MORTUARY EXPERIENCE

OF

THE MUTUAL LIFE

INSURANCE COMPANY OF NEW YORK,

WITH

TABULATED REPORTS

AND

AN ANALYSIS OF THE CAUSES OF DEATH,

BY

G. S. WINSTON, M.D., W. R. GILLETTE, M.D.,
E. J. MARSH, M.D.

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TO THE POLICY-HOLDERS

OF THE

Mutual Life Insurance Co. of New York,

AND OTHERS INTERESTED IN THE SCIENCE OF LIFE INSURANCE.

Two years ago, this Company published its mortuary experience for thirty years, as prepared by its Medical Officers.

It contained an analysis from its records of the causes of death in the Company, the periods of insurance, and other important facts.

This record was so interesting, and of so much importance to us in the information it gave, that we then proposed and promised a more detailed and specific study of our experience, to be developed and published in due time thereafter.

This specific study has been completed by our Medical Officers, and this volume is the result of their investigations. Of the fidelity, accuracy, and ability of this work there need be no question.

It states the various causes of death, each cause analyzed separately, examined with care, and its results exhibited.

Consumption, as a disease, occupies a large share of this volume, on account of its pre-eminent importance in our experience, over twenty per cent of all the deaths in the Company having been occasioned thereby. The effects of the presence or absence of hereditary family influences, and the physique and proportions of the consumptives, are ascertained and developed.

Next in the order of frequency, Typhoid Fever and Apoplexy are considered and analyzed, with a view to eliciting points which may aid us in our future selection of risks.

In the former published report only the proportionate rate of mortality for each disease was given. Since then the report of our Actuary gives the actual number of lives exposed at each period of life, and we have therefore now been able to calculate the real rate of mortality.

Wherever practicable, a comparison has been drawn between the mortality rates of our insured and those of other Life Insurance Companies, and also of the adult male population of this city. The results of these comparisons will gratify our policy-holders, as they show that our endeavors to make a careful selection of the risks of the Company have been eminently successful, and that our methods of selection have been, as a rule, wise and efficient.

We have been enabled to correct the errors necessarily made in the early history of the Company, from want of experience as to risks in different localities, and will not hereafter be exposed to the results of that class of losses by epidemics peculiar to the Southern States.

This Company has now completed the period of a generation, embracing within its limit of time, it is believed, events bearing upon the lives, health, and condition of the population of the country, equal in number, variety, and importance, to any like period of its history. We have had foreign and interstate wars, pestilence in epidemic form, periods of great apparent prosperity, and revulsions both severe and long protracted. The mental and physical strain in such eventful times, with the disappointments and pecuniary embarrassments occasioned thereby, have greatly increased certain kinds of diseases and losses which have carried off large numbers of the insured.

With peace and the prospect of its continuance, and with returning prosperity, it is safe to believe that these abnormal sources of loss will measurably disappear, and that the same care and discretion in the selection of future risks, will result not less favorably in the second generation of the Company's history than in the first.

F. S. WINSTON, *President.*

NEW YORK, October, 1877.

REPORT ON CONSUMPTION.

In our Preliminary Report the mortality experience of the Company was analyzed according to causes of death, the number dying from each cause, the nativity, place of residence, and age of the deceased, and the length of time for which the insurance had run prior to each loss, and tables and diagrams were given showing clearly these various relations. Our remarks were therefore necessarily general; but in conclusion it was stated that on some future occasion it would be advisable to analyze the records of death from the more important diseases separately, in order to ascertain, as far as practicable, the constitutional characteristics to which each cause of death is most likely to attach itself, and the circumstances which are favorable to its development, endeavoring, from these considerations, to deduce rules for estimating the probability of its attacking and proving fatal to any given individual.

Such an examination and analysis is now presented. Consumption merits our first attention, for the reason that it causes more deaths and greater losses in the Company than any other disease.

The words "Consumption" and "Phthisis" are employed synonymously, defining them in the broad meaning as "a destructive disease of the lungs, generally chronic, attended with cough and emaciation."

The disease embraces several varieties, but any attempt to subdivide them would be useless, owing to the want of accuracy and minuteness in the death-certificates. In specifying the cause of death, the word "Consumption" has been generally employed; but occasionally the name is varied according to the learning and care, the diagnostic skill, and the pathological views of the certifying physician.

The following names therefore are grouped by us under the title of Consumption :

Consumption, Consumption of the Lungs, Laryngeal Consumption, Tubercular Consumption, Tuberculosis, Acute Tuberculosis, Hæmoptysis, Hemorrhage of the Lungs, Abscess of the Lungs, Disease of the Lungs, Chronic Pneumonia.

Our previous report assigned to Consumption 17.61 per cent of the total mortality in the Company's

experience; but it was there stated that a more critical examination might increase the number to twenty per cent, and this we have since found to be almost precisely the case. Further examination and reflection have convinced us that the deaths from Hæmoptysis, Abscess of the Lungs, Disease of the Lungs, Chronic Pneumonia, and a few others registered as Exhaustion, were in reality Consumption, and we have therefore transferred them to this disease, thus increasing the total number of deaths from nine hundred and twenty to one thousand and thirty-one, and the proportion from 17.61 to 19.74 per cent of the mortality from all causes. Perhaps some cases of consumption may have escaped under the designation of Bronchitis, Pleurisy, etc.; but as there have been few deaths from these diseases, the error is small, and probably compensated by similar errors of diagnosis on the other side.

This broad use of the word Consumption, and the admitted errors of diagnosis, may appear to some to invalidate these statistics, but as similar objections have been urged against the value of almost all medical statistics, this claim can only be of force when they are used for unfair comparisons, and to deduce results beyond their range of proof. Interesting

and valuable information may be obtained by comparing different series of facts as collected in statistical tables, but care should be taken to compare them only in those respects in which they are essentially similar. They must have been collected with similar care and accuracy, and under similar circumstances, or the differences must be known and allowed for. For instance, we propose presently to compare our figures with those in the Reports of the United States Census, the New York Board of Health, and the statistics of some other Life Insurance Companies. The figures representing the actual mortality in the Census reports are notoriously and inevitably inaccurate, and therefore can only be used with many allowances and within narrow limits; those of New York City are accurate in numbers, but in some other respects less reliable; while those of other Insurance Companies may be presumed to present a close resemblance to our own, with similar elements of error, having been collected under essentially the same conditions, although occasional circumstances affecting individual companies may prevent a perfect comparison.

So, too, when we examine numerous facts of personal and family history as collected from the Company's records, we shall take statements of these

facts made by a large number of individuals under precisely similar circumstances, and even allowing that they may not be absolutely correct, still the same probability of error will run through the whole series of cases, and therefore cannot interfere with the comparison which it is proposed to make.

PREVALENCE.

The great prevalence of Consumption in all parts of Europe and the United States is acknowledged in the writings of physicians, and verified by the mortality statistics of different nations. It is difficult, however, to ascertain its actual and comparative frequency in different cities and countries from the want of accurate statistics. Calculations have been made and tables have been compiled from the most trustworthy authorities and statistics, by Schnepp,* Oesterlen,† and others; but the sources of information are of very unequal value, and generally far from accurate.

* Archives Générales de Médecine, Juin, 1865.

† Oesterlen, Handbuch der Medicinischen Statistik, p. 375.

They agree in showing the extreme frequency of this disease in all civilized countries. As a general estimate, it may be said that Consumption is a cause of death in from 10 to 15 per cent of those dying from all diseases, and that it annually destroys about 35 in every 10,000 adult inhabitants. Niemeyer* says: "It is supposed that from a seventh to a fifth of all deaths are the results of this disease, and that in nearly the half of all cadavers we find traces of the nutritive disorders from which pulmonary consumption proceeds."

The mortality reports of New York City have an established reputation for completeness and accuracy, and we shall therefore make use of them as the standard for estimating the prevalence of Consumption among the population at large, while recognizing the probability that the disease may be more frequent in this city than in the rural districts or other sections of the country. To compare these statistics, however, with the experience of our Company, we must make due allowance for the limitations of sex and age among the insured, and must not compare this special class with a mixed population of males and females, adults

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* Text-book of Practical Medicine, Vol. i., p. 216.

and children. For instance, we said above that Consumption occasioned from 10 to 15 per cent of the deaths from all causes. A very large proportion, however (nearly 50 per cent) of this total mortality is made up of deaths of young children, among whom Consumption is rarely a cause of death; calculating the proportion for adults alone, it reaches nearly 30 per cent, or, in other words, *nearly one third of all the deaths occurring among adult males* (*in New York City*) *are caused by Consumption.* According to the United States Census of 1870, the proportion for the entire country is about one fourth, but the Census figures are less reliable than those above.

Since, then, Consumption is so frequent a cause of death, Life Insurance Companies must expect to have some of their insured die from this disease, although they may hope, by proper care, to make the numbers small. To this end, very earnest efforts have been directed by the adoption of stringent rules, and the publication of minute instructions to Medical Examiners. And this precaution has been merited not only by the frequency and fatality of the disease, but also by the fact of its great prevalence among the young, on whom the losses to the Company are of course heaviest.

A reduction of the Consumption mortality of the insured below that of the population at large may properly be expected, by the rejection of all persons already in the pronounced stages of the disease, who of course would scarcely offer themselves for insurance; by the detection and consequent exclusion of those in the earliest stages of the disease by the Medical Examiner; and, finally, by the more difficult elimination of those who may be suspected of liability to Consumption by reason of an existing predisposition, as indicated either by inheritance, physical development, or injurious habits and occupations.

The following table shows the amount of the Consumption mortality occurring among the adult male population of New York City and the insured in this Company:

TABLE I.

SHOWING THE MORTALITY FROM CONSUMPTION IN NEW YORK CITY AND IN THE MUTUAL LIFE.

	Percentage of Consumption to total Mortality.	Annual Number of Deaths from Consumption in 10,000 Lives.
New York.....	29.38	73
Mutual Life Insurance Co..	19.74	19

We here find a considerable decrease in the proportion of Consumption to the general mortality, and a very remarkable decrease in the number of deaths among a given number of individuals. The disproportion is much greater than can be accounted for by the first named cause, and indicates the beneficial results of careful medical selection.

It is proposed to consider first the Age, Nativity, Residence, and Duration of Insurance as bearing upon Consumption. These subjects were partially discussed in our former report, but it is necessary to tabulate the cases anew, on account of the addition made to their number, and in some instances to elaborate remarks thereon in accordance with the importance of the subject.

AGE.

THE following Tables II. and III. show the number dying of Consumption at each year and decennial period of life:

TABLE II.

TABLE SHOWING THE NUMBER OF DEATHS FROM CONSUMPTION AT EACH YEAR OF LIFE, IN THE EXPERIENCE OF THE MUTUAL LIFE INSURANCE COMPANY.

Age at Death.	Number of Deaths.	Age at Death.	Number of Deaths.	Age at Death.	Number of Deaths.
20	6	40	32	60	9
21	4	41	35	61	7
22	9	42	33	62	5
23	10	43	34	63	4
24	15	44	31	64	..
25	17	45	31	65	2
26	16	46	28	66	1
27	24	47	21	67	2
28	27	48	23	68	2
29	53	49	28	69	1
30	33	50	13	70	1
31	36	51	10	71	1
32	36	52	18	72	1
33	44	53	18	73	..
34	49	54	13	74	2
35	52	55	9	75	..
36	48	56	8	76	2
37	29	57	8		
38	37	58	10		
39	37	59	6		

TABLE III.

CONSOLIDATED FROM TABLE II. IN GROUPS OF TEN YEARS.

Age in Decennial Periods.	Number Dying from Consumption.	Age in Decennial Periods.	Number Dying from Consumption.
20 to 29 years.....	181	60 to 69 years.....	33
30 " 39 "	401	70 " 79 "	7
40 " 49 "	296	Total.....	1031
50 " 59 "	113		

It has already been shown that, in the experience of this Company, a large number of deaths from Consumption have occurred after middle life, and also that there was reason for believing that the opinion, prevailing among the laity and in the profession, concerning the great frequency of Consumption in youth, and its comparative rarity after middle life, was erroneous, as it was found to occur with very slightly, if at all, diminished frequency at the more advanced ages of life.

In demonstration of this, we will now give some statistics, drawn from the population at large. The first table is taken from the report of the United

States Census of 1870. In this, as stated before, the actual number of deaths from Consumption is undoubtedly very much smaller than it should be, owing to the method of collecting the facts; but there is every probability that the omissions are in equal proportions through all ages, and therefore the relative percentage for each age is not disturbed.

TABLE IV.

SHOWING THE MORTALITY FROM CONSUMPTION IN THE ADULT MALE POPULATION OF THE UNITED STATES, ARRANGED IN DECENNIAL PERIODS OF LIFE, FROM THE U. S. CENSUS 1870.

Age in Decennial Periods.	Male Population of the United States.	Annual Number of Deaths from Consumption.	Annual Number of Deaths from Consumption in 10,000 Living.
20 to 29 years.....	3,351,617	7,842	23
30 " 39 "	2,452,999	6,591	27
40 " 49 "	1,829,599	5,054	27
50 " 59 "	1,209,855	3,787	31
60 " 69 "	658,153	3,042	46
70 " 79 "	259,318	1,863	71
80 " 89 "	60,042	664	111

The proportion of deaths from Consumption to the living population is thus seen *increasing* steadily with each decennial period of life, from 23 per 10,000 at 20 to 30 years of age, to 27 at 30 to 50, 31 at 50 to 60, 46 at 60 to 70, 71 at 70 to 80, and 111 at 80 to 90.

The next is a similarly constructed table, drawn from the mortality records of New York City. There is no table of the city population in decennial periods of life in the United States Census of 1870, and we have therefore calculated one from the total *male* population as given in that Census, and divided into ages on the same proportion as given by the State Census of 1865. The deaths are the yearly mean of five years from 1868 to 1872 inclusive.

TABLE V.

SHOWING THE MORTALITY FROM CONSUMPTION IN THE ADULT MALE POPULATION OF NEW YORK CITY, GROUPED IN DECENNIAL PERIODS OF LIFE.

Age in Decennial Periods.	Male Population, New York City.	Annual Number of Deaths from Consumption.	Annual Number of Deaths from Consumption in 10,000 Living.
20 to 29 years.....	75,044	524	70
30 " 39 "	74,884	528	71
40 " 49 "	56,877	375	66
50 " 59 "	26,760	226	84
60 " 69 "	11,939	131	110
70 and upwards.....	3,892	59	151

In this table is found much the same result as before. The proportion of deaths is larger, as should be expected from the greater accuracy of the records, and the percentage increases in the same regular manner with advancing age, with the exception of a small decrease for the period between 40 and 50 years. In both instances the mortality from Consumption is nearly constant between the ages of 20 and 60 years, after which it very rapidly and greatly increases.

TABLE VI.

SHOWING THE ANNUAL NUMBER OF DEATHS FROM ALL CAUSES AND FROM CONSUMPTION, IN NEW YORK CITY AND IN THE MUTUAL LIFE, CALCULATED FOR 10,000 LIVING AT EACH DECENNIAL PERIOD OF LIFE.

Age in Decennial Periods.	Annual Number of Deaths among 10,000 Living at Each Age.			
	From all Causes.		From Consumption.	
	New York.	Mutual Life.	New York.	Mutual Life.
20 to 29 years.....	170	62	70	24
30 " 39 "	197	72	71	20
40 " 49 "	231	87	66	17
50 " 59 "	351	139	84	14
60 " 69 "	589	299	110	18
70 and upwards.....	1,430	699	150	30

TABLE VII.

SHOWING THE ANNUAL NUMBER OF DEATHS FROM CONSUMPTION OCCURRING AMONG ADULT MALES IN ENGLAND (FROM OESTERLEN).

Age.	Male Lives.	Deaths from Consumption.
15 to 25 years.....	10,000	33
25 " 35 "	10,000	41
35 " 45 "	10,000	40
45 " 55 "	10,000	39
55 " 65 "	10,000	37
65 " 75 "	10,000	27
75 " 85 "	10,000	11

TABLE VIII.

SHOWING THE ANNUAL NUMBER OF DEATHS FROM CONSUMPTION AMONG 10,000 INSURED AT EACH QUINQUENNIAL PERIOD OF LIFE, IN THE EXPERIENCE OF THE MUTUAL LIFE, AND OF CERTAIN GERMAN INSURANCE COMPANIES.

Age.	Proportion of Deaths from Consumption to every 10,000 Insured.	
	Mutual Life Insurance Company.	12 German Life Insurance Companies.
21 to 25 years.....	23	19
26 " 30 "	23	39
31 " 35 "	22	42
36 " 40 "	17	37
41 " 45 "	17	30
46 " 50 "	16	38
51 " 55 "	15	35
56 " 60 "	16	32
61 and upwards.....	18	32
All ages.....	18.6	35.7

These three tables differ somewhat in their representation of the actual frequency of Consumption at each period of life; but they agree in many essentials, and lead to the same conclusions, viz.: that Consumption is an extremely frequent cause of death at every period of adult life; and that there is no special prevalence of the disease in youth, but that its fatality is nearly the same at all ages from 20 to 60 years. The proportion in New York City is as follows: Out of every 10,000 inhabitants between the ages of 20 and 30 years, 70 would die annually of Consumption; from 30 to 40 years, 71; 40 to 50 years, 66; 50 to 60 years, 84. After this period, the English reports show a very decided *decrease* in the frequency of Consumption, and the American an equally decided *increase* up to extreme old age.

The tables from the population at large represent the natural law of the prevalence of Consumption more correctly than Life Insurance statistics, which are drawn from a limited class of the community. It will presently be shown that the influence of medical selection is especially perceptible at certain ages, and hence we are not surprised at finding the Life Insurance experience differing somewhat from that of the

city population. There is a much smaller proportion of deaths from Consumption at all ages, and the course of the disease attains a maximum of frequency of 24 in 10,000, between the ages of 20 and 30 years; then gradually diminishes till it reaches the figure of 14 in 10,000, between 50 and 60; and then again rapidly increases.

Table VI. indicates the difference in the annual number of deaths from all causes, and from Consumption, among an equal number of insured and non-insured. We find among the insured a general mortality of from one third to one half that of the population at large, while the mortality from Consumption alone is for the earlier years of life about one third, and for the later years about one sixth, that of the general population. This would apparently indicate that a careful selection of cases for insurance greatly diminishes the mortality below that of the general population, and that it is *of very special value in detecting those who are liable to death from Consumption.* The benefits of selection are only slight in early years, but very decided in middle age.

