.

For purposes of demonstration, suppose there has been organized a life insurance company with a number of members equal to the number of persons out of 100,000 that the mortality table commonly in use in this country shows will be alive at the age of thirty-five. This number is 81,822; and each member is insured for \$1,000. The payable at death, holding what is termed an ordinary life policy, the premium to be paid yearly until death, the mortality table shows it will be twenty years, only the simplest sort of mathematics would be required to find the net premium. Of if the company could start out on the day of its organization with \$81,822,000 in hand, the total face value of all the policies, the life insurance business would be a very simple one. But the money is to come in yearly installments; therefore, it is necessary to know how much money this company of 100,000 members will have to have on hand from year to year to meet the death claims that the mortality table shows it will be called upon to meet each year.

According to the mortality table, all of these 81,822 members will have died within the next sixty-one years, since all are thirty-five years of age. It is impossible to know when any particular member will die, or how long he will live. The amount that each member should pay, therefore, cannot be determined by means of a computation based upon a single life, as would be the case if it were known definitely that each of the 81,822 members would live twenty years and then die.

But if it is not known how long any one individual will live, it is known how long certain groups of members will live. For example, the mortality table at age 35 shows that 733 of the 81,822 members of the company will live only one year; that 812 will live ten years, to age 45; 1,470 will live fifty years, to age 85; and that the last three will live sixty-one years, to age 96. The computations must be based, therefore, upon the aggregate number of lives—upon the length of time the members will live as a body, as shown in the case of these several groups of the mortality table.

As 812 members will die during or at the end of the tenth year, at the attained age of 45, \$812,000 will be needed in the tenth year to pay the 812 policies, each calling for \$1,000. But as the law generally permits life insurance companies to assume that their funds will earn money at the rate of 3-1/2 per cent. compound interest, it is necessary to have in hand now only a sum sufficient to amount to \$812,000 in ten years at this rate.

At this rate of interest, the present worth of \$812,000, due in ten years, is \$575,636.80. With this sum in hand and safely invested it is mathematically certain that the company will be able to pay the losses of the tenth year.

The mortality table also shows that in the twentieth year, at age fifty-four, there will be 1,141 deaths calling for the payment in that year of \$1,141,000. The present worth of that sum is \$574,471.80. There will be 732 deaths in one year, is \$732,000.

In like manner, it can be determined what the losses will be for each year to the last, the sixty-first, when the death claims will aggregate \$5,000. So also can be computed the present worth of the amount which will be needed in each year to pay all the losses of each year until the very last year, when the three surviving members will die. Three hundred and sixty-seven dollars and ninety-three cents or hand today will amount in sixty-one years to \$3,000, a sum sufficient to pay in full the policies of the last three of the original 81,822 members of the company. The total losses in the sixty-one years, when the last three policy holders die, will be \$81,822,000. The total present worth of the combined losses is \$3,319,142.10. With this amount on hand today, assuming that the same will earn 3-1/2 per cent. compound interest, the company will have funds sufficient for the payment of every loss that can possibly occur in any year until the sum of three members die, in the ninety-sixth year of their age.

This amount, divided by 81,822, the number of persons originally insured in the company, gives \$37.55. In other words, if each member of the company will pay in cash the sum of \$37.55, the company will have at date of organization a total of \$3,019,142.10, and this sum, plus the interest it will earn, will be sufficient to pay every existing policy in full as the several deaths occur.

This \$37.55 is termed the net single premium. It is the net amount, without provision for expenses, which a man at the age of thirty-five should pay for a full paid ordinary life policy of \$1,000.

Thus, it is seen that in life insurance the larger part of the money used in paying losses comes from interest.

The net single premium having been deposited, no further payments would be required. Most men, however, would find it inconvenient to pay for their life insurance in a lump sum; that is, to take out full-paid, or paid-up policies. But by means of a comparatively simple mathematical process, the net single premium may be apportioned into equivalent yearly payments to be made by the insured during life.