In Table VIII. we have placed by the side of our own experience that of several German Life Insurance

Companies, as given by Dr. Oldendorf.* These are the only figures that we have found where the proportion of deaths from Consumption has been calculated on the number insured. In the German experience nearly twice as many deaths occur from Consumption as in our own, and the disease prevails nearly equally, with irregular fluctuations, at all periods of life.

We have now proved conclusively the fallacy of the common opinion concerning the comparative frequency of Consumption in youth and its rarity at and after middle age. This erroneous idea, however, is so widely spread and firmly fixed, that we propose to quote opinions of medical writers, to show that the best authorities corroborate our conclusions.

When the accurate study and diagnosis of diseases of the lungs was first made possible by the discovery of auscultation, Laennec wrote: "The ancients thought that Phthisis made its attacks particularly between the ages of 18 and 35, and it cannot be denied that this is the period at which it is most commonly manifest, and most easily recognized. Bayle, however, found in the hospitals of Paris that it was most common from the

* Report on the Mortality from Consumption in German Life Insurance Companies.

fortieth to the fiftieth year. But no age is exempt from it. It is very frequent in old age."* Sir Thomas Watson, after quoting from the tables of Louis and Bayle, says: "You see from this account how erroneous the common notion is, that Consumption does not occur at an advanced period of life, and that a person who has reached his thirtieth or fortieth year is therefore safe from that disease." †

In our previous report, Drs. Fuller, Chambers, and Sieveking were quoted to the same effect.

Dr. Walshe, in a very elaborate statistical report on Consumption as occurring in the Brompton Hospital, states that the twenty years comprised between the ages of 15 and 35 supply nearly 67 per cent of the whole number of cases, but warns that "we must not, however, conclude that these numbers consequently exhibit the relative tendency to the disease at different ages, or, in other words, teach us *the influence of age on its generation.* In order to establish the amount of this influence, the number of phthisical persons should be compared with the total number living at each corresponding age." ‡

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* Diseases of the Chest, p. 338.

† Principles and Practice of Physic, Vol. II., p. 248.

‡ Br. and For. Med.-Chirurg. Rev., No. V., p. 226.

In 1853, Dr. Christison, in one of the earliest and best medical reports on Life Insurance mortality statistics, wrote: "Notwithstanding considerable discrepancies in the details now referred to, there is sufficient correspondence among the facts as a whole to satisfy any one that Consumption is far from being so infrequent after middle life, or even in advanced age, as had been until lately supposed."*

On the other hand, Drs. Flint, Hughes Bennett, and Niemeyer agree in stating that it is most frequent between the ages of 20 and 30 years. Niemeyer says: "Towards the period of puberty, and still more between the twentieth and thirtieth year, the malady attains its greatest frequency, becoming rarer as life advances, without becoming quite unknown even in extreme old age."†

From the foregoing quotations, it will be seen that while there has been a widespread opinion in the profession that youth is the "harvest-time for Consumption," a majority of the most observant and careful physicians have warned against this fallacy, and shown that the disease is prevalent at all periods of adult life.

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* Monthly Journal of Medical Science, Aug., 1853.

† Op. cit., vol. i., p. 216.

This prevailing but erroneous opinion has originated, as suggested by Dr. Walshe, from merely counting the number of cases occurring at each year, or period of life, without taking into consideration the number of individuals living at corresponding ages to furnish the observed number of cases. For instance, there are nearly three times as many persons living at the ages of 20 to 30 years as at 50 to 60 years, and consequently three times as many cases of Consumption at the earlier period as at the later would only indicate an equal prevalence of the disease at both periods. Moreover, the percentage of Consumption mortality to the total mortality is very great at the earlier decades of life, and this has been supposed to prove its comparative prevalence at that period. It would show this, if the other causes of death were constant at all ages, but in reality only indicates the rarity of many other causes of death, such as apoplexy, heart and kidney diseases, among the young. The increased percentage is therefore caused not by excess of Phthisis, but by the small number of other fatal diseases.

The following table gives the percentage of deaths from Consumption to the total mortality, for each decennial period, as occurring in New York City, the

Mutual Life, Scotland, and Scottish Insurance Companies:

TABLE IX.

SHOWING THE PERCENTAGE OF DEATHS BY CONSUMPTION ON THE TOTAL MORTALITY FROM ALL CAUSES, FOR EACH DECENNIAL PERIOD OF ADULT LIFE.

Age.	New York City.	Mutual Life.	Population of Scotland.	Ten Life Assurance Companies of Scotland.
20 to 29 years	40.84	37.09	47.20	33.60
30 " 39 "	35.13	28.06	33.65	24.10
40 " 49 "	28.46	19.62	22.40	13.60
50 " 59 "	23.99	10.27	14.50	7.40
60 " 69 "	18.57	6.10	6.45	2.30
70 " 79 "	12.72	5.51	1.70	.65
80 " 89 "	5.56		.35	.35

In the above there is a general similarity between all the columns of figures—namely, a very high comparative mortality in early life, diminishing steadily with advancing years. Between the insured and the uninsured the rate of decrease varies considerably, that for the insured being much the greater. For instance, between 20 and 30 years of age the proportion of

deaths from Consumption to the total mortality is nearly equal in both cases, being 40.84 per cent in New York and 37.09 in the Mutual Life; while between 60 and 70 the proportion among the insured is about one third, being 18.57 per cent for the city, and only 6.10 for the Mutual Life. This would tend to prove again that the effect of medical selection in eliminating Consumptive risks is comparatively small among the young, and much greater at and after middle age.

We have thus far examined the relation of Consumption to age by comparing the number dying of this disease with the number living, or exposed to risk at each year of life. We have found that medical selection was probably of more value in eliminating Consumption risks from Insurance Companies after middle age than in youth and early manhood. To investigate this subject more fully, we have taken the number of those entering insurance at each age (decennial groups), and ascertained the number of these who have subsequently died of Consumption.

TABLE X.

SHOWING THE NUMBER DYING OF CONSUMPTION IN EVERY 1000 ENTERING INSURANCE AT EACH DECENNIAL PERIOD OF LIFE.

Age at Insurance.	No. of Deaths from Consumption per 1000.
Under 20 years	14
20 to 29 "	13
30 " 39 "	11
40 " 49 "	8
50 " 59 "	7
60 " 69 "	7
70 " 79 "	..

We learn from this table that, of those admitted to insurance at every age, some will die of Consumption. The number is largest in early life, but considerable for all periods. Out of every thousand persons insuring below 20 years of age, 14 have died of Consumption; of those insuring between 20 and 30, 13; and the number slowly decreases until we find that, of those insured after 50 years, 7 out of every thousand have died of this disease. Hence, it would appear that it is much less easy to detect a liability to Consumption among the young than among the

middle-aged. The reason of this is not altogether apparent. It is partly due to the numerous cases of chronic Phthisis which cause death after many years' duration; partly because slightly suspicious symptoms, injurious occupations, deficient physical development, etc., which may be overlooked in a youth, under the hope of their not being firmly fixed, or certainly hurtful, have, in full manhood, established themselves as causes of premature decline. The hope that we have indulged in favor of the young man has proved to be delusive by the time middle age is reached.

These considerations have been so clearly stated by Dr. Christison, that we will give his words: "When a man has reached the age of 40 or, still more, of 50, the value of his life is much more easily judged of than at ages considerably earlier. His habits, the influence of occupation, his personal liability to disease, the constitutional infirmities of his family, and other less important circumstances, are, in general, developed by that time, and easily ascertained. Hence, a large proportion of indifferent lives, proposed for insurance about middle age, and afterwards, may be at once set aside as hazardous with very ordinary care. These swell the list of deaths from Consumption later in life in the general population, but

they are easily shunned in the practice of Insurance Companies. . . . Whatever may be the frequency of Consumption in the general population after middle life, it becomes progressively a less frequent cause of death among lives accepted for insurance at a later and later period of life, and therefore great and increasing facilities must exist for escaping Consumptive risks proposed after middle age." *

It is well known that Life Insurance Companies have ignored this fact of the prevalence of Consumption at all periods of life, and have established rules of selection based on the popular opinion that the danger of death from Consumption exists to an appreciable extent up to the middle period of life only—an opinion expressed by one medical writer as follows: "It is known that Consumption prevails more extensively between the ages of 20 and 40, and that after the subject, having an hereditary tendency, passes the age of 40, the danger that he will become affected diminishes rapidly till the age of 50 or 55, when it may be considered as practically past." The following query will therefore probably suggest itself: How happens it, that, if Life Insurance examinations have been guided by rules based on such incorrect ideas,

* Op. cit.

the companies have not suffered more seriously from their ignorance, and subsequently corrected their practice as a result of their disastrous experience? To this our answer would be: First, that the law of the constant high mortality from Consumption, at all ages, is undoubtedly true, and Insurance Companies *have* suffered serious loss from ignoring it, for we have seen that, among those insuring at advanced life, the Consumption mortality is half as great as among the young. Second, that they have been protected from greater losses, not by virtue of these rules, but in spite of them, and solely on account of the greater facility in detecting a liability to Consumption among those advanced in life; and individuals with a tendency to Consumption, who might have been insured according to the rules, have been, in practice, excluded by the examination of the physician.

NATIVITY.

To ascertain the influence of nationality as a cause of Consumption, it would be desirable to know the birthplace of all who have been insured, and the number born in each country. There is no such

classification of the insured, however, and we are therefore reduced to the mortality records. In these we can obtain the nativities, and can learn the proportion that Consumption bears to the general mortality in each national group. This will probably give us a correct idea of the predisposition of each class to Consumption.

TABLE XI.

SHOWING THE PERCENTAGE OF DEATHS FROM CONSUMPTION TO THE GENERAL MORTALITY AMONG THE INSURED, GROUPED ACCORDING TO NATIVITY.

Nativity.	Mortality from all Causes.	Consumption.	Percentage.
Total Deaths.....	5,224	1,031	19.74
United States.....	3,917	792	20.22
Germany.....	501	86	17.06
Ireland.....	238	57	23.99
England and Wales..	227	28	12.33
Scotland.....	93	16	17.20
Other Countries and Unknown.....	248	52	20.97

The natives of the United States show a slight, and the Irish a large, excess of Consumption above the average. On the other hand, the Germans and English fall below the average—the latter to a very con-

siderable extent. Whether these results depend solely upon national characteristics, or upon circumstances of age, occupation, and residence, cannot readily be determined. When the nationalities are subdivided into groups, formed on these considerations, the numbers become too small for a basis of calculation.

The same conclusions, however, have been reached by Gen. F. A. Walker, from a study of the last Census, and substantiated in part by the reports of the New York Board of Health, and we therefore regard them as correct.

RESIDENCE.

The remarks which have been made with reference to nationality apply with equal or more force to climate and place of residence. There are no means of ascertaining the number of insured living in each State, and the years of life passed there, and these facts are necessary to enable us to draw reliable conclusions as to the influence of such localities in producing disease. From the following table of the total mortality and the number of deaths from Consumption in each State may be drawn some probable conclusions. In doing so, however, it is necessary to guard

against some sources of error; for instance, certain localities attract consumptives by reason of the salubrity of the climate, and a portion of them dying there, the ratio of deaths from Consumption will be greatly increased. Under these circumstances, the mortality statistics would create a false impression, and represent a healthy region to be an especially dangerous one. Examples of this will be given presently.

TABLE XII.

SHOWING THE NUMBER OF DEATHS FROM CONSUMPTION IN EACH STATE, AND THE PROPORTION TO THE TOTAL MORTALITY.

Residence at Death.	Number of Deaths.		Percentage.
	All causes.	Consumption.	
Maine	59	16	27.1
New Hampshire	36	8	22.2
Vermont	37	13	35.1
Massachusetts	424	83	19.6
Rhode Island	73	11	15.
Connecticut	197	52	26.4
New York	1,471	290	19.72
New Jersey	330	74	22.4
Pennsylvania	406	82	20.2
Delaware	8	2	25.
Maryland	96	17	17.7
District of Columbia	27	5	18.5

TABLE **XII.**—*Continued.*

Residence at Death.	Number of Deaths.		Percentage.
	All causes.	Consumption.	
Virginia	84	15	17.8
West Virginia	13	2	15.3
North Carolina	4	1	25.
South Carolina	28	7	25.
Georgia	48	7	14.6
Florida	14	6	42.3
Alabama	31	7	22.2
Mississippi	17	2	11.8
Louisiana	42	5	11.9
Texas	19	4	21.
Ohio	284	59	20.8
Indiana	111	21	19.
Illinois	227	45	20.
Michigan	133	26	20.
Wisconsin	119	29	24.3
Iowa	71	7	9.8
Minnesota	43	20	46.5
Kentucky	68	11	16.2
Tennessee	36	4	11.1
Missouri	143	17	11.9
Arkansas	7	...	....
California	273	49	18.
Oregon	7	1	14.3
Other Western States and Territories	67	8	11.94
Canada	36	6	16.67
Foreign Countries	135	19	14.59

TABLE XIII.

SYNOPSIS OF TABLE XII.

Residence at Death.	Number of Deaths.		Percentage.
	All causes.	Consumption.	
Maine to Connecticut.....	826	183	22.15
New York	1,471	290	19.72
New Jersey, Pennsylvania, and Delaware.....	744	158	21.24
Maryland to Texas.....	423	78	18.44
Ohio, Indiana, and Illinois..	622	125	20.10
Michigan to Minnesota....	366	82	22.40
Kentucky, Tennessee, Missouri, and Arkansas.....	254	32	12.6
California and Oregon.....	280	50	17.86
Other Western States and Territories.....	67	8	11.94
Canada.....	36	6	16.67
Foreign Countries	135	19	14.59

It appears from these tables that the disease prevails with remarkable uniformity in all sections of the country, varying but slightly from the general average. The group of States—Kentucky, Tennessee, Missouri, and Arkansas—gives the lowest mortality, and one considerably below the average. The New England States are slightly above it. In the percentage for

individual States there is a wider range of difference, but this probably is accidental, on account of the small number of total deaths in each State. The greatest proportional number of deaths occurred in Florida and Minnesota, a fact explained by the reputation these States enjoy as beneficial to, and consequently a favorite resort of, consumptive patients. We have ascertained that of the 20 consumptives dying in Minnesota, only 6 were residing in the State at the date of insurance, and that of 6 dying in Florida, none were residents of the State when insured. When these 14 deaths are deducted, the Consumption mortality of Minnesota is equal to the average of that of the other States.

DURATION OF INSURANCE.

In our preliminary report we gave tables of the numbers dying from all causes, and from individual diseases, arranged according to the duration of insurance. As a result of this comparison, it was found that the proportion of Consumption mortality was very small during the first year of insurance, and after

that time rapidly increased. In addition to these tables, another is now given, in which the number of deaths is calculated upon the number of lives exposed.

TABLE XIV.

SHOWING THE NUMBER OF DEATHS FROM CONSUMPTION IN EACH YEAR OF INSURANCE.

Year of Insurance.	Deaths from Consumption.	Year of Insurance.	Deaths from Consumption.	Year of Insurance	Deaths from Consumption.
1st year....	57	12th year....	30	23d year....	4
2d "	117	13th "	21	24th "	3
3d "	133	14th "	11	25th "	4
4th "	143	15th "	10	26th "	1
5th "	116	16th "	14	27th "	2
6th "	108	17th "	13	28th "	1
7th "	61	18th "	7	29th "	1
8th "	57	19th "	7		
9th "	37	20th " ...	9		
10th "	34	21st "	2		
11th "	25	22d "	3		

TABLE XV.

CONSOLIDATED FROM TABLE XIV., AND SHOWING PROPORTION OF CONSUMPTION MORTALITY TO TOTAL MORTALITY AND TO YEARS OF LIFE EXPOSED.

Duration of Insurance.	Deaths from Consumption.	Percentage on Total Mortality.	No. of Deaths to 10,000 Years of Life Exposed.
1st year.....	57	10.67	7
2d "	117	20.07	17
3d "	133	24.19	21
4th "	143	25.49	25
5th "	116	23.73	24
6th to 10th year.....	298	22.70	28
Above 10 years.....	168	14.33	23

In Table XV. we have given the yearly numbers for the first five years, and after this period, as they become small and subject to greater fluctuations, we have consolidated them in groups. The figures in the last column are not absolutely correct, but closely approximate the truth. In the Actuary's report, from which is taken the number of lives exposed at each year of insurance, the numbers are calculated for the calendar year, while our deaths are calculated from the date of insurance; we have therefore compared

our first year's experience with the Actuary's second year, and so on. This is very nearly correct, and the error lies in representing the mortality as slightly higher than it actually was.

The effect of medical selection in eliminating consumptive risks has been shown by the great diminution of the number of deaths from Consumption below that occurring in the population at large. We stated that this elimination acted upon two classes: 1st, those already in a more or less advanced state of disease; 2d, those likely to become consumptive at some future date. The exclusion of the latter class would give us a less rate of Consumption mortality at all periods; the rejection of the former a reduced rate for the few years following insurance.

Table XV. shows the duration of this influence. For the first year, the actual and proportional number of deaths is very small, for, of over 100,000 lives that have been insured in the Company, only 57 have died of Consumption within a year of the date of insurance. This mortality is very small, and can easily be accounted for by unavoidable errors of judgment on the part of examiners, and the occurrence of acute cases of disease. In the second year, the proportion more than doubles, in the third it becomes threefold, and

increases still further in the fourth and fifth years. After this time the number becomes much smaller, and the proportions fluctuate considerably, so that we have consolidated the years in two groups. From 5 to 10 years, the proportion is somewhat greater than for the preceding and following periods, but we are unable to see any reason for this difference. As a final conclusion, we would say that the influence of selection, by the rejection of consumptive lives, lasts only for the first three years of insurance, and that after the third year the proportion of deaths from Consumption is nearly the same for all periods of insurance.

The percentages on the total mortality show, to a certain extent, the same result. But these figures are more likely to be modified by the influence of age, and they are therefore not so trustworthy.

OCCUPATION.

BUSINESS occupations and habits of life are undoubtedly powerful factors in the causation of Phthisis, but unfortunately our records can give us little information as to the extent of their influence. We have a nominal record of the occupation of every person who has been insured, but it is often expressed by such a general term as to convey no definite meaning. For instance, four classes—merchants, clerks, agents, manufacturers—form half of our total mortality list, and yet each of these classes is too comprehensive to represent any definite mode of life. Of the minor occupations, the representatives are too few to allow any generalizations. Still another difficulty arises from the frequent change of occupation, many persons being engaged in one form of business at the time of insurance, and another at the time of death. For these reasons we have not thought it profitable to form any elaborate table of the occupations of all those who have died of Consumption, but have limited our observations to a few special cases, in which there is little probability of error, and which at the same time indicate marked susceptibility or insusceptibility to Consumption.

TABLE XVI.

SHOWING THE MORTALITY FROM ALL CAUSES, AND FROM CONSUMPTION IN CERTAIN SPECIFIED OCCUPATIONS.

Occupation.	Deaths from all Causes.	Deaths from Consumption.	Percentage.
Total Mortality.....	5,224	1,031	19.74
Carpenters.....	67	5	7.46
Butchers.....	25	2	8.00
Lawyers.....	180	17	9.44
Farmers	262	26	9.92
Physicians.....	132	15	11.36
Clergymen.....	137	26	18.98
Tailors	54	14	25.92
Millers.	29	8	27.58
Teachers.....	59	17	28.81
Printers.....	31	10	32.26
Jewellers and Silversmiths.....	59	20	33.89
Hatters.....	19	9	47.37

We find carpenters and butchers presenting an extremely low rate of Consumption mortality. Next come lawyers, farmers, and physicians, all much below the average mortality from this disease; clergymen are very slightly below the average. Above it, and with a proportion increasing in the following order, are tailors, millers, teachers, printers, jewellers, and hatters.

FIGURE—PROPORTIONATE HEIGHT AND WEIGHT.

Thus far we have considered the mortality from Consumption as influenced by circumstances of age, nationality, residence, duration of insurance and occupation, and to establish their definite relations we have employed our own general mortality experience, and the tables of mortality of the population at large. We propose now to investigate a portion of the subject to which these tables are inapplicable, namely, the tendency to this disease arising from such personal peculiarities of applicants as family history, figure, as shown by weight in relation to height, and the record of previous sickness.

These subjects have been considered by various writers, and opinions have been formed and expressed, but often from insufficient and one-sided data, which therefore, even if correct, are not satisfactorily established. We think that the most satisfactory method of investigation will be to compare two sets of cases, one composed of deaths from Consumption, the other of an

equal number of deaths from other causes, corresponding to the first in the proportion at each period of life. As the individuals of both sets have been selected under the same rules and circumstances, they will be in every respect comparable.

We have 1031 deaths from Consumption; our second set of cases is made up of 357 deaths from casualties, 322 from typhoid fever, 352 from other acute zymotic diseases. By reference to Table IV. of the Preliminary Report, it will be seen that the mortality from these causes corresponds closely to that of Consumption for each period of life.

In examining applicants for Life Insurance, Military Service, or for any position where the present and prospective health is of great importance, the figure, and development of the frame are properly regarded as affording grounds of decision. The amount and quality of bones and flesh are an indication not only of muscular strength, but, to a certain extent, of the health of the entire organization. They show whether the organs of digestion and assimilation are performing their functions satisfactorily, and in due proportion to the destruction and wear of the tissues. An experienced examiner can generally judge of this by his eye alone, but to prevent deception by clothing

and as a means of guidance for the less experienced, it is advisable to take actual measurements of height and weight, ascertain their proportion, and compare it with a standard of normal development. For this purpose, tables have been computed, and are published by various Insurance Companies. These tables represent the mean measurements of a given number of healthy men, and it must be remembered that it is not even the usual height and weight, and that of the entire number from whom the observations are made, few, or perhaps none, of the individuals were of this exact size, but that they ranged on each side of it.

On taking the standard authorized by this Company, and comparing it with the average weight of Consumptives, we, to our surprise, found the latter so much lower that we supposed there might be some error in the formation of this table. Such error might arise if the standard were taken from some class of individuals of greater weight, or other age, than those of applicants for Life Insurance in this Company. We therefore determined to form another standard table, computed for each decennial period of life, and we found materials for two such tables. The first, from the statistics of the U. S. Sanitary Commission, in which the measurements of several thousand soldiers,

enlisted during the late war, are given; these measurements were carefully made, and in recording the weight an allowance was deducted for clothing. The second, from the records of the 1031 Non-Consumptives mentioned above; in these the measurements were taken and recorded in the usual manner of Life Insurance examinations, from the statements of the applicant in the majority of instances. For these reasons we would expect to find the proportional average weight less among the soldiers.

In our experience the records of measurements are not complete. We find in the 1031 Consumptive cases, 619 records of measurement; in the 1031 Non-Consumptive cases, 649 records. None of the tables that we have computed are of any value for extremes of height. That taken from the Sanitary Commission is calculated only for heights ranging from five feet four inches to five feet ten inches, both inclusive; while the tables from the Insurance records include too few cases beyond these same limits to be of any value, except when corroborating the results obtained from the more numerous cases.

In tables XVII. and XVIII. are given the recorded height and weight of every case, insured between the ages of thirty and forty years, Consumptives

and Non-Consumptives separately. In the centre line is the old standard table, and all weights ranging above this standard are placed above the line, and those below it below the line.

We have prepared similar tables for the other decennial periods, but instead of presenting these in detail, will give a consolidated table of the total numbers above and below the standard. Next we will give a comparison between the standard and the average weight computed for each series of observations.

TABLE XVII.

SHOWING THE HEIGHT AND WEIGHT AT THE AGES OF 30 TO 39 YEARS—NON-CONSUMPTIVES.

5 feet	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	5.10	5.11	6 feet	6.1	6.2	6.3
										199					
										198					
										195					
										195					
								200		187					
								177		187					
								175		185					
								170		180					
								170	207	179					
							200	170	194	175	242				
						149	182	170	190	175	220				
						195	174	168	185	174	215				
						190	170	167	175	174	208				
						189	165	167	173	173	194				
						175	161	163	172	170	192				
						170	160	163	170	168	190				
						155	158	160	170	167	185	230			
						155	158	160	162	165	185	220			
					169	150	155	160	160	165	180	210			
				190	155	150	154	160	160	165	178	197			
				170	150	149	154	155	160	165	174	194			
				150	147	148	150	150	160	163	173	190			
				140	147	146	149	150	159	162	170	180			
		150	151	138	144	145	146	150	158	160	170	180		185	
		150	145	136	140	143	145	148	155	160	165	195	220	180	
120	**125**	**130**	**135**	**140**	**143**	**145**	**148**	**155**	**160**	**165**	**170**	....	....	..	
				133	139	140	143	146	153	158	155	165	163	175	
				126	137	140	140	146	152	158	150	157			
					135	135	140	145	150	158	150	156			
					135	130	140	145	150	155	150	155			
					132	129	140	144	150	155	145	150			
					130	125	139	142	148	153	145	138			
					125	125	135	138	148	153	142	133			
					124	124	135	138	146	145	140				
					122	120	134	137	145	145	140				
					120	118	134	136	145	143	138				
					120		132	136	143	142	138				
							130	135	143	140	132				
							128	134	142	140	130				
							120	130	138	138					
								130	136	135					
								130	135	135					
								130	133	134					
								130	130	134					
								126	128	130					
								125		130					
								125							

TABLE XVIII.

SHOWING THE HEIGHT AND WEIGHT AT THE AGES OF 30 TO 39 YEARS.—CONSUMPTIVES.

5 feet.	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	5.10	5.11	6 feet	6.1	6.2	6.3
								213							
								168							
							165	168							
							160	158	183		196				
							155	155	180	174	177	196			
							149	155	168	173	175	180			
						150	145	155	158	164	175	175			
			136		160	145	145	150	155	160	172	173			
			133	143	149	145	145	150	155	160	165	170	183	190	
	120	125	130	135	140	143	145	148	155	160	165	170	....	.....	..
110				130	128	140	142	146	152	158	163	168	170	170	176
				130	125	140	140	145	150	158	158	165	167		
				125	123	135	140	145	150	155	155	165	165		
				120	119	134	140	145	150	155	155	160			
				100	119	134	136	142	150	154	155	160			
					117	134	136	141	150	150	155	148			
					114	131	135	140	149	150	154	142			
						130	135	140	148	150	150	136			
						130	135	140	145	150	145	122			
						130	135	138	145	148	145				
						129	135	138	140	147	145				
						129	134	137	140	146	135				
						126	130	136	140	145	135				
						125	130	135	140	145	135				
						125	129	135	140	142	135				
						125	129	135	140	140	130				
						123	129	134	140	140					
						120	129	133	138	138					
						119	127	133	138	136					
						112	125	132	138	135					
							125	131	135	135					
							120	130	135	134					
							144	130	135	134					
								130	135	130					
								130	134	125					
								126	133						
								125	133						
								125	130						
								125	130						
								125	128						
								125	128						
								123	123						
								122							
								118							
								118							

TABLE XIX.

SHOWING THE RELATIVE WEIGHT AMONG CONSUMPTIVES AND NON-CONSUMPTIVES, GIVING THE NUMBER OF EACH ABOVE AND BELOW THE NORMAL STANDARD, AND ARRANGED ACCORDING TO AGE.

Age.	Non-Consumptives.		Consumptives.	
	Number above standard Weight.	Number below standard Weight.	Number above standard Weight.	Number below standard Weight.
Total.....	326	323	135	484
Under 20 years.....	..	..	2	9
20 to 29 "	58	123	35	200
30 " 39 "	139	119	48	179
40 " 49 "	100	55	34	77
50 " 59 "	29	26	15	16
60 " 69 "	..	..	1	3

TABLE XX.

SHOWING THE RELATIVE WEIGHT AMONG CONSUMPTIVES AND NON-CONSUMPTIVES, GIVING THE NUMBER OF EACH ABOVE AND BELOW THE NORMAL STANDARD FOR EACH INCH OF HEIGHT.

Height.	Non-Consumptives.		Consumptives.	
	Number over Weight.	Number under Weight.	Number over Weight.	Number under Weight.
5 feet.....	2	..	1	1
5 feet 1 inch.....	..	..	1	..
5 feet 2 inches.....	2	1	..	..
5 " 3 "	5	3	3	2
5 " 4 "	15	6	3	12
5 " 5 "	18	20	7	22
5 " 6 "	30	22	19	61
5 " 7 "	48	39	16	57
5 " 8 "	50	53	29	86
5 " 9 "	37	51	14	71
5 " 10 "	59	54	20	79
5 " 11 "	32	38	11	48
6 feet.....	20	24	6	31
6 feet 1 inch.....	3	7	3	6
6 feet 2 inches.....	5	3	2	4
6 " 3 "	..	2	..	3
6 " 4 "	..	..	..	1

TABLE XXI.

SHOWING THE AVERAGE WEIGHT IN PROPORTION TO THE HEIGHT, ACCORDING TO THE STANDARD TABLE, THE SANITARY COMMISSION STATISTICS, AND THE MEASUREMENTS OF NON-CONSUMPTIVES AND CONSUMPTIVES IN THE RECORDS OF THE MUTUAL LIFE, CALCULATED FOR EACH DECENNIAL PERIOD OF LIFE.

20 TO 29 YEARS.

	5 ft.	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	5.10	5.11	6 ft.	6.1	6.2	6.3
Standard.....		120	125	130	135	140	143	145	148	155	160	165	170			
Sanitary Commission.....					131	135	138	142	143	151	155					
Non - Consumptives.....	121		120	118	137	133	139	142	139	145	148	154	154	161	186	
Consumptives...	145	140		123	119	128	123	134	138	141	146	148	154	149	160	177

30 TO 39 YEARS.

Standard.		120	125	130	135	140	143	145	148	155	160	165	170			
Sanitary Commission.....					135	134	140	145	148	155	157					
Non - Consumptives.....			150	147	148	137	148	147	150	156	161	169	177	192	180	
Consumptives. ..				135	125	128	131	137	142	144	147	155	161	171	180	176

40 TO 49 YEARS.

Standard		120	125	130	135	140	143	145	148	155	160	165	170			
Sanitary Commission..... ..					136	138	141	147	146	155	158					
Non - Consumptives....				146	149	146	154	150	159	152	163	162	169	172	186	160
Consumptives ...					125	139	136	137	142	142	149	155	155	185	153	165

50 TO 59 YEARS.

Standard....		120	125	130	135	140	143	145	148	155	160	165	170			
Non - Consumptives						159	151	142	153	161	153	164	169			
Consumptives. ..				130	117	136	150	143	155	149	155		159			175

A glance at these tables will show that, while the Non-Consumptives are almost equally divided, half being above and half below the standard, *nearly eighty per cent of the Consumptives are below it.* On examining the figures still farther, we find that a large majority of both classes under thirty years of age are below the standard, and from this we would infer that the standard is fixed at too high a figure for this period of life. After thirty, however, we find the majority of the Non-Consumptives above the standard, and a large majority of the Consumptives below it, although in the decade from fifty to fifty-nine years there is not much difference. Of the 619 Consumptives, 135 were above the standard weight, and 484 below it; of the 649 Non-Consumptives, 326 were above and 323 below the standard. Or deducting all under thirty years of age, we have 373 Consumptives, of whom 98 were above and 275 below; 470 Non-Consumptives, with 268 above and 200 below the standard.

In Table XXI., we have given three tables of the mean weight for each inch of height, and for each decennial period, computed from the Sanitary Commission statistics and our own records, and have placed with them the standard now in use. On exam-

ination of these, we find that under the age of thirty years, the averages of all three series are below the standard—a result which proves that the standard is fixed too high for this class of persons. The averages of the Sanitary Commission and Non-Consumptives approach each other closely, while that of the Consumptives falls considerably below them both

In the next two decades, thirty to forty, and forty to fifty, the standard and the Sanitary Commission run closely together, while the Non-Consumptives average higher and the Consumptives lower than these. For the period between fifty and sixty years, the tables are based on too few numbers to merit much consideration.

We may draw the conclusion from this table that the standard now in use is not correct for the early ages of life, the weight being greater than is usually attained at that period; above thirty years of age, however, it is sufficiently correct. When used for Life Insurance examinations, an addition must be made for clothing. We also consider it proved by our tables that a weight below the average is a *very suspicious* circumstance, as indicating a tendency to Consumption, and would advise that all persons presenting such disproportionate figure should be most carefully scrutinized.

CHEST MEASUREMENTS.

THE records of chest measurement are of much less value than those of height and weight, and we will therefore devote only a few remarks to them.

In the examination of applicants, measurements of the circumference of the chest are taken at the greatest, medium, and least expansion. The mobility of the chest, or the difference between the greatest and least expansion, is of most importance in estimating the vitality, but it requires considerable skill on the part of the examiner to obtain its true measure. In the majority of our records, the medium measurement only is given, and this is often unreliable, from the variable amount of the clothing worn by the applicant, and the want of skill of the examiner.

We have carefully gone over all our records, and prepared tables similar to those of weight and height. We shall not give them, however, but merely state, as a final result, that a comparison of the Non-Consumptives and Consumptives shows throughout an average chest measurement from one to one and a half inches less for the Consumptives.

PREDISPOSITION AND FAMILY TAINT.

Most medical writers, when discussing the causes of Consumption, assign the greatest weight to what they call predisposing causes, or, as applied to the individual, a predisposition to the disease. This, it is said, may be either congenital or acquired; the chief stress being laid on some unknown condition of the system which attaches to the individual from the time of birth, although other causes, such as improper food and air, unhealthy place of residence, or injurious occupation, may in after-life produce the same constitutional condition. Temporary and accidental circumstances working upon such a predisposition evoke the disease Consumption.

The signs of the consumptive diathesis have often been described, and are commonly supposed to be easily discernible by an experienced eye. They are usually given in vague or general terms, or, when a more minute description is attempted, so many exceptions of every kind are noted that the signs become of little practical value as a means of ascertaining the presence or absence of a tendency to the disease. The

experience of Military Service and Life Insurance companies give abundant proof of this, for in them, after a careful selection of such men only as present marks of sound health and prospective longevity, very many still die of Consumption.

In describing this diathesis, the terms "hereditary," "congenital," and "family" are applied to it, and often used interchangeably, though their meanings are very different. This misuse of terms has occasioned much confusion.

The term "hereditary" can only be properly applied where the same disease has existed in one of the progenitors; "family" is more comprehensive, as it includes not only these, but also the cases in which brothers and sisters were affected. Some persons seem to think that the presence of a disease in several members of a family is of itself a proof of its previous existence in a common ancestor, but this is a mere supposition. Such instances may as well be supposed to occur from the influence of a common cause acting upon all in the same manner, such as food, air, soil, or perhaps influences derived from parents, though not hereditary. "Congenital" predisposition may be hereditary, or may arise from the last-

mentioned source of influence—as Dr. Bennett writes, "weak parents beget weak offspring."

The study of the influence of heredity, and especially the hereditary transmission of certain tendencies to disease among human beings, is surrounded by so many difficulties, and in its discussion there has been so much assertion, supported with such loose logic and scanty proof, so many absurdities built upon a slight foundation of truth, that a few remarks on the subject will not be out of place.

The general laws, embracing all phenomena of heredity, are two—namely:

1. Every organism produces others of like kind with itself; but,

2. No organism is exactly like either parent.

Variations originating under this second law, or subsequently acquired, may cease with the individual, or be transmitted to a succeeding generation.

By the operation of the first law, the uniform type of the species is preserved within a comparatively narrow range of variations allowed by the second law. In this general sense, the law of heredity is universally acknowledged, and it is only called in question when applied to minor personal qualities. Every individual is born with the general structure and powers of

his species, also with some personal qualities or modifications, derived from ancestral influences. From birth to the end of life, he is constantly undergoing changes and becoming modified by the operations of external causes, and his individual characteristics are thus effected.

Now, being thus eventually constituted, the question to be determined is, what portion was innate and what acquired, and then, further, of the congenital portion, what has been inherited from parents, what derived otherwise from the same source, and what may be personal variation.

The existence of hereditary transmission is most strikingly shown by the examples of variation. The transmission of a uniform type is too common an occurrence to attract attention, but wherever a marked deviation from the type takes place, and the peculiarity is transmitted to another generation, then our attention is at once aroused. The best instances of this are seen among the lower domestic animals, because their period of gestation and maturity being short, we can observe several generations, and whenever variations occur, can control the breeding and other external circumstances, and thus preserve all the deviations which may be of advantage. In this way, stocks

have been altered and many varieties of each species permanently preserved. In the human race, there are a few equally marked instances—where, for example, certain blemishes, as supernumerary digits and exaggerated features, have been handed down from parent to child. These, though equally conspicuous, are less permanent, because, instead of being fixed by interbreeding, they soon disappear through mixture of uncontaminated blood. Undoubtedly, other qualities, both mental and physical, are transmitted; but the observations are usually less trustworthy and the deductions less rigid, as these qualities are more or less originated or influenced by culture, education, and surrounding circumstances, and the resemblances are matters of opinion as much as of fact, being often a question more or less dependent upon the judgment or prejudice of the observer.