THE NET ANNUAL PREMIUM.

The first step necessary in finding the net annual premium is to compute the value of a life annuity.

An annuity is a specified sum of money to be paid yearly to some designated person. The one to whom the money is to be paid is termed the annuitant. If the payment is to be made every year until the annuitant dies, it is termed a life annuity. The amount of yearly income or annuity which can be purchased with \$1,000, say, will naturally depend upon the age of the annuitant. One thousand dollars will buy a larger income for a man of 60 than for one of 25 years, because the former has on an average a much shorter time to live. The net cost of an annuity amounting to be paid therefore in one sum—is termed the value of the annuity. Like the net single premium of life insurance, it is determined by means of the mortality table.

Suppose each of 81,822 persons each 35 years of age wish to take out a life annuity of \$1.00 and the first payment is to be made immediately on issuance of the contract. The first step is to ascertain the net amount that the company should charge for a life annuity of \$1 in order that its funds would be sufficient to pay every annuity until the last three members die in the sixty-first year.

On the day the contracts are made the company must pay out \$81,822 in annuities. During the ensuing year, according to the mortality table, 732 annuitants will die after having received only one payment apiece; thus, \$1,000 persons will be living on the first day of the second year to receive a payment of \$1 each, and that day the company will only need a total of \$81,000 on hand to meet all claims. The present worth of that sum, at the age of 35, is \$78,240.16. This is the sum which the company really should have in its possession today to pay the \$81,000 annuities on the first day of the second year.

In like manner, the amount necessary to have on hand to meet payments at the end of every one of the sixty-one years can be ascertained. The present worth of the sum necessary to pay the last three annuities on the first day of the sixty-first year is a fraction over 12 cents; and the present worth of the total of 2,641,618 annuities to be paid from year to year to an ever decreasing number of annuitants is \$1,521,707.42. By dividing the amount of the present worth of the annuities by \$1,822, the value of a life annuity at the age of 35 is found to be \$18.61.

So, \$18.61 paid down in one sum is the exact equivalent at the age of 35 of the payment of \$1 at the beginning of each year during life. It has been seen that the net single premium for \$1,000 ordinary life insurance at the age of 35 is \$37.55. As \$18.61 is the mathematical equivalent of one dollar to be paid annually for life, then \$37.55 must be the mathematical equivalent of as many dollars to be paid yearly during life as \$18.61 is contained in \$37.55, which is 2.015 times. Therefore, \$18.61, paid at the beginning of each year during life, is the exact equivalent of the net single premium of \$37.55, and is the net annual premium of an ordinary life policy of \$1,000 at age 35.

THE PREMIUM FOR EACH AGE.

In similar fashion the net annual premium can be scientifically computed for any certain number of persons at any given age. For example, for the 74,055 persons out of 100,000 who will be living at the beginning of the forty-fifth year, according to the mortality table, and it is easy to understand why with each year of increasing age this net annual premium must be proportionately larger, if the company is to have the funds with which to pay all death claims without making assessments from time to time, or depending on the premiums of new members to meet the death claims of old members.

The net premium, plus the annual loading, gives the gross annual premium, which is popularly called simply the premium. The premium is often paid semi-annually and quarterly, and sometimes monthly and weekly. Paid in any of these ways, interest charges are added, so that the company will be certain of its interest money, wherewith to help meet losses as they occur.

PREMIUMS OF DIFFERENT KINDS OF POLICIES.

The premiums of the different sorts of policies now issued (there is an infinite number of them) are all based on the net single premium of the ordinary, or whole, life policy, which covers the whole period of life. All other policies are but variations of this one, and hence, their premiums are but variations of the premium of the ordinary life policy.