There are additional difficulties surrounding the study of the transmission of *disease* in the human being.

All inherit a body subject to death, and to suffering and disease under given circumstances. Violence will break a bone; poison will kill any or all, though the amount required to produce the effect may vary. It is possible that, under the influence of acquired disease or long-acting noxious surroundings, the physical

structure might be so altered and debilitated as to be unable to produce offspring endowed with the normal vigor of the race. Such offspring might be born with a structure similar to that of the parent, or with a general weakness or vulnerability of constitution that would make them unable to resist attacks from which others would soon rally. Or they might pass through the usual period of life, and themselves give birth to offspring of the same feeble constitution. This would not be the necessary result, however, for the offspring might revert to the primitive normal type, or the other and more robust parent might determine its structure.

These constitutional weaknesses, taints, diatheses, are what are usually called hereditary diseases, although in rare cases a disease existing in the parent may also be transmitted to the offspring.

It is probable that an external cause is always necessary for the production of active disease, and whenever the effect is greatly disproportionate to the cause, the presence of a constitutional predisposition may be inferred. The predisposition may have been inherited or acquired, and the only proof of inheritance is the previous existence of the same disease in an ancestor.

The disease, or at least the predisposition, must

have existed in the parent previous to the birth of the child—a consideration which would appear self-evident, and yet is practically neglected on account of the extreme difficulty of obtaining information on the subject. In statistical inquiries, the deaths of parent and child from the same disease is generally admitted as evidence of transmission, but it is by no means proof.

It is extremely difficult to obtain reliable information concerning the diseases and causes of death of even two or three successive generations of a family. Physicians can seldom observe for themselves the complete histories of two generations, and are obliged to depend upon the statements of their patients. In the few instances of blemishes and easily recognized causes of death, there is little liability to error; but for most diseases in which the diagnosis may have been obscure and a technical name describes a group of symptoms, such unprofessional statements and oral traditions are of little value.

From these general considerations upon the hereditary nature of diseases, we will proceed to the subject of Consumption. From early times, physicians have reported, as the result of observation, that numerous members of some one family died of Consumption, while those of other families were seldom

affected with this disease. Sometimes parents and children, sometimes more numerous branches of a family suffered. As a result of this kind of observation, a general belief was firmly established that Consumption was an hereditary disease. It was difficult, however, to sustain this belief by rigid proof. Such proof could be afforded by two methods of inquiry. Either by taking an equal number of consumptive and non-consumptive persons, and tracing their descendants for at least two complete generations; a comparison of the number of Consumptives in each set of cases would show the existence or non-existence of hereditary influence, and its extent. However, the collection of such a set of family histories has never been made, and, in fact, is almost impossible. As we have before said, three generations cannot pass under one observer, and, in absence of professional records, little reliance can be placed on recollections and traditions. Or the second method of statistical inquiry would be to examine into the family history of a number of Consumptives, and ascertain how many of the blood relatives, near and remote, had died of this disease. This method has been frequently adopted, and by it the hereditary nature of Consumption has appeared to be proved. The force of the proof is

weakened, however, by certain sources of error which have not been allowed for. The number of consumptive cases has been given, and the number has appeared large, but we have no statement of the total number of relatives and the expected Consumption mortality among them, and without such a comparison the mere numbers are of little value. It seems to have been forgotten that Consumption is an *extremely common* disease, and that, therefore, among any large number of deaths in one or several families, there is a reasonable expectation of finding many from this disease.

We have already stated that Consumption is generally considered by physicians to be a hereditary disease, although some deny the value of this influence in its causation. A few quotations will indicate these differences of opinion. Laennec writes: "The universal and habitual experience of practitioners proves that the children of phthisical parents are more subject to this disease than others are." *

Sir Thomas Watson says: "No one, of the least observation, can doubt that the disposition to Consumption is very often transmitted from parent to

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* Op Cit., p. 337.

child. . . . Like other hereditary tendencies, it may skip over one or two generations, and reappear in the next, just as family likenesses are known to do." *

Dr. Fuller writes: " M. Roche has gone so far as to say that the children of consumptive parents almost necessarily prove victims of the disease; and if the statement were restricted to those persons whose parents were both consumptive, my own experience would have led me to concur with M. Roche. But the proportion of cases in which a transmitted tendency to the disease is developed in the children is not so large when one parent was healthy. In that case, as far as my observation has gone, the disease is developed, sooner or later, in about three fifths of the offspring." †

Quotations of similar import might be multiplied indefinitely, but these will suffice. On the other hand, Dr. Walshe considers the hereditary nature of Consumption unproved and doubtful, and in the careful and elaborate report before quoted, in answer to the question, Is Phthisis an hereditary disease? says: " Popular feeling has so long and so absolutely replied to

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* Op. Cit., Vol. I., p. 227.

† Diseases of the Air Passages and Lungs, pp. 364–5.

this query in the affirmative, that it may appear an empty labor to submit the question to investigation. But in point of fact, *proof* has never been afforded of the justness of the general conviction. . . . The final conclusion, then, deducible from this analysis of 446 cases, is, *that Phthisis in the adult hospital population of this country, is, to a slight amount only, a disease demonstrably derived from parents.* There is no reason to believe that the law differs among the middle and higher classes of society."*

Dr. J. Hughes Bennett says: "Although, therefore, there can be no doubt that weakness in parents is a cause of weakness in the offspring, we are of opinion that it (hereditary influence) is by no means so general or influential a source of Phthisis as is usually supposed."†

Drs. Flint and Niemeyer also think that the hereditary influence has been overrated, and that it is less important in the causation of the disease than has commonly been considered.

While these opinions (except that of Dr. Walshe) seem to be the result of general though careful ob-

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* Op. Cit., p. 240.

† Reynolds' System of Medicine, Vol. III., p. 546.

servation, the statistical method has not been neglected. Numerous histories have been recorded by Drs. Walshe, Cotton, Williams, and others. Drs. Walshe's and Cotton's records were taken from hospital patients, and Dr. Williams' from those in private practice. Objection has been made to the first mentioned on the ground that hospital patients belonged to a class ignorant of their family history, and hence their statements are unreliable. Dr. Williams' cases were observed in private practice among the middle and upper, and consequently more intelligent classes; in these respects resembling Life Insurance risks. We will give their tables in connection with our own, but desire first to briefly examine Dr. Williams' figures for the reason above given, and because the same criticism will apply to many similar observations which have been adduced to prove the extent of hereditary influence.

The following was the result of Dr. Williams researches.*

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* Med. Chirurg. Trans., Vol. LIV., p. 95.

Of 1000 Consumptives:

10 had grandparents affected.
43 " fathers "
67 " mothers "
10 " both parents "
48 " uncles and aunts affected.
72 " father's or mother's family affected (particulars unknown).
224 " brothers or sisters affected.
10 " cousins "

484 total—some member of family affected.

The first thing that strikes us in examining this table is that nearly half the cases had some other member of the family affected with Consumption, and this large proportion would apparently indicate the existence of a family taint. Looking farther at the particulars, we find that of these 1000 Consumptives, only 10 had grandparents and 10 had cousins similarly affected. This shakes our previous conclusion, and would prove either that Consumption does not affect an entire stock or family, or that the statements of the patients were unreliable. To our mind it proves the latter. Consumption is, as we have shown, so extremely common a disease, that it is impossible to believe that only 10 of the 4000 grand-

parents of 1000 persons were consumptive. If we admit that the statements are inaccurate, and therefore no proof of the absence of hereditary influence, we should reject them altogether, and not use them to swell the total number of consumptive relatives. The same reasoning will apply to aunts and uncles; the number is larger, but the proportion small. In the case of members of the immediate family, parents, brothers, and sisters, the number of Consumptives is very considerable, and affords probability of the existence of family taint, though it does not afford proof. Taking the low percentage of Consumption among our selected lives, 20 per cent or 400 out of 2000 parents might be *expected* to die of Consumption, and only a number larger than this would be disproportionate—presuming that all the parents had ended their lives. We do not know how many parents, brothers, and sisters had died, and consequently cannot tell how the reported numbers compare with the average. The figures show a strong probability of this hereditary influence, but the most important deductions to be drawn from them in our opinion are, 1st, That, as a general rule, it is useless and misleading to extend our inquiry beyond a very narrow family circle; and, 2d, *That, in more than half the cases of Consumption, the most careful inquiry, extended to all the branches*

of a family, will fail to find another member similarly affected.

Having found, then, that statistical proof of the existence of a family predisposition to Consumption has not yet been afforded, we will proceed to the consideration of our own records, and see if they can throw any additional light on the subject. Before presenting them, however, we will remark that they cannot be compared with those last given and other similar ones, or taken as establishing the frequency of family taint in general. Our cases were all healthy lives, selected after medical examination, and one of the rules of this examination tended to exclude persons with a decided family taint. Hence we should expect to find here a much smaller number of tainted families than among Consumptives in general. The value of our tables will consist in presenting a comparison of an equal number of two classes, Consumptives and Non-Consumptives, whose histories have been taken and recorded under similar circumstances, so that even if the histories are not precisely accurate, the errors are the same in both sets of cases, except that, if it be established that Consumption is hereditary, the rule of selection above referred to would bear particularly upon the first class.

TABLE XXII.

TABLE SHOWING THE FREQUENCY OF FAMILY TAINT AMONG CONSUMPTIVES AND NON-CONSUMPTIVES.

	Some Member of Family Consumptive.								No Member of Family Consumptive.
	Total.	Father.	Mother.	Father and Brother or Sister.	Mother and Brother or Sister.	Two or more Brothers and Sisters.	Brother or Sister.	Total.	
Consumptives.....	1031	38	40	7	16	22	71	194	837
Non-Consumptives.	1031	18	20	2	12	5	45	102	929

In 2 cases among the Consumptives both parents were consumptive. They are entered under the column of "father."

TABLE XXIII.

CONSOLIDATED FROM TABLE XXII.

	Parent Consumptive.			Brothers or Sisters.	Total with Family Taint.
	Father.	Mother.	Total.		
Consumptives.....	45	56	101	93	194
Percentage.....			9.79	9.02	18.81
Non-Consumptives.....	20	32	52	50	102
Percentage.....			5.04	4.85	10.89

These figures sustain the general opinion regarding the influence of hereditary and family predisposition in causing Consumption more fully than any hitherto published, and we consider them as affording positive proof of its correctness. We find that of an equal number of Consumptives and Non-Consumptives, similar in every respect, nearly twice as many of the former had consumptive blood-relations as of the latter; or to speak more accurately, 18.81 per cent of the Consumptives, and only 10.89 per cent of the Non-Consumptives, had near relatives who had died of Consumption. The difference is too great and constant through all the subdivisions, and drawn from too large a series of cases, to be the result of chance, and we must consider it the expression of a law.

Our table shows the number of Consumptives in each class of relations, but the numbers of each separately are too small for the deduction of laws. In Table XXIII. we have consolidated these subdivisions in two groups, showing, first, those having parents, and, second, those having brothers and sisters only, dying from Consumption. The proportion for each group is nearly equal in both classes, the number of

parents affected being only slightly greater than the number of brothers and sisters among both Consumptives and Non-Consumptives. From this we would infer that there are other causes of family predisposition equally powerful with hereditary influence. It does not come within the range of our inquiries to ascertain what these causes may be, but it is probable that they might arise from a common rearing and education. We may also conclude that in deciding the value of any life for insurance, the previous occurrence of Consumption in any member of a family, whether parent, brother, or sister, is of equal importance

In Table XXII. it will be seen that the number of consumptive mothers is greater than that of consumptive fathers. The same fact has been observed by Dr. Williams and others, and from their observations the inference has been drawn "that Consumption is more likely to be transmitted by a mother than a father." This is not sustained by our table, which shows a similar preponderance of consumptive mothers among both Consumptives and Non-Consumptives, and perhaps the circumstance can be best explained by the observation of Dr. Walshe, "that the procreative power of phthisical males is below the

average, and the fecundity of phthisical females materially above it."*

For convenience of reference, a table from three authorities, showing the frequency of family taint, is here inserted.

TABLE XXIV.

	Total Cases.	Father Consumptive.	Mother Consumptive.	Both Parents Consumptive.	Brother or Sister Consumptive.	Total Tainted.	Not Tainted.
Mutual Life.	1031	45	56	2	71	194	837
Dr. Williams	1000	43	67	10	224	344	656
Dr. Cotton..	1000	112	102	27	126	367	633

We have thus been able to verify the general opinion of physicians, and to establish by statistical proof the existence of a family predisposition to Consumption. We have demonstrated that the occurrence of the disease in one member of a family is a reason to suspect and fear its subsequent occurrence in another member, and that, in Life Insurance examinations, whenever an applicant states that a parent, brother, or sister has died of Consumption, it must

* Op. Cit.

be judged a suspicious circumstance in estimating the probability of his own longevity. This opinion, however, has been so often enforced, and is so firmly established as a rule of guidance in the selection of lives, that we will not dwell upon it farther, but will rather point out some other conclusions of equal importance, and which there is danger of overlooking. These are:

1. That, as a general rule, it is useless to investigate family histories beyond the immediate family circle.

2. That in a majority of instances no indication of family taint can be found within this circle; in Life Insurance experience it was absent in 84 per cent, and in Dr. Williams' cases from private practice in 66 per cent.

The following calculation will give an estimate of the amount of the influence of family taint in the causation of Consumption. This estimate, however, is only approximative, as it is deduced from selected lives. Allowing the same rate for Consumptive families in all our Non-Consumptive cases, as has been found in the 1031 selected cases, we would have for our total mortality experience: in the 5224 cases a family taint of Consumption in 649. Of these, 194, or 30 per cent, died of Consumption; 455, or 70 per cent, died of other dis-

eases. Thirty per cent of those having Consumptive families have died of Consumption, against our general average of twenty per cent of deaths from this disease. On the other hand, more than two thirds died of other diseases than Consumption. These figures all tend to the same result—namely: that hereditary or family taint is of only secondary importance in the causation of Consumption, being absent in the large majority of cases.

The practical conclusions are, that in the selection of risks for Life Insurance, the existence of family taint is to be allowed a due but not an excessive value in forming a judgment; that it must always be considered an unfavorable element, but affords no sufficient ground for rejecting an otherwise good risk. This refers solely to cases where *one* member of a family has died of Consumption; the danger will probably be much greater where two or more have been consumptive, although our numbers are too few to establish this point. On the other hand, *the absence of such family taint does not improve the value of a life otherwise doubtful.*

It has been stated, and the statement has been supported by some statistics, that Consumption is developed at an earlier age among those having a

family predisposition than among those free from it. We have prepared the following table with reference to this point:

TABLE **XXV.**

SHOWING THE PROPORTION OF CONSUMPTIVE CASES WITH FAMILY TAINT AT EACH DECENNIAL PERIOD OF LIFE.

Age at Death.	Total Deaths from Consumption.	Number of Cases with Family Taint.	Percentage.
Total.....	1031	194	18.81
20 to 29 years.....	181	34	18.78
30 " 39 "	401	76	18.95
40 " 49 "	296	51	17.23
50 " 59 "	113	24	21.24
60 " 69 "	33	7	21.21
70 " 79 "	7	2	28.59

The proportion of those having family taint is nearly the same for all ages, the higher percentage at a late period of life probably arising from the small number of cases. Hence we would conclude, that family taint is of equal importance in estimating risk of life at all ages, and is not to be neglected because an applicant has reached 40 or 50 years.

A remark has been quoted to the effect that weakness in parents is a cause of Consumption in

offspring, and such an opinion has been supported by several medical authorities. This is a subject very difficult to investigate satisfactorily, and we have thought that the following table might be a contribution to its study. It may be presumed that the constitutional strength of the parents would be shown by their longevity, the presence of any disease or debility causing premature death ; we have therefore prepared a table in which the Consumptives and Non-Consumptives are compared on the basis of the longevity of their parents.

TABLE XXVI.

SHOWING THE NUMBER OF CASES AMONG CONSUMPTIVES AND NON-CONSUMPTIVES, IN WHICH THE PARENTS DIED UNDER OR OVER 50 YEARS OF AGE.

	Parents Dying at or Under 50 Years of Age.			
	Both.	One.	Neither.	Total.
Consumptives.....	43	234	307	584
Non-Consumptives..	37	214	314	565

We find here the proportion of parents dying at an early age to be nearly the same for both classes, and these statistics fail to sustain the opinion above quoted.

PREVIOUS DISEASE.—HÆMOPTYSIS.

In Life Insurance examinations, the medical history of an applicant is carefully investigated, in order to ascertain whether he may have suffered from any disease, and if so, to judge whether it were of a nature to threaten a recurrence of similar attacks, whether it appeared as a precursor of some other form of disease, or whether it may have resulted in some permanent impairment of his constitution. Such histories are then entered upon the record for future reference. We have examined these records of our series of Consumptives and Non-Consumptives to see if there were any symptoms or diseases specially indicative of approaching Consumption. We have found no marked difference between the two groups of cases; and the Consumptives have had only a very few more entries against them of previous respiratory disease, such as Cough, Asthma, Catarrh, Lung Disease, Pleurisy, and Bronchitis. To one other symptom we have devoted special attention: Hæmoptysis, or spitting of blood. This is properly considered, and has often been demonstrated, to be one of the most certain indications of approaching Phthisis, and it is consid-

ered by all Life Insurance Companies to be of such fatal omen as to exclude those who have once suffered from it, except under very special circumstances. We believe that they all refuse to admit any applicant who may have raised blood from his lungs within a period varying from five to ten years previous to his application, and even after this period he must give indications of exceptionally sound health.

We therefore give the following list of all the cases in our mortality experience in which there is any record of Hæmoptysis previous to insurance, and in it we include spitting of blood to any amount, and from any source whatever.

TABLE XXVII.

CASES OF HÆMOPTYSIS.

Cause of Death.	Time of Occurrence previous to Insurance.	Age at Insurance.	Time Insured, Years and Months.	Quantity.	Cause, Source, etc.
Consumption....		44	4.6		
"	1 year.	35	11.5	Slight.	
"	1 "	39	3.8		
"	1 "	30	4.1	"	Over-exertion.
"	2 years.	39	13.3		R.R. accident.
"	2 "	36	15.10	"	
"	3 "	22	5.5		From nose.
"	5 "	37	1.08		

CASES OF HÆMOPTYSIS.—*Continued.*

Cause of Death.	Time of Occurrence previous to Insurance.	Age at Insurance.	Time Insured, Years and Months.	Quantity.	Cause, Source, etc.
Consumption....	6 years.	43	2.6		Pneumonia.
"	7 "	37	9.3		
"	8 "	41	8.1		
"	9 "	37	15.2	Slight.	
"	10 "	43	6.11	"	Strain.
"	10 "	38	11.11		
"	11 "	43	9.7	"	Severe exercise.
"	12 "	36	1.5		
"	13 "	36	2.2		
"		39	8.9		
"		41	6.5	Some.	Throat.
"		33	3.5	3 or 4 times.	Unknown.
"		32	3.5	3 times.	Over-exertion.
"		29	1.10		Violent exercise.
Pneumonia.....	12 "	52	19.	Several times	
"	15 "	36	9.10	Slight.	
"	15 "	48	4.4	"	
"	20 "	34	4.9		
"	32 "	51	12.9		
"		26	22.4		
"		42	4.5	2 or 3 times.	Jumping.
Bronchitis.....		36	13.7		After a fall
Congestion of Lungs.....	1 year.	35	4.10	Twice.	
Typhoid Fever..	6 years.	30	.4	Slight.	
" "		40	5.11	"	
Yellow Fever....		29	9.3	Some.	
" "	3 "	32	1.11		
Dysentery		35	4.8	Slight.	
"	8 "	29	11.4		
Cholera.....	12 "	37	12.		
Erysipelas.....		42	.9	"	Not from lungs.
Small-Pox.....		28	5.1	Twice.	Typhoid Fever and Pneumonia.

CASES OF HEMOPTYSIS.—*Continued.*

Cause of Death.	Time of Occurrence previous to Insurance.	Age at Insurance.	Time Insured, Years and Months.	Quantity.	Cause, Source, etc.
Disease of Stomach and Bowels	10 years.	38	22.4		
Inflammation of Bowels.....	12 "	27	16.1		
Inflammation of Bowels.....	16 "	50	17.8		
Inflammation of Bowels.....		34	17.3		
Inflammation of Bowels.....		36	21.6		
Ulceration of Bowels.....		37	25.10		
Bright's Disease.	in boyhood	31	10.2		
" "	9 years.	40	3.6		
Apoplexy.....	15 "	50	2.6		
"	20 "	43	3.		
"		47	5.9	Slight.	Acute bronchitis
Insanity.....		30	18.2		
Inflammation of Brain.....		36	.8		
Congestion of Brain.....		43	1.		
Congestion of Brain.....		54	1.7		
Softening of Brain.....		40	10.3		
Disease of Brain.		46	20.		
Dropsy.....	few weeks	49	12.10	"	
Casualty.....	10 years.	30	5.4		Throat.
"	12 "	42	15.	"	
"	16 "	24	2.4	"	
"	29 "	42	1.4		"
Debility from Old Age.....	10 "	47	26.00		

These figures do not show the absolute value of Hæmoptysis as a sign of a consumptive tendency, or the frequency with which it is followed by that disease. Our cases are all selected ones, in which, notwithstanding the occurrence of hemorrhage, the risk of Consumption was considered small. There are only 63 out of a total of 5224 deaths in which there is any record of Hæmoptysis ; of these, 22 died of Consumption and 41 of miscellaneous diseases. The general ratio of the Consumption mortality was 19.74 per cent, while in these cases it is 34.92 per cent, or nearly double. The present rule of the Company is to reject any applicant who may have spit blood within seven years previous to the examination. Of the total 63 cases of Hæmoptysis, the date of its occurrence is stated in 39, in 13 cases the date of hemorrhage was within seven years, in 22 cases within ten years. Of those occurring within seven years, 9, or 69.23 per cent, died of Consumption; of those occurring within ten years, 13, or 58.18 per cent; while in those cases in which the date of hemorrhage was more than ten years before insurance, only 18.75 per cent died of Consumption. This shows conclusively not only the propriety of the present rule, but also the advisability of the extension of the limit to ten years,

and its invariable enforcement. A few good risks might be rejected, but the Company would be saved from considerable loss. In less than half the cases, the supposed source or cause of hemorrhage is given, and in the majority of these it was reported as slight, as coming from the throat and nose, or as the result of an injury or excessive exertion. These explanations are mostly given in the consumptive cases, and our experience shows that statements indicating the cause of the hemorrhage are usually untrustworthy, as patients always, and physicians sometimes, are apt to delude themselves with the most hopeful views.

The cases are too few to determine certainly whether hemorrhage is a more important symptom when occurring at one period of life than at another. It would appear, however, that Hæmoptysis during childhood is not an indication of a consumptive taint, for of the five cases in which it occurred before the age of fifteen years, none died subsequently of Consumption.

We have now completed the examination of the record of the deaths from Consumption experienced by this Company. We have tabulated them in various forms to show clearly the facts of our experience concerning the nature of the disease, and to obtain infor-

mation useful for our future guidance. There are many other interesting and important points, especially in relation to the causation and prevention of Consumption, which we have not touched upon, as they do not come within the scope of our sources of information, and must therefore be left to the practising physician and sanitarian.

In conclusion, we will give a brief synopsis of our statements and conclusions.

1st. Consumption is an extremely common disease in all parts of the world, causing from 10 to 15 per cent of the total mortality, and destroying annually about 35 in every 10,000 adult inhabitants. In New York City, nearly one third of all the deaths occurring among adult males are caused by this disease.

2d. In the experience of the Mutual Life, the proportion has been 19.74 per cent of the total mortality, and 19 per 10,000 lives annually.

3d. Consumption prevails with nearly equal frequency at all ages between 20 and 60 years, and according to American statistics, with increasing frequency above that age.

4th. In Life Insurance experience this law of equal prevalence between 20 and 60 years does not hold good. The disease is frequent at all

ages, but has a maximum at about 21 years, then diminishes up to the age of 60, and after this increases. The difference between the mortality in the general population and among assured lives is accounted for by the more ready detection of consumptive risks after middle age than in youth.

5th. There is little difference in its prevalence in different sections of the United States, as experienced by the Mutual Life.

6th. There are few deaths from Consumption within the first year of insurance; the number increases regularly to the fourth year, after which it remains nearly uniform during all subsequent periods.

7th. Our records show nothing important with regard to the influence of occupation.

8th. The average weight of Consumptives is considerably below that of non-consumptive persons. Hence a light weight must be regarded as a suspicious circumstance in estimating the value of a life for insurance.

9th. The existence of an hereditary tendency to Consumption has been generally asserted and believed, but has not been proved. Our statistics afford this needed proof. It occurs, however, only in a minority of cases, and its presence or absence should not be

allowed undue weight in deciding upon the value of a life.

10th. Hæmoptysis is the most valuable sign of the consumptive diathesis, and whatever its reported cause and source may be, it should never be disregarded, and no person should be considered a safe risk for Life Insurance until ten years have passed since its occurrence.

ZYMOTIC DISEASES.

ZYMOTIC DISEASES have been defined as "diseases which are either epidemic, endemic, or communicable, induced by some specific body, or by the want or by the bad quality of the food."

This group of zymotic diseases is of special interest to sanitarians, for the reason that their causes are, to a very considerable extent, under our control, and by hygienic means may be prevented or diminished in frequency. The causes that produce them are generally outside the individual, and diffused through the community or locality.

These diseases are also of special interest to Life Insurance Companies, for the reason that many of the heaviest losses come by their means, as they attack the young in the full vigor of life. Insurance Companies deal with the individuals, and, after selecting healthy lives, have comparatively little influence in warding off causes of disease, accidetn, and

death. They have no means of control over the hygienic condition of a community. They can guard against these diseases in a few cases only, by avoiding risks in unhealthy localities—as yellow-fever districts, or by requiring means of prevention—as vaccination. The first and principal precaution on the part of Insurance Companies is the selection of persons of sound body and constitution, and the rejection of all sickly, delicate, or diseased persons. But the healthiest bodies and soundest constitutions are susceptible to the poisonous causes of zymotic diseases, and although all are not equally susceptible, yet we have no means of ascertaining such difference, and therefore the individual whom we have selected as a specimen of health and prospective longevity may, within a few weeks thereafter, be stricken down with typhoid fever or cholera.

We have constructed the following tables to illustrate the subject. In Table I. is given the mortality from the principal zymotic diseases in New York City, and in the experience of the Mutual Life, with the proportion of deaths in 100,000 lives. In Table II., the deaths from all zymotic diseases in the same classes, divided according to the age, is given. The mortality of New York City, as given in these and subsequent

tables, is the mean of five years, calculated by the method described in the Report on Consumption. Of course considerable allowance must be made in drawing any conclusions from these comparisons, on account of obvious distinctions between the two classes of cases. The city population is made up largely of the laboring and improvident classes, and covers only a small area of territory. The Mutual Life risks represent a higher social class, and also the residents of other cities and of rural districts, in which the causes of disease differ from those in New York. For instance, yellow fever is almost unknown in New York, consequently the mortality from it is very small. So, too, the cause of malarial diseases exists in greater intensity in rural districts. On the other hand, there was an epidemic of relapsing fever in New York for a year or two, which, however, caused no deaths in the Mutual Life. Typhus fever was also more prevalent here. Allowance must also be made for the date at which the deaths occurred. The Mutual Life experience is drawn from a period of thirty years; the New York experience from five only; and in the former we had several Cholera epidemics, in the latter none. Notwithstanding all these differences, the two may be usefully compared, though we regret that there are no

accurate mortality statistics for the whole country, to represent the causes of death for the entire population.

TABLE I.

SHOWING THE NUMBER OF DEATHS FROM ZYMOTIC DISEASES, AND THE PROPORTION OCCURRING ANNUALLY IN NEW YORK CITY AND IN THE MUTUAL LIFE.

Diseases.	Number of Deaths.		Annual Proportion in 100,000 Lives.	
	New York City.	Mutual Life.	New York City.	Mutual Life.
Total Zymotic.....	864	951	346	171
Cholera.....	3	67	1	12
Yellow Fever.....	1	27	..	5
Typhoid Fever.....	135	305	54	55
Malarial Fever.....	54	113	22	20
Scarlatina and Diphtheria	12	21	5	4
Erysipelas.....	30	79	12	14
Small-pox.....	119	38	48	7
Typhus Fever.....	49	30	20	5
Relapsing Fever.....	20	..	8	..
Cerebro-spinal Fever ...	17	23	7	4
Dysentery.....	77	81	31	15
Diarrhœa.....	91	52	36	9
Alcoholism.....	169	31	68	6
Miscellaneous.....	87	84	34	15

TABLE II.

SHOWING THE ANNUAL MORTALITY FROM ZYMOTIC DISEASES AMONG 100,000 MALE LIVES AT EACH DECENNIAL PERIOD OF LIFE IN NEW YORK CITY AND IN THE MUTUAL LIFE.

Age.	Number of Lives.	Number of Deaths Annually.	
		New York City.	Mutual Life.
20 to 29 years.....	100,000	310	166
30 " 39 "	100,000	283	149
40 " 49 "	100,000	295	162
50 " 59 "	100,000	433	211
60 " 69 "	100,000	678	292
70 and upwards.....	100,000	1336	603

It is here seen that the mortality in the Mutual Life has been only half that of the general city population, and that this proportion exists at all periods of life. This great difference would appear to be more than can be accounted for solely by reason of the medical selection of applicants for insurance. It partly depends upon the differences between the two classes of lives, as may be seen by noting in what diseases the

city mortality is equal to, greater or less than, that among the insured. The Mutual Life experience shows a higher rate of mortality from cholera and yellow fever only. The explanation of this is, that our experience includes epidemics of these diseases from which New York City was free during the years for which the statistics are drawn. The rate of mortality is about equal for both from typhoid and malarial fevers, erysipelas, scarlatina, and diphtheria, although we should have expected to find less mortality from malarial fevers among the city population.

The mortality is greater in New York from small-pox, typhus, relapsing, and cerebro-spinal fevers, dysentery, diarrhœa, and alcoholism. This difference can be partially explained. The high mortality from small-pox arises from the presence of an epidemic in New York during some of the years included in our statistics. The same epidemic prevailed also among the insured, but this insurance experience runs over a longer period and more years without an epidemic, consequently the percentage on the total mortality is less; this partially accounts for the difference, but still more important is the protection of vaccination, which is generally required among the insured. The epidemic of relapsing fever was of

short duration, and confined almost entirely to New York City. Typhus Fever also is more prevalent here than in other sections of the country. Diarrhœa is a frequent cause of death in old age, and the percentage of aged persons is much greater in the city population than in the Insurance Company. The greatest difference between the mortality of the two classes is from Alcoholism. In the city population there are annually 68 deaths in 100,000 lives, while in the Mutual Life there are only 6. This is one of the few zymotic diseases in which selection ought to be of most value, and it is proved by the comparison to have actually been so. It differs from most of the others, and resembles the constitutional class, in being chronic in its nature, and the habitual use of alcoholic drinks can generally be detected by medical examination and inquiry into the habits of an applicant.

For the same reasons, the mortality from zymotic diseases may be expected to be as high during the first years after insurance as at any subsequent period. It has been seen in our Preliminary Report by Lithographic Table XVI., that the comparative mortality from this class of diseases is very high during the earlier years of insurance. The following table gives

the number of deaths in proportion to the number of lives exposed:

TABLE III.

SHOWING THE NUMBER OF DEATHS FROM ZYMOTIC DISEASES IN PROPORTION TO THE NUMBER OF LIVES, AT DIFFERENT PERIODS OF INSURANCE.

Duration of Insurance.	Number of Lives.	Number of Deaths.
1st year.....	100,000	190
2d "	100,000	218
3d to 5th year.....	100,000	162
6th " 10th "	100,000	185
Above 10 years.....	100,000	214

We find here a slight difference in the proportion of deaths for different periods of insurance, but there is no regularity in the increase and decrease. The mortality is about equal for all periods, being as high in the first and second years of insurance as at any subsequent period. Hence we find that our arguments are verified by these tables, and that, with a few exceptions, the medical examination of applicants has little influence in protecting the Company from a high mortality by zymotic diseases.

We will now proceed to examine the individual diseases as causes of mortality.

SMALL-POX.

THERE have been 38 deaths from Small-pox, the large majority of which have occurred since 1870, as shown in Table I., Preliminary Report. Occasional cases have occurred at intervals of one or two years, but it is only during the last epidemic that the proportion was at all large. This is shown by the following table:

TABLE IV.

SHOWING THE DATE OF OCCURRENCE OF DEATHS FROM SMALL-POX.

YEAR.	DEATHS.	YEAR.	DEATHS.	YEAR.	DEATHS.
1853	2	1862	3	1868	2
1856	1	1864	1	1871	6
1860	1	1866	3	1872	12
1861	1	1867	1	1873	5

We find thus occasional cases and signs of epidemics in some years, and then intervals of one or two years with no deaths from Small-pox. In all from 1853 to 1870 there were 15 deaths, when, in 1871,

a severe epidemic, extending gradually through all sections of the country, and showing its presence for three years, occurred, and occasioned 23 deaths.

The number of cases is too small for any reliable deduction with regard to age; but, as they stand, they show the highest proportional mortality, compared with the table of mortality from all causes between the ages of 30 and 50 years. Twenty-six were natives of the United States, and 12 were of foreign birth, showing an excess of foreigners; while when these cases are still further analyzed, we find of the 12 foreigners 8 were Germans. Compared with the mortality from all causes, we have for natives of Germany: mortality from all causes, 9.6 per cent; mortality from Small-pox, 21.1 per cent. Dr. Oldendorff states that the mortality from Small-pox among the German Insurance Companies in 1871 was nearly 10 per cent of the total mortality; while, with us, in 1872, the most fatal year in our experience, the Small-pox mortality was only 2.3 per cent. This would seem to show either a neglect of vaccination or a special susceptibility to the disease among the Germans.

The actual losses from Small-pox may appear small, being only 38 out of a total of 5224 deaths, or .73 per cent, yet even this small proportion might be

almost entirely done away with, if the Company should require a vaccination at the time of insurance, or evidence of its effectual performance within a short time previous thereto. Small-pox might and should be banished from all intelligent communities.

MEASLES.

THERE has been one single death from Measles. The case was that of a teacher, born and living in Charleston, S. C., aged 35 years, and who had been insured for 2 years. The record states that the disease was of a very severe form.

SCARLET FEVER.

THIS has been the cause of 10 deaths, in 3 of which the disease was complicated with pneumonia, diarrhœa, and diphtheria, respectively. The ages at death were as follows: 20 to 29 years, 2 cases; 30 to 39 years, 6 cases; 40 to 49 years, 1 case; 50 years, 1 case. Only 4 were natives of the United States; of the rest 4 were born in England and 2 in Germany.

DIPHTHERIA.

THERE have been 8 deaths reported from Diphtheria, and 3 from Malignant Sore Throat. The first death from Diphtheria occurred in 1860, although 1 was reported from Malignant Sore Throat in 1852. The deaths took place at all ages, and in different sections of the country.

TYPHUS AND TYPHOID FEVERS.

THERE have been 30 deaths reported from Typhus and 305 from Typhoid Fever. In our Preliminary Report we consolidated the figures of the two diseases and analyzed the total number. The differential diagnosis, as given in the death certificate, cannot be depended upon, and it is most probable that the Typhus Fever was generally Typhoid. The cases do not denote the existence of any epidemic of Typhus, but were scattered sporadically through years and sections of the country, and in all respects follow the statistics of Typhoid.

In our previous report we analyzed the statistics of these fevers in their various relations, and now have little to add to our deductions. We then found that the proportion of the mortality from Typhoid Fever to that from all causes was much the greatest at an early age of life, from 20 to 29 years, and diminished rapidly with each advancing decade. This might occur either from an actual diminution of deaths from Typhoid Fever, or from an increase of deaths from other causes, the number of Typhoid cases remaining the same. We have therefore compiled the following table, showing the number of deaths for each age in proportion to the number living, both in the experience of the Mutual Life, and among the male population of New York City:

TABLE V.

SHOWING THE ANNUAL MORTALITY FROM TYPHOID FEVER AMONG 100,000 MALE LIVES, AT EACH DECENNIAL PERIOD OF LIFE, IN NEW YORK CITY, AND IN THE MUTUAL LIFE.

Age.	Number of Lives.	Number of Deaths Annually.	
		New York City.	Mutual Life.
20 to 29 years.....	100,000	99	87
30 " 39 "	100,000	59	52
40 " 49 "	100,000	51	54
50 " 59 "	100,000	75	58
60 " 69 "	100,000	100	104
70 and upwards.....	100,000	128	86

This table shows: first, that there have been fewer deaths in proportion to the numbers exposed in the Mutual Life than in the population of New York City; second, that the number of *deaths* is not greatest in youth, diminishing with advancing years. The two series of figures for the Mutual Life and New York City agree in showing a mortality high for the period between 20 and 30 years, then diminishing from

30 to 60, and after this time again increasing to a maximum. It must be remembered that these figures do not show the age at which the *disease* is most prevalent, but only the age at which most deaths occur. Other observations have established the history of the disease, and the frequency of its occurrence in proportion to the early age of the persons exposed to it; but, on the other hand, if the disease is least frequent at an advanced age, it is most fatal at that period of life, and it is probably this increased fatality that gives the large mortality after 60 years.