One of the common variations of the ordinary life policy is the limited payment life policy. When ten premiums only are to be paid, it is a ten payment life; if twenty premiums, a twenty payment life, and so on. To determine the net single premium of a twenty payment life policy of \$1,000, at any given age, divide the net single premium of an ordinary life policy known as the net single premium of \$1,000 at the same age by the value of a temporary annuity of \$1.00 terminating in twenty years. A temporary annuity, like a life annuity, terminates on the death of the annuitant, but unlike a life annuity, it must terminate as well when a specific number of payments have been made—as, for example, when ten payments have been made—even though the annuitant is still living. The value of a temporary annuity is computed in a manner similar to that of a life annuity.

TERM INSURANCE.

Term insurance is taken out when life insurance is desired for the protection it will give during a specified period pending the development of a business enterprise, the maturing of a debt, and so on. If the insured dies within the period named in the policy, the policy will be paid. If he lives longer than that period, he will be paid nothing at any time. Term policies may be for any number of years. To find out the net single premium for \$1,822 ten-year term policies issued to the same number of men all at age 35 years it is only necessary to find out (as in the case of the ordinary life computation) the present worth of the amount of money needed to meet the death losses that the mortality table shows will occur during the period covered by the contracts, and proceed as before. The persons who are living after the tenth year are not taken into consideration. Accordingly to the very terms of their policies, these 74,173 survivors, although they pay premiums yearly for ten years, will receive nothing except the protection the insurance affords them during a trying period at an exceedingly low rate.

ENDOWMENT INSURANCE.

One of the most popular forms of insurance today is endowment insurance. It has been devised for the person who may wish to make some provision for his own future, as well as for the future of his dependents. An endowment policy is one which is payable to the insured himself if he lives through a specified number of years or to a stated age, so payable to his beneficiary in the event of his death before the specified period.

This policy is a combination of term insurance and pure endowment. A pure endowment policy is payable only to a person who lives to complete the endowment period, and those who die before that time get nothing.

At age thirty-five each of the 81,822 members of a company takes out a ten-year pure endowment policy of \$1,000. During the next ten years the 74,499 members who die will receive nothing. At the end of that period, 74,173 survivors will be paid a total of \$74,173,000. Find the present worth of this sum and proceed as in computing the net single and net annual premiums for ordinary life.

The net single premium for such an endowment policy is \$852.54. This amount in ten years at 3 1/2 per cent. compound interest will amount to only \$906.52 instead of the face value of the policy, \$1,000. This difference is made up by the premiums forfeited by the members who die during the term, and who get nothing. Here comes in what is known as forfeitures in life insurance.

To obtain the net single premium of the more popular form of endowment, known as the ten-year and twenty-year endowment, suppose that each of the 81,822 members of the company, besides carrying pure endowment policies, also carry term insurance of like amount, covering the same period of ten years. Then each of the 74,499 persons who die during the ten years will receive \$1,000, and thus, by combining the premium of a term policy with that of a pure endowment policy, the net single premium of a regular endowment is obtained.

There are innumerable other forms of policies, but these are representative, and suffice to show how the premiums of all policies result from computations based upon the mortality table and the expenses incident to the running of a life insurance company.

THE RESERVE.

The reserve in life insurance is simply the insurance fund or mortality fund of the company, from which all death claims are paid. The reserve is made up of the net annual premiums and the money these premiums will earn at 3 1/2 per cent. compound interest, and the money these premiums will interest thereon can be devoted under the law to any other use than to the payment of death claims.

A life insurance company has just begun business with 81,822 members each at age 35, and each holding an ordinary life policy for \$1,000. It has been found that the net annual premium for this sum and kind of policy is \$19.91. This amount, collected from each policy holder at the beginning of the first year, totals \$1,638,651.42. Twelve months' interest on this sum brings the total to \$1,685,861.64. There will be 732 deaths during the first year of business calling for a total death claim payment of \$732,000. Thus the balance at the end of the first year will be \$953,861.64. The sum on hand at the beginning of the year is called the initial reserve, and the balance at the end of the year the terminal reserve. In the first year of a company's existence the initial reserve consists of the net premiums only, after that the initial reserve consists of the net premiums plus the interest thereon.