In our previous report we gave the mortality from Typhoid Fever in proportion to the total mortality at different periods of insurance. In the first year of insurance the proportion was 11.80 per cent, in the second year 10.63 per cent, after which it rapidly diminished, until after 10 years' insurance we found the proportion to be only 3.24 per cent. We will now give a table in which the deaths are calculated in proportion to the lives annually exposed.

TABLE VI.

SHOWING THE NUMBER OF DEATHS FROM TYPHOID FEVER IN PROPORTION TO THE NUMBER OF LIVES, AT DIFFERENT PERIODS OF INSURANCE.

Duration of Insurance.	Number of Lives.	Number of Deaths.
1st year.....	100,000	75
2d "	100,000	83
3d to 5th year.....	100,000	58
6th " 10th "	100,000	67
Above 10 years.....	100,000	55

From this table it would appear that the mortality is nearly equal at all periods of insurance, with only a slight diminution after 10 years' insurance, and therefore that the lessened proportion shown by our former table was due, not so much to an actual diminution of deaths, as to an increase of other causes of mortality.

ERYSIPELAS.

THIS has been the cause of 79 deaths. The number is larger than we should have expected to find among selected lives, the mortality being almost exactly the same as that of the population of New York City. Erysipelas, although a frequent disease, rarely causes death, except among the aged or infirm, and we are unable to account for so many deaths (49) in insured persons under 50 years of age. According to the tables given in our previous report, it prevailed equally among all nationalities, and in all sections of the country.

CEREBRO-SPINAL FEVER.

THIS disease, under the names of Cerebro-spinal Meningitis, Cerebro-spinal Fever, Spotted Fever, has been the cause of 23 deaths. It has prevailed epidemically in recent years only, and was most fatal in 1872 and 1873, there having been 6 deaths in the former and 12 in the latter year. One death was reported from "Spotted Fever" in Pennsylvania in 1863, 1 in New York in 1864, 1 in Maine in 1867, and 1 in Vermont in 1871. In 1872 there were 4

deaths in New York, 1 in Pennsylvania, and 1 in Missouri. In 1873 there were no deaths in New York, and the majority were in the Western and Northwestern States. This shows a prevalence of the epidemic in different sections of the country in different years. The disease occurred equally at all times of life and among all nationalities.

YELLOW FEVER caused 27 deaths, almost all of which occurred in the Southern seaport cities, or in cities on the Mississippi River—New Orleans, Vicksburg, and Memphis. The dates and localities have been as follows:

TABLE VII.

SHOWING THE DATES AND PLACES OF OCCURRENCE OF DEATHS FROM YELLOW FEVER.

DATE.	NUMBER OF DEATHS.	LOCALITY.
1848	3	New Orleans, Galveston, Vera Cruz.
1849	1	Vera Cruz.
1851	1	At Sea.
1854	5	Vicksburg, Louisiana, Alabama.
1855	6	Savannah, Charleston, Texas.
1856	2	New Orleans, Memphis.
1864	2	Vicinity of New York.
1868	3	Maine, San Francisco, New Orleans.
1873	4	Memphis and vicinity.

Of those dying in Southern cities, several were natives, but the majority were born in the North, though resident in these cities at the time of, and previous to, insurance. Five were persons in the naval or merchant marine service, and two had business relations with commerce—one as a custom-house officer, and one as a shipbroker. The only deaths at the North were of seafaring men, and the shipbroker mentioned above. One of the victims is reported to have had Yellow Fever previous to insurance. The deaths generally occurred at a comparatively early age and at an early period of insurance, there being none over 56 years of age or insured for 10 years.

MALARIAL FEVERS.

THERE have been 113 deaths reported from Intermittent, Remittent, and Congestive Fevers. Of the latter, several were marked "Congestive Chill"—an indefinite term. We have nothing to add to our remarks and tables in the Preliminary Report, which we may summarize by repeating that these fevers prevailed at all ages and periods of insurance, standing

high among the causes of mortality during the first two years after insurance. They occurred among all nationalities and in all sections of the country, least in the New England States, and most in the West from Ohio to Kansas.

OTHER FEVERS.

One death was reported from "Typho-Malarial Fever," and 1 from Camp Fever

There have been 27 deaths reported as caused by "Fever" solely, or by a fever of an indefinite type, as "Adynamic," "Nervous," etc. These cases admit of no analysis or classification, on account of their want of definiteness.

INFLUENZA.

One death was caused by Epidemic Influenza. The case was that of a merchant residing in New York City, 53 years of age, insured over 25 years, who died in the year 1869.

DIARRHŒAL DISEASES.

Dysentery, Diarrhœa, Cholera Morbus, and Cholera approach one another closely, and often there is no distinct line of separation in either the popular or professional nomenclature. Cholera proper, however, is usually sufficiently defined as a malignant epidemic form of disease, though occasionally cases of Cholera Morbus are confused with it.

DYSENTERY.

There have been 81 deaths from Dysentery. As shown in our Preliminary Report, it occurred equally at all ages and all periods of insurance, and among all nationalities, except that there were few cases among the Germans. It has been most prevalent in the Western and Northwestern States, and least in the Middle States. There were proportionally more deaths in the Eastern States, especially in Connecticut, than in the Middle States. The only time and place in which it was especially fatal, so as to approach the character of an epidemic, was in 1849

and 1850, among the immigrants to California. In 1849 there were 10 deaths, 6 of which occurred in California, and 2 on the voyage between California and Panama; in 1850 another death occurred in California. There has been no special prevalence of the disease in that State since 1850. The States in which it has been proportionally most frequent were Connecticut, Wisconsin, Kentucky, and Missouri.

DIARRHŒA.

THERE have been 52 deaths from Diarrhœa. Eighteen were reported as "Chronic Diarrhœa," and others apparently belonged to the same form, judging from the duration of the sickness. There have been a comparatively small number of cases among the young, and a very large mortality at advanced age, the number of deaths increasing directly with the age. It has been nearly equal among all nationalities, but, geographically considered, much more frequent in the Southern States than in other sections. A few of the cases occurred among those serving in the army during the late war, and exposed to the influence of Southern climate, combined with camp life and diet.

CHOLERA MORBUS.

TWENTY-TWO deaths have been reported from Cholera Morbus. There were no cases in persons under 40 years of age. Half were natives of the United States and half foreigners—an excess of the latter amounting to double their proportion of the total mortality. There was 1 case only in the Eastern States, 7 in New York, 3 in Pennsylvania, and none in the Southern States. Other sections of the country afforded an occasional case. The greatest mortality did not occur in the same years as epidemic Cholera, but during the absence of this disease.

CHOLERA.

THERE have been 67 deaths from Cholera. We have shown in our previous report that it occurred equally at all ages, among all nationalities, and at all periods of insurance.

We shall now give a history of the epidemics as indicated by our death reports.

In 1848 there were 4 deaths: 2 in New Orleans, 1 in Panama, and 1 in Pennsylvania.

In 1849, there were 11 cases scattered through different sections of the country—New York City, Virginia, Ohio, Michigan, Missouri, and Texas.

In 1850 there were 8 cases: 1 in Illinois, 2 in Ohio, 1 in Panama, and 4 in California.

In 1852 there were 6 cases: 2 in Ohio and Illinois each, and 1 in California and 1 in New York.

In 1854 there was again a more extensive and severe epidemic, causing 10 deaths, 5 in New York, and the others scattered as follows: 1 each in New Jersey, Maryland, Tennessee, Missouri, and Canada.

In 1855 there were 3 deaths: in Ohio, Missouri, and Louisiana. After this time there were no cases of Cholera for 11 years.

In 1866 the disease again became epidemic, and caused 16 deaths: 7 in New York, 1 in New Jersey, 4 in Pennsylvania, 1 in Cincinnati, 2 in Chicago, and 1 in Iowa.

In 1867 there were 3 deaths: in Iowa, Missouri, and Maine, respectively.

In 1868 and 1869, 1 death each year in Massachusetts.

In 1871 there was 1 death in Virginia.

In 1873 there were 2 deaths in Missouri and Tennessee.

An examination of these dates and figures will show the existence and influence of the three principal epidemics which have visited the United States. First, that of 1849 and 1850, extending over all portions of the country. Second, that of 1854 and 1855, prevailing in the first year chiefly in New York and its vicinity, and in the second year in the Mississippi Valley. Third, that of 1866, in the Middle and Western States. The years mentioned are those of the chief severity of the disease, although there were a few cases in the succeeding years.

CARBUNCLE.

THIRTEEN deaths have been reported from Carbuncle. It is a comparatively rare disease before middle life, and seldom fatal, except in constitutions impaired by age or disease. In our experience, the youngest was in a person aged 39 years, and insured

only 6 months. The total number of deaths appears small, but it is larger than we should have expected to find among selected lives.

PYÆMIA.

THERE have been 11 deaths reported by Pyæmia, but the death certificates are not full enough to admit of any useful analysis.

ALCOHOLISM.

THIRTY-ONE deaths have been attributed directly to the use of Alcohol, the cause of death being stated either as "Delirium Tremens" or "Intemperance." In addition, one person committed suicide while suffering from Delirium Tremens, which case is included with the suicidal deaths.

A majority of these cases occurred under 40 years of age, 90 per cent under 50 years, and none after sixty years, showing that the excessive use of alcohol as a habit is acquired at an early age, and that no constitution can long withstand its destructive influence.

An extremely large proportion, 6 of the 31, or nearly 20 per cent, died within the first year of insurance, indicating that the applicants had probably concealed their habits of life by false statements to the medical examiner. A slight proportional excess occurred among foreigners, especially the English and Irish, although the native element is large. The smallest number of deaths occurred in the New England States, and the largest in the West.

These figures represent only the deaths resulting from the use of alcoholic drinks as a sole cause, and they are of little importance in comparison with the more numerous cases, where life has been *indirectly* shortened—those in which chronic diseases of various organs and tissues have been produced, or a thus debilitated constitution has given way before acute disease. These acute diseases—pneumonia, meningitis, injuries or the pathological conditions of certain organs, as the

liver, kidneys, etc.—are stated on the certificates of physicians and friends to be the causes of death, while the real cause, the habit of body induced by the indulgence in alcoholic liquors, is, out of charity to the family of the deceased, withheld.

These cases are known to be numerous, and are fully appreciated by all Insurance Companies, but unfortunately we have no way of investigating them statistically from this Company's mortality records.

OTHER DISEASES.

THERE have been 3 deaths from Purpura Hæmorrhagica at the ages of 37, 47, and 52. The records give no particulars of interest.

One death from Malignant Pustule has been reported. The case was that of a broker in New York City, aged 27 years, and in the third year of insurance, who died after an illness of three days.

There was also 1 death reported from Glanders, in a produce-dealer, 42 years of age, living in Maine,

who is said to have contracted the disease from a horse.

There was also 1 death reported to have been caused by Goitre, but the cause of death was really doubtful. The patient, aged 55 years, insured 16½ years, had had a goitre for many years, but for a short time had become very much debilitated, and died suddenly. No post-mortem was made.

CONSTITUTIONAL DISEASES.

CONSTITUTIONAL DISEASES are those depending upon some general taint of the blood or body. They differ from zymotic diseases in that they are individual, and not epidemic, that they do not proceed from a specific poison, and that they are usually chronic in their form. They show their constitutional nature by affecting several organs of the body, and by a tendency to recur. The exact nature of the taint is in no case known. It may be inherited, or may be acquired

subsequent to birth by circumstances affecting the habits of life of the individual. The most important of the class are the tubercular diseases, the chief of which, Consumption, we have already discussed. The other diseases are Cancer, Rheumatism, Gout, Anæmia, Gangrene, and Dropsy.

MISCELLANEOUS DISEASES.

In addition to Consumption, which we have already described, Marasmus and Consumption of the Bowels, Lumbar and Psoas Abscess, Hip-Joint Disease, Tubercular Meningitis, and Scrofula, causing in all 30 deaths, make up this group.

There have been 11 deaths recorded from Marasmus, and 6 from "Consumption of the Bowels." We unite these cases, although the term Marasmus is often applied indefinitely to cases in which there is a wasting away for want of proper assimilation and digestion, whether the cause be tubercular or some other form of disease. The cases have occurred at all ages, as follows: Between 20 and 29, 2; 30 and 39, 4;

40 and 49, 3; 50 and 59, 5; 60 and 69, 1; 70 and 79, 2. The cases recorded as Consumption of the Bowels have been chiefly at the earlier, and those of Marasmus at the later periods of life.

There have been 4 cases of Lumbar and 1 of Psoas Abscess, and 2 of Hip-Joint Disease. They were all, except 1, under 40 years of age: between 20 and 29, 2 cases; 30 and 39, 4; 50 and 59, 1 case.

One death is reported from Tubercular Meningitis.

There have been 5 deaths from Scrofula, the local manifestation of the disease not being mentioned. The ages of death were as follows: 28, 29, 41, 50, and 56.

CANCER.

THERE have been 91 deaths caused by Cancer. We are unable to give a table of the different organs affected, because in the majority of cases the certificate of death is indefinite in this respect. In our Preliminary Report we gave an analysis of the more important facts in relation to this disease, and we can now only corroborate our previous statements. We

found that it was most frequent in proportion to the advance of age and to the duration of the insurance, although there were several deaths soon after insurance had been effected. The following tables show the number of deaths in proportion to the number of lives exposed:

TABLE VIII.

SHOWING THE PERCENTAGE OF DEATHS FROM CANCER ON THE MORTALITY FROM ALL CAUSES, AND THE ANNUAL MORTALITY IN 100,000 LIVES AT EACH DECENNIAL PERIOD OF LIFE, IN NEW YORK CITY, AND IN THE MUTUAL LIFE.

Age in Decennial Periods.	Percentage on Total Mortality.		Annual Mortality in 100,000 Lives.	
	New York City.	Mutual Life.	New York City.	Mutual Life.
20 to 29 years.....	.31	.41	3	3
30 " 39 "	.68	.98	13	7
40 " 49 "	1.75	1.13	40	9
50 " 59 "	3.01	3.45	105	45
60 " 69 "	2.84	3.33	167	89
70 and upwards.....	1.61	1.57	231	86

TABLE IX.

SHOWING THE PERCENTAGE OF DEATHS FROM CANCER ON THE MORTALITY FROM ALL CAUSES, AND THE MORTALITY IN 100,000 INSURED LIVES AT DIFFERENT PERIODS OF INSURANCE.

Duration of Insurance.	Percentage on Mortality from all Causes.	Annual Mortality.	
		Number of Lives Exposed.	Number of Deaths.
1st year	1.31	100,000	8
2d "	.51	100,000	4
3d to 5th year	.87	100,000	8
6th " 10th "	2.74	100,000	31
Above 10 years	2.64	100,000	40

The first table shows an enormous difference in the mortality among insured lives and the general population—a difference that would not seem to be entirely accounted for by the medical examination. It may be said in round numbers, that there are twice as many deaths from Cancer among the male population of New York as in the experience of this Company.

The number of deaths increases with the age: under 50 years there are few deaths, 3 between 20 and 30, 7

between 30 and 40, and 9 between 40 and 50 years; after this the number rapidly increases, so that between 50 and 60 there are 45 deaths, between 60 and 70, 89; and above 70 years, 86 deaths in 100,000 lives.

These results are what we should have expected, and are in accordance with the statistics of Walshe, Paget, and others.

In the second table, we have the deaths in reference to the period of insurance. This, too, is what we expected from our previous tables and the pathology of the disease. We had previously shown that the mortality from Cancer compared with that from all causes was small for the first 5 years of insurance, and became very much greater after that period. Cancer is usually chronic in its course, often taking years before the final fatal result. Hence the medical examination eliminating those already affected with the disease, it will be only after a few years have elapsed that there can be many deaths from Cancer. We find, however, one marked exception to this rule: the mortality in the first year after insurance is remarkably high, being double that of the second year. This may be merely a matter of chance, on account of the small number of figures; but it is most probable that the disease existed at the time of insurance, and that the

applicants denied or concealed their symptoms from the scrutiny of the medical examiners.

The disease has caused more deaths proportionally among foreigners than among natives. The percentage of deaths from all diseases is, for natives, 75, and foreigners, 25 ; from Cancer it is 65 and 35 respectively.

There are only 3 cases in which there is any family history of the disease. In these 3 cases, a mother, brother, and sister, respectively, had died of the disease.

Although, as we have seen, the difference in the mortality from Cancer among the insured and general population is very great, still it is not a disease which we would expect to be much influenced by medical selection. The etiology of Cancer is too obscure to enable us to detect the probabilities of its approach. Age, inheritance, occupation, and perhaps climate and nationality, have some influence on its causation ; but, in the words of Sir James Paget, " After all, when we have assigned to these conditions their full weight in producing the cancerous constitution or state of the blood, that which may strike us most of all is the comparatively small influence which any known internal or external conditions possess."

RHEUMATISM.

THERE have been 20 deaths attributed to Rheumatism as the sole cause of death, and in addition there are 3 cases called "Rheumatism of the Heart," and 7 of "Acute Rheumatic Inflammation of the Heart," which we have included among the diseases of that organ. We have but scanty information concerning most of these cases, some being reported as "Inflammatory Rheumatism" and "Rheumatic Fever," while others are merely designated as "Rheumatism." The ages at death were as follows: 20 to 29 years, 2 cases; 30 to 39, 5; 40 to 49, 7; 50 to 59, 5; 70 to 79, 1 case. Twelve of the 20 were between 30 and 50 years of age. Among all these deaths from Rheumatism and Rheumatic Disease of the Heart, in only 3 cases had there been an attack of Rheumatism previous to insurance, and in no instance is there any record of Rheumatism in other members of the family. A very large proportion—8 out of 20—were foreigners.

GOUT.

THERE have been 7 deaths from Gout. The numbers are too few for any useful analysis, therefore we will merely give some particulars of the cases. There are, unfortunately, no means of ascertaining the injury, or the deaths caused by Gout indirectly, either by the kidney disease, or the general deterioration of the system that it may produce—conditions which are far more important than the knowledge of the few cases in which the Gout is the direct cause of death.

The ages at death have been as follows: Between 30 and 39 years, 1 death; 40 and 49, 1; 60 and 69, 3; 70 and 79, 2; or 2 deaths under 60 years of age, and five above that period.

Two died under 5 years of insurance, and 5 above that period. Only 2 had suffered from Gout previous to insurance, and in no instance is there any family record of the disease.

ANÆMIA.

THERE have been 7 deaths from Anæmia. All but 2 died above 50 years of age, as follows: 29, 45, 55, 59, 60, 64, and 69 years. One died in the first year of insurance, 1 in the fourth, 1 in the fifth, and 4 after a duration of 10 years. One is stated to have been scrofulous at the time of insurance; he was 34 years of age when insured, and died at 60, after a duration of 26 years' insurance.

GANGRENE.

THERE have been 4 deaths from Gangrene. In 5 cases the foot was the part affected, and in 1 the hand. The ages at death were 41, 44, 55, and 62 years.

DROPSY.

ALTHOUGH Dropsy may be considered as a symptom, and not as a disease proper, still it is frequently

stated to be the cause of death, when the underlying disease is hidden from the physician's observation, and consequently unknown, and when the accumulation of water becomes the immediate cause of death.

There have been 82 such deaths from Dropsy. They have occurred chiefly at advanced ages; very few below 40 years, but after that age rapidly increased in frequency. So, too, there were few deaths within 5 years of insurance. There has been little difference of prevalence from nationality or locality of residence. In fact, our statistics show nothing more than that it belongs to advanced life, like its most frequent causes, cardiac and renal diseases.

DISEASES OF THE NERVOUS SYSTEM.

THE class of diseases of the nervous system is based chiefly on anatomical or regional considerations, and includes all diseases of the encephalic and vertebral cavities, and the nerves issuing therefrom, whether the part involved be the nervous tissue proper, or the blood-vessels, membranes, or adventitious growths. Diseases of the brain (encephalon) practically repre-

sent for us diseases of the nervous system, for although the other portions are not unfrequently the seat of disease, they cause an extremely small proportion of mortality.

Whatever tissue or part of the brain be affected, the disease is manifested chiefly through interference with the functions of the nervous element, and as several conditions may give rise to similar symptoms, the diagnosis of the special form is often obscure.

We have in our records 84 death certificates which give "Disease of the Brain" as the cause of death, the attending physicians thus acknowledging their ignorance of its special nature; and in our opinion this modesty might have been still further extended with benefit, as sometimes the diagnoses are evidently mere guesses, while in other instances a prominent symptom, as convulsions, or result of disease, as paralysis, is given as the cause of death.

Unfortunately, too, the definition of the terms is unsettled, and the same name does not always represent the same disease to different physicians. For instance, the name Apoplexy is used by some to designate cases of cerebral hemorrhage, while to others, and probably the majority, it represents a group of symptoms, an acute seizure, producing stupor, abolish-

ing consciousness and the faculties of sensation and motion. Softening of the Brain and Epilepsy are also undefined terms.

It is necessary to keep in mind these imperfections when analyzing and studying our mortality records. Other statistics have been collected under the same difficulties, as they represent the knowledge and opinions of average physicians. They therefore admit of mutual comparison, and by such comparison, and by keeping within the proper limits, we hope to draw some interesting and useful deductions.

It was seen by the tables in the Preliminary Report, that nervous diseases increased among the causes of death directly with advancing years. This, however, was only the proportion to the deaths from all causes, and we have therefore examined the subject again, and give the following additional figures:

TABLE X.

SHOWING THE PERCENTAGE OF DEATHS FROM DISEASES OF THE NERVOUS SYSTEM ON THE MORTALITY FROM ALL CAUSES, AND THE ANNUAL MORTALITY IN 100,000 LIVES AT EACH DECENNIAL PERIOD OF LIFE, IN NEW YORK CITY, AND IN THE MUTUAL LIFE.

Age.	Percentage on Total Mortality.		Annual Deaths in 100,000 Lives at each Period.	
	New York City.	Mutual Life.	New York City.	Mutual Life.
20 to 29 years.....	5.11	7.58	87	50
30 " 39 "	6.84	12.17	135	83
40 " 49 "	8.53	17.56	197	149
50 " 59 "	11.06	20.99	389	288
60 " 69 "	14.08	23.84	829	694
70 and upwards.....	14.00	22.96	2004	1336

The first portion of this table shows the percentage of deaths from diseases of the nervous system on the mortality from all causes. We find the proportion increasing steadily from 5 per cent between 20 and 30 years of age, to 14 per cent between 60 and 70. After 70 years the proportion ceases to increase. This is for the population of New York City. In our own expe-

rience the figures are different, but the increase is at about the same rate. In the second portion of the table we have calculated the number of deaths that have occurred in every 100,000 lives. We see here the same regular increase with advancing years, but at a far more rapid rate. Between 20 and 30 years there are 87 deaths; between 40 and 50, 197 deaths; between 60 and 70, 829 deaths; and above 70, 2004 deaths. This is for New York City. For the Mutual Life the numbers are less, but the rate of increase is nearly the same. These figures probably represent the true proportion of increase, and it may approximately be said that the mortality from diseases of the nervous system nearly doubles with each decade of life. We find, too, that the increase continues up to extreme old age, and that the slight diminution after 69 years, seen in the first portion of the table, is only apparent, perhaps arising from the rapid increase of deaths from other causes.

The difference between the general population and the insured in the rate of mortality from diseases of the brain is shown in the table given above. In the first portion of the table we find that in the general population, 10¼ per cent of all deaths are caused by diseases of the nervous system, while among the insured the

proportion is 16½ per cent. It further appears that this difference exists at all periods of life, and consequently does not depend upon a difference of age between the two classes. We have found a similar difference reported between the mortality of the Scottish Life Insurance Companies and the population of Scotland. Hence it might be supposed that brain diseases were more frequent among the insured than in the general population. The second portion of the table shows this supposition to be erroneous, and that the greater mortality is only comparative, arising, probably, on account of a diminished mortality from some other disease, as, for instance, consumption. In the second portion of the table we have the number of deaths in an equal number of lives of both classes. This shows us the true mortality rate, and we find it considerably lower among the insured than in the general population. In 100,000 insured lives there are annually 150 deaths from diseases of the brain, and in a general city population of the same number there are 224 deaths. This difference exists at all periods of life, and in each decade we find about one third less deaths among the insured than in the general population.

It was to be expected that the mortality rate should differ in the two classes. The medical examination

and selection ought to detect some impaired constitutions, and those already suffering from the chronic forms of disease. But, on the other hand, the individuals who insure their lives belong, generally, to a class of society which is engaged in the active competition of professional or business life, and consequently have brain work and mental strain, with excitement and depression, anxiety and worry, more than the laboring class which forms so large an element of a city population. This might be expected to produce an excess of mortality from brain diseases, and perhaps would do so, were there not counterbalancing advantages in favor of the insured, arising from their superior knowledge of the laws of health, their greater personal comfort in shelter, food, and clothing, their ability to take care of themselves in time of sickness, and above all, from their general temperate habits. In this latter respect they have a vast advantage over the city population. The excessive use of alcoholic stimulants is known to have a powerful effect on the nervous system, and Insurance Companies succeed generally in excluding those addicted to alcohol from their risks. This, probably, is one of the main elements in causing the diminution of nervous diseases.

We believe that there is a general opinion to the

effect that brain diseases are on the increase of late years, and that this is attributable chiefly to the excessive wear and excitement of the present methods of working and living. The following table, taken from the Health Report of New York City, for the year 1873, is of interest in this connection :

TABLE XI.

ABSTRACT OF RECORDS OF APOPLEXY AND PARALYTIC DISEASES FOR THE SEVEN DECADES ENDING DECEMBER 31ST, 1873.

Ten Years Periods.	Estimated Population.	Apoplexy.		Paralytic Diseases.	
		Deaths.	Annual Number in 100,000 Lives.	Deaths.	Annual Number in 100,000 Lives.
1804 to 1813 inclusive.	95,000	313	33	212	22
1814 " 1823 "	130,000	523	40	319	25
1824 " 1833 "	250,000	969	39	389	16
1834 " 1843 "	350,000	1145	33	523	15
1844 " 1853 "	560,000	4529	81	1060	19
1854 " 1863 "	720,000	2719	38	1756	24
1864 " 1873 "	1,000,000	3758	38	1501	15

The number of deaths represent registered facts, but the registration during many years was incomplete, and therefore not altogether reliable. The table shows, however, the mortality statistics of New York City give no evidence of any increase in brain diseases, but rather render it highly probable that there has been no such increase.

We will now proceed to the consideration of the individual diseases.

APOPLEXY

HAS caused 308 deaths—a larger number than is attributed to any other disease of the nervous system.

The term is used in death certificates rather in accordance with symptoms than lesions. It usually represents cases in which loss of consciousness, sensation, and voluntary motion occur rather suddenly, and, after an interval of a few hours or days, are followed by death. It may happen to a person apparently healthy at the time, or at the termination of life of one sick with cerebral or other disease. In the majority of instances it is supposed that the symptoms are due to an effusion of blood into the brain, although other

lesions produce similar effects. If, instead of death, recovery ensues, it is usually only partial and attended with paralysis, and then when the patient eventually dies, the death certificate gives "Paralysis" or "Brain Disease" as the cause.

The percentage of deaths from Apoplexy on the total mortality was extremely small at an early age—only 1.64 per cent between 20 and 30 years, and increased up to nearly 10 per cent between 60 and 70 years.

TABLE XII.

SHOWING THE ANNUAL MORTALITY FROM APOPLEXY AMONG 100,000 LIVING MALES, AT EACH DECENNIAL PERIOD OF LIFE, IN NEW YORK CITY, AND IN THE MUTUAL LIFE.

Age.	Number Lives.	Number of Deaths Annually.	
		New York City.	Mutual Life.
20 to 29 years.....	100,000	13	10
30 " 39 "	100,000	37	17
40 " 49 "	100,000	74	59
50 " 59 "	100,000	176	116
60 " 69 "	100,000	419	277
70 and upwards.....	100,000	925	431

This table shows us the true mortality rate of Apoplexy as affected by age. The two experiences of New York City and the Mutual Life agree in establishing a steady increase with age, though at different rates, from 20 years to extreme old age.

The former, which represents the general population, gives the following rate: Of 100,000 males between 20 and 30 years of age, 13 die of Apoplexy annually; of the same number between 30 and 40, there are 37 deaths; between 40 and 50, 74 deaths; 176 deaths between 50 and 60; 419 deaths between 60 and 70, and 925 deaths between 70 and 80. The deaths thus more than double for each decennial period. In the Mutual Life there have been fewer deaths, but the rate of increase is about the same. The influence of selection is seen in diminishing the total deaths to two thirds of that of the general population, and this diminution is apparently nearly the same at all ages. This result has been effected only by the selection of generally sound and healthy lives, and not by any special elimination of persons of apoplectic tendency. The high rate of mortality during the first year after insurance shows that there are no signs by which a special tendency to Apoplexy, or even an approaching attack of the dis-

ease, can be foretold. Table XV. of the Preliminary Report showed that the percentage of deaths from Apoplexy on the general mortality was as high during the first year of insurance as subsequently, in this respect resembling acute fevers and accidents. The following table shows the rate of mortality in proportion to the numbers exposed:

TABLE XIII.

SHOWING THE NUMBER OF DEATHS FROM APOPLEXY IN PROPORTION TO THE NUMBER OF LIVES, AT DIFFERENT PERIODS OF INSURANCE.

Duration of Insurance.	Number of Lives.	Number of Deaths.
1st year.....	100,000	43
2d "	100,000	27
3d to 5th year.....	100,000	51
6th " 10th "	100,000	66
Above 10 years.....	100,000	124

In 100,000 persons in their first year of insurance, 43 will die of Apoplexy; of the same number in the second year of insurance 27 will die; from the third to the fifth year the annual mortality will be 51;

from the sixth to the tenth year, 66; and after 10 years, 124.

We find that the annual mortality is much greater in the first than in the second year, and nearly as great as in the third. After the fifth year the mortality increases considerably. But here another element —namely, the increase of age—comes into consideration, and this will account for a large part, or all, of this increase. The falling off in the second year is remarkable, and only partly to be explained by supposing that individuals with some slight admonitions of failing health, and for this very reason, apply for insurance. Presenting no special marks of disease, they are approved by the medical examiners as healthy and safe lives; while, meanwhile, their own suspicions, scarcely acknowledged by themselves, turn out to be correct. Degeneration of their physical structure continues, and within a few months they die of Apoplexy. We have further ascertained that this high mortality during the first year is common to all ages, and at each decennial period the deaths are more numerous in the first than in the second year after insurance.

The influences of Nationality and Residence were considered in the Preliminary Report, and we have

nothing further to add on these subjects. We found that the Scotch gave by far the largest proportion of deaths from Apoplexy, the Germans next, and the Irish the smallest.

The different sections of the country gave but slight differences in their rates of mortality.

The older writers on medicine have given "a particular conformation of body" as one of the marks of a predisposition to Apoplexy. This conformation is described as follows: "A large head, a short, thick neck, a florid complexion, broad shoulders, short stature, with a tendency to corpulency."* A belief in this apoplectic build still prevails among the laity and among a large portion of the profession. It has, however, been denied by recent writers, as Flint, Niemeyer, Hughlings, Jackson, and others. Dr. Flint writes: "Formerly much importance was attributed to a so-called *apoplectic constitution*, consisting of shortness of the neck, with considerable *embonpoint*, and what is known as a full habit. An analysis of a considerable number of cases shows that no reliance is to be placed on these or any other external characters as denoting a predisposition to Apoplexy. The

* Gregory's Practice of Physic, Vol. II. p. 33.

larger number of persons attacked are either spare or of an ordinary habit of body."*

We have analyzed our records with reference to this point, and will give the results. The records do not give all the particulars embraced in the above description of the apoplectic figure, but only two, namely, height and weight. These, however, are the essential ones, an excess of weight in proportion to the height being necessary to fulfil the description. Of our 307 cases of Apoplexy, in 153 the height and weight are recorded. We will compare them with the tables constructed from the casualty and fever deaths and employed in the Report on Consumption. These, we think, fairly represent the average of height and weight of our Company's risks. The standard with which they are compared is that now used by the Company in its Instructions to Medical Examiners.

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* Flint's Practice of Medicine, p. 583.

TABLE XIV.

SHOWING THE NUMBER OF PERSONS DYING OF APOPLEXY AND SOME OTHER DISEASES, ABOVE AND BELOW THE NORMAL STANDARD OF WEIGHT, AND ARRANGED ACCORDING TO AGE.

Age.	Apoplexy.		Casualties, etc.	
	Above Standard.	Below Standard.	Above Standard.	Below Standard.
20 to 29 years.....	4	6	58	123
30 " 39 "	27	23	137	121
40 " 49 "	41	19	100	55
50 " 59 "	24	2	29	26
60 " 69 "	6	1	..	..
Total.....	102	51	327	325

We see here that the proportion of apoplectics above the standard weight was far greater than that of those dying of casualties. Of the former, two thirds were above the standard; of the latter, only one half. This difference is specially marked if we consider only the aged. For the young there is no great difference in the weights; but taking persons above 50 years, it is very decided. Of 55 persons

dying of casualties 29 were above the standard, and 26 below it; while of 33 persons dying of Apoplexy, 30 were above the standard and only 3 below it. This proves that persons dying of Apoplexy at ages above 50 years, are, as a very general rule, of heavier weight than the average. The number of cases is not large enough to render a table of the average weight for different heights at all reliable or useful, although we have found such an average to be almost uniformly higher for those dying of Apoplexy than for those dying of casualties.

Now, with regard to height, the following table gives the number dying of Apoplexy for each inch of height, and also the number dying from casualties, etc.

TABLE XV.

SHOWING THE NUMBER OF DEATHS FROM APOPLEXY AND CASUALTIES, ETC., ARRANGED ACCORDING TO HEIGHT.

Height.	Number of Deaths from	
	Casualties.	Apoplexy.
5 feet	2	1
5 " 1 inch	..	..
5 " 2 inches	3	..
5 " 3 "	8	2
5 " 4 "	21	5
5 " 5 "	36	10
5 " 6 "	52	21
5 " 7 "	87	22
5 " 8 "	103	29
5 " 9 "	88	17
5 " 10 "	113	30
5 " 11 "	70	10
6 "	44	3
6 " 1 inch	11	1
6 " 2 inches	7	1
6 " 3 "	2	..
6 " 6 "	..	1
Total	647	153

Uniting these into groups for convenience, and calculating the proportion for 100 of each class, we have the following table:

TABLE XVI.

SYNOPSIS CONSOLIDATED AND CALCULATED FROM TABLE XV.

Height.	Number of Deaths from	
	Casualties.	Apoplexy.
From 5 feet to 5 feet 4 inches.....	5	5
" 5 " 4 inches to 5 feet 8 inches.	43	54
" 5 " 8 " " 5 " 10 "	31	31
" 5 " 10 " upwards.....	21	10
Total	100	100

We may consider the persons dying of casualty, etc., to represent the average specimen of our Insurance risks, and we have the following result: There have been more deaths from Apoplexy in persons between 5 feet 4 inches and 5 feet 8 inches high, and much fewer in those above 5 feet 10 inches, than might have been expected; out of a similar number of cases, there have been 21 deaths from casualties to 10 deaths from Apoplexy in persons above 5 feet 10 inches. Hence it would appear that tall persons are not as liable to Apoplexy as those of medium height.

This difference between apoplectics and others as regards their respective heights and weights is shown

by the following table, in which the actual weight and height of each case is given. The arrangement of the table has been described in the Report on Consumption, and is similar to those (Nos. XVIII. and XIX.) there given.

TABLE XVII.

SHOWING THE HEIGHT AND WEIGHT OF PERSONS DYING OF CASUALTIES, ETC., AND OF APOPLEXY, AT THE AGE OF 50 YEARS AND UPWARDS.

CASUALTIES, ETC.

HEIGHT.

feet. 5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	5.10	5.11	6 feet.	6.6
							185	175				
							185	170				
					158	158	180	170	188			
					153	155	180	168	163		200	
					148	149	150	165	160		175	
				159	146	145	150	164	160	200	172	
lbs.												
120	125	130	135	140	143	145	148	155	160	165	170	
						142	143	150	155	152	150	
						140	133	146	155	140	146	
						134	128	140	153			
						130	128		150			
						128	126		150			
									145			
									140			
									140			
									130			

APOPLEXY.

HEIGHT.

feet. 5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8	5.9	5.10	5.11	6 feet.	6.6
									193			
							232		190			
							190		185			
							175	193	185			
							162	180	180	218		
							160	173	178	214		
			153				157	165	170	188	205	
			150		162		157	155	170	178	175	210
lbs. 120	125	130	135	140	143	145	148	155	160	165	170	
				124			140					
							140					

This table illustrates at a glance what we have previously stated, that while the average insured persons, as represented by those dying from accidental causes, are in nearly equal numbers above and below the standard of weight for their respective heights, those dying from Apoplexy have been, with very few exceptions, above the standard. We have instances enough to show that persons of all sizes, extremes of high and low stature, and little or great weight, have died of Apoplexy, yet the large majority of such deaths have

been in persons of medium height and excessive weight. This is particularly the case with persons of advanced age, and we are justified by our experience in stating that persons who, at or above the age of 50, are below the usual standard of weight seldom die of Apoplexy.

Thus far we find the old opinion of "an apoplectic conformation of body" sustained and verified. We would suggest that a possible explanation of this discrepancy of views between the older and more modern writers lies in the meaning attached to the term "Apoplexy." The older writers used it in the broad sense and definition that we have adopted, while recent writers have had in view that particular form due to "Cerebral Hemorrhage." This explanation seems to us plausible, but we have no means of verifying it.

An *hereditary predisposition* has also been assigned as one of the causes of Apoplexy. This is supposed to be either an inheritance of the conformation of body described as the mark of an apoplectic constitution, or a transmission of a direct tendency to the disease from parent to child. It is not necessary for us to enter into a discussion of this important subject, as unfortunately our records of family histories are too

few and incomplete to be of much weight in evidence. As far as they go, however, they completely fail to support such an opinion. In 169 of our cases there is a more or less complete family history, and in only 12 of these is there any record of Apoplexy or Paralysis. In 1 case both parents died of either Apoplexy or Paralysis. In 9 cases one parent died of either Apoplexy or Paralysis. In 2 cases one brother died of either Apoplexy or Paralysis.

CONGESTION OF THE BRAIN.

One hundred and eleven deaths have been reported from Congestion of the Brain. The disease resembles apoplexy in some of its symptoms, but the diagnosis is more obscure and the meaning of the term undefined. On account of this indefiniteness of pathology and diagnosis, it requires but slight statistical consideration. Some of the cases reported as Congestion of the Brain are probably Bright's disease, and others are the result of alcoholism. Like apoplexy, it is sudden in onset, short in duration, and attended with unconsciousness. It differs from it in showing a greater

prevalence in the earlier years of life. Fourteen per cent of the cases of apoplexy, and 38 per cent of cases of Congestion of the Brain, occurred under forty years of age. In proportion to the number living, however, there is a very slight increase in the number of deaths with advancing age. It has occurred with equal frequency at all periods of insurance. A comparatively small number of cases have been reported from the Eastern States and a large number from the West.

SOFTENING OF THE BRAIN.

THERE have been 69 deaths from Softening of the Brain. One case only occurred under 30 years of age. After this period it increases in frequency with advancing years, though not nearly so rapidly as apoplexy, as is seen by the following table:

TABLE XVIII.

SHOWING THE ANNUAL MORTALITY FROM SOFTENING OF THE BRAIN, AMONG 100,000 LIVING MALES, AT EACH DECENNIAL PERIOD OF LIFE, IN NEW YORK CITY, AND IN THE MUTUAL LIFE.

Age.	Number of Lives.	Number of Deaths Annually.	
		New York City.	Mutual Life.
20 to 29 years.....	100,000	6	1
30 " 39 "	100,000	12	9
40 " 49 "	100,000	19	11
50 " 59 "	100,000	44	25
60 " 69 "	100,000	134	35
70 and upwards.....	100,000	334	43

There are no other points calling for special notice, except that we do not find the same high mortality during the first year after insurance from this disease as we found for apoplexy.

DISEASE OF THE BRAIN.

In 85 cases the medical certificates have stated that death was caused by "Disease of the Brain," the particular form of disease being unrecognized. On account of this indefiniteness and obscurity it is unnecessary to consider them further than we have already done in the tables of our Preliminary Report.

PARALYSIS.

One hundred and twenty-five deaths have been attributed to Paralysis. This does not include those forms of Paralysis caused by disease of the spinal cord. The term, as used in death certificates, is generally applied to chronic cases in which Paralysis has remained after partial recovery from cerebral hemorrhage, or resulted from softening or other disease of the brain. It is also sometimes used in acute cases of the above diseases, where the paralysis is the most prominent symptom, and which are consequently called "Paralytic Strokes."

We have already seen that the above-mentioned diseases generally occur after middle age, and consequently we may expect that patients who survive those lesions with resulting Paralysis will die at still more advanced ages. This is shown by the following table:

TABLE XIX.

SHOWING THE ANNUAL MORTALITY FROM PARALYSIS, AMONG 100,000 LIVING MALES, AT EACH DECENNIAL PERIOD OF LIFE, IN NEW YORK CITY, AND IN THE MUTUAL LIFE.

Age.	Number Living.	Number of Deaths Annually.	
		New York City.	Mutual Life.
20 to 29 years.....	100,000	4	4
30 " 39 "	100,000	9	5
40 " 49 "	100,000	25	14
50 " 59 "	100,000	49	51
60 " 69 "	100,000	168	100
70 and upwards.....	100,000	647	488

The number of cases continues large up to extreme old age. The percentage on the mortality from all causes increases rapidly in the last two decades; the

number of deaths in 100,000 lives exposed increases from 5 in 100,000 between 30 and 40 years, to 51 in 100,000 between 50 and 60, and 647 between 70 and 80 years. This increase is greater and more rapid than we found even for apoplexy.

For the same reasons, its appearance at advanced age, and its chronicity as a sequel to acute disease, it comparatively seldom occurs in the first years of insurance, but generally among those who have been insured for a number of years, as shown by the following table:

TABLE XX.

SHOWING THE NUMBER OF DEATHS FROM PARALYSIS, IN PROPORTION TO THE NUMBER OF LIVES, AT DIFFERENT PERIODS OF INSURANCE.

Duration of Insurance.	Number of Lives.	Number of Deaths.
1st year.....	100,000	6
2d "	100,000	9
3d to 5th year.....	100,000	14
6th " 10th "	100,000	29
Above 10 years.....	100,000	72

We find that Paralysis causes less than 1 per cent of the deaths of those in their first year of insur-

ance, and nearly 5 per cent of those insured more than 10 years; and that 6 out of 100,000 insured will die of Paralysis in the first year of insurance, while 72 out of 100,000 of those insured more than 10 years will die annually from the cause. A proper inference from this and the preceding table is, that when Paralysis figures high among the causes of death in the mortality of an Insurance Company, it denotes that its deaths have been chiefly among the aged, and after a considerable duration of insurance.

INFLAMMATORY DISEASES OF THE BRAIN.

We have included under this title all deaths designated on the certificates as caused by Inflammation of the Brain, Meningitis, Cephalitis, Encephalitis, Phrenitis, Brain Fever, and Abscess of the Brain. The number of these cases is 70. The diagnosis of these diseases is often obscure, and perhaps has not always been reliable, but we find that as a class they possess some characteristics which separate them from the diseases we have been considering. The most noticeable difference is the age at which they occur.

TABLE XXI.

SHOWING THE ANNUAL MORTALITY FROM INFLAMMATORY DISEASES OF THE BRAIN AMONG 100,000 LIVING MALES AT EACH DECENNIAL PERIOD OF LIFE IN NEW YORK CITY AND IN THE MUTUAL LIFE.

Age.	Number of Lives.	Number of Deaths Annually.	
		New York City.	Mutual Life.
20 to 29 years.....	100,000	25	16
30 " 39 "	100,000	32	9
40 " 49 "	100,000	33	15
50 " 59 "	100,000	48	12
60 " 69 "	100,000	67	44
70 and upwards.....	100,000	103	..

We find in the Company's experience no regular increase of mortality with age, as we found for other brain diseases; but that it is as high between 20 and 30 years as subsequently. The whole series is irregular, and the proportion of deaths is greatest between 50 and 60 years, but this is probably owing to the small number of the cases. There is certainly no such regular increase as we found for apoplexy

and paralysis, and the number among the very young is far greater than in other brain diseases. We have found, too, that the mortality is about equal at all periods of insurance. In the population of New York, the mortality shows a steady though slight increase with age.

EPILEPSY AND CONVULSIONS.

THERE have been 30 deaths from these diseases. We have grouped them together, because, although they are distinct diseases, the difference is frequently neglected by physicians, and persons dying from a first attack of Convulsions are said to have Epilepsy, and the reverse. Epilepsy means convulsive attacks, periodically recurring; while Convulsions may arise from various causes. When the cause of the Convulsion is not ascertained, we are obliged to be satisfied with a diagnosis of "Convulsion."

The deaths have occurred nearly equally at all ages and all periods of insurance, and we have nothing further to add to the tables in our Preliminary Report.

INSANITY.

SEVENTY persons are reported to have died insane, in 31 of whom the Disease of the Brain was the direct cause of death, and 39 committed suicide. These are all the cases in which there is any record of insanity, although it is possible that there may have been other insane persons who have died of fever, pneumonia, or other acute disease, and their deaths been recorded under these titles; or the cause of death may have been called "Disease of the Brain."

The number of suicides in proportion to the total number is very great, and it certainly is very remarkable that more insane persons should die by suicide than by disease. The majority of them may have shown some premonitory symptoms, and aroused suspicions in regard to their sanity, but the suicide was the first pronounced and undoubted symptom of insanity. We will enter into this subject more fully when we come to deaths by suicide, and for this reason we shall tabulate separately the two sets of cases.

TABLE XXII.

SHOWING THE NUMBER OF DEATHS FROM INSANITY, BY DISEASE AND BY SUICIDE, AND THE PROPORTION IN 100,000 LIVES AT EACH DECENNIAL PERIOD OF LIFE.

Age.	By Disease.		By Suicide.	
	Number of Deaths.	Proportion in 100,000 Living.	Number of Deaths.	Proportion in 100,000 Living.
20 to 29 years	0	0	1	1
30 " 39 "	6	3	14	7
40 " 49 "	10	5	10	5
50 " 59 "	8	9	10	12
60 " 69 "	7	35	4	18
70 and upwards.....	0	0	0	0

There were no deaths by disease under 30 years of age, and but few under 40 years. The largest number occurred between 40 and 50. The proportion to the number of lives increases up to 70 years; after this, there were no deaths. The number of deaths by suicide is largest between 30 and 40 years—the very period when those by disease are fewest. The deaths by suicide were also largely in excess during the first year of insurance.

The numbers are too few to exhibit any influence arising from Nativity, Residence, or Occupation. The only instances of any hereditary influence are one case in which the father died at the age of 51 of "depression from failure in business," and another in which the father died at 63 years of age of "Brain Disease."

In addition to these cases of Insanity, there have been 3 other deaths attributed to mental or emotional diseases of the nervous system: 2 from "Mental Anxiety in business," and 1 from "Fright."

MISCELLANEOUS.

THERE have been several cases of special diseases of the nervous system which do not come under any of the above titles, and are yet too few to require anything more than mere mention. These comprise 3 cases of Neuralgia, 2 from Progressive Muscular Atrophy, and 1 each from Cerebro-Spinal Sclerosis, Cerebral Embolism, and Cerebral Anæmia.

DISEASES OF THE SPINAL CORD.

THIRTEEN deaths have been occasioned by some disease of the spinal cord, but the certificates are too indefinite to allow any satisfactory classification or identification. The names used are as follows: Disease of Spine, Disease of Spinal Cord, Spinal Disease, Inflammation and Congestion of Spinal Cord, Myelitis, Inflammation of Spine, Paraplegia. The number for each decennial period of life was as follows: between 30 and 39, 5 cases; 40 and 49, 4 cases; 50 and 59, 2 cases; 60 and 69, 1 case; 70 and 79, 1 case. The proportion of deaths under 50 years of age is far greater than that which we found from diseases of the brain; probably because very many of these spinal diseases were inflammatory and not degenerative.

DISEASES OF THE CIRCULATORY SYSTEM.

THESE consist almost entirely of diseases of the heart; diseases of the arteries and veins forming only a very small percentage of the total. Thus, there have

been 307 deaths from disease of the heart, 19 from diseases of the arteries, and 4 from diseases of the veins.

In only one third of the cases is the special lesion or variety of disease mentioned, and in two thirds the certificates merely state "Heart Disease" to be the cause of death. It is, therefore, useless to analyze the varieties separately, and we will take the whole class of Heart Diseases together.

They may be divided into three groups, when considered in relation to their symptoms and course: 1st, acute inflammatory lesions; 2d, permanent impairment of tissue, resulting from these inflammatory lesions, or degenerative changes of tissue; 3d, sudden deaths and angina.

The large majority belong to the second group. Their course is chronic, and they produce symptoms of impeded circulation and lessened vitality for some length of time before death. The lesions may exist, however, for years, without any perceptible effect on the health, though they may generally be detected by a medical examination.

In our Preliminary Report, we investigated partially the influence of age on the causation of Heart Disease. We then found that the comparative mortality from Diseases of the Heart was small in the early

ages of life, and increased with each succeeding decade, from less than 2 per cent under 30 years, to nearly 13 per cent after 70 years. We will now give a table, showing the number of deaths in proportion to the number living.

TABLE XXIII.

SHOWING THE ANNUAL MORTALITY FROM DISEASES OF THE HEART AMONG 100,000 LIVING MALES AT EACH DECENNIAL PERIOD OF LIFE IN NEW YORK CITY AND IN THE MUTUAL LIFE.

Age.	Number of Lives.	Number of Deaths Annually.	
		New York City.	Mutual Life.
20 to 29 years.....	100,000	75	12
30 " 39 "	100,000	90	26
40 " 49 "	100,000	127	41
50 " 59 "	100,000	227	106
60 " 69 "	100,000	452	367
70 and upwards.....	100,000	899	732

Taking the mortality of New York City as an illustration of the average frequency of Heart Disease, we find that, out of a population of 100,000 males between 20 and 30 years of age, there are 75 deaths

annually from Diseases of the Heart; in the same number between 50 and 60 years, there are 227 deaths; and in the same number between 70 and 80, there are 899 deaths. The number of deaths is thus small in youth, increases regularly and rapidly, so that, in old age, Heart Disease is one of the most common causes of death. In the experience of the Mutual Life, the mortality at all periods of life is less than in the general population, though here, too, the deaths are very numerous after 60 years of age. The difference between the rates of the insured and the general population is greatest in early life, the deaths being only 12 in the Mutual Life to 75 in New York City, between 20 and 30 years of age; after 60, however, the difference is less, though still marked, there being 452 deaths in New York to 367 in the Mutual Life, and after 70 years, 899 deaths in New York to 732 in the Mutual Life.

Since, then, Diseases of the Heart are such frequent causes of death among elderly people, Insurance Companies must always show a high mortality from them, and the proportionate mortality will be great just in proportion to the success of the company in escaping early deaths. It will also depend somewhat upon the age of the company, as the oldest companies

will have the greatest number of advanced lives. Thus, we find, in the Mutual Life, the proportion of deaths above 60 years of age has been 13 per cent, and the mortality from Heart Disease nearly 6 per cent of the mortality from all causes; in the Scottish Widows' Fund Life Insurance, nearly 50 per cent of the deaths have been above 60 years of age, and the mortality from Heart Disease has been nearly 16 per cent. The latter company has been in existence 60 years, and has a large number of advanced lives at risk.*

It was seen in Diagram XVI. of our Preliminary Report that the mortality rate from Diseases of the Heart increased in proportion to the duration of insurance. The rate was 3.18 per cent of the mortality from all causes, during the first year of insurance, and 8.88 per cent after the tenth year. The actual rate of increase is still better seen by the following table:

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* Edinburgh Medical Journal, Dec., 1874.

TABLE XXIV.

SHOWING THE NUMBER OF DEATHS FROM HEART DISEASE IN PROPORTION TO THE NUMBER OF LIVES, AT DIFFERENT PERIODS OF INSURANCE.

Duration of Insurance.	Number of Lives.	Number of Deaths.
1st year	100,000	22
2d "	100,000	32
3d to 5th year	100,000	46
6th " 10th "	100,000	83
Above 10 years	100,000	141

During the first year, the annual mortality is 22 in 100,000 lives; during the second year, 32; from the third to the fifth year, 46; from the sixth to the tenth year, 83; and above ten years, 141. This increased mortality after prolonged insurance is chiefly due to the influence of advancing age, but also partly to the influence of medical examination in eliminating those suffering from this class of disease. The thoroughness of this examination and elimination is seen in the very small number of the deaths during the first and second years of insurance, only about 25 in 100,000 lives. Some of these cases, coming on soon after insurance

were due to acute inflammatory attacks from rheumatism, and others to chronic forms of disease, thus showing that serious disease of the Heart may commence insidiously and make considerable progress without giving any symptom or sign to attract the attention of the medical examiner.

The relation of Rheumatism to Heart Disease has often been discussed, and is of considerable importance in life insurance examinations. Unfortunately, we have but few records bearing on this subject. Of the 307 deaths from Heart Disease, in 34 only was there any record of Rheumatism; in 21 cases there had been Rheumatism previous to insurance; there were 7 cases of Acute Rheumatic Inflammations of the Heart, and 6 other cases in which the disease was attributed to Rheumatism. These numbers are too few to require further consideration.

There have been 19 deaths from Aneurism, including 1 case recorded as "a rupture of the aorta into the pericardium." In 16 cases the aorta was the seat of the disease, and in the other 3 there is no record of the vessel affected. The age at death was as follows: 4 cases between 30 and 39 years, 5 between 40 and 49, 6 between 50 and 59, and 3 between 60 and 69 years. The earliest age was 32 years, at which there

were 2 deaths. Four died within 1 year after insurance, at the ages of 32, 43, 47, and 53 years.

Of the 4 cases of Phlebitis, 1 was stated to be inflammation of the portal vessels; in the others there is no special record.

DISEASES OF THE RESPIRATORY SYSTEM.

THE number of deaths from diseases of the Respiratory Organs was given in our Preliminary Report as 648. We have removed from this class all deaths recorded as being caused by Hemorrhage, Abscess, or Disease of the Lungs, and Chronic Pneumonia, and transferred them to Consumption. There were 110 cases under these titles, and the number of deaths from diseases of the Respiratory System proper is therefore reduced to 538.

The acute inflammatory affections, Pneumonia, Bronchitis, and Pleurisy, are the chief diseases of this class, producing about five sixths of the total mortality; the remaining sixth being caused by the same diseases in a chronic form and a few rarer diseases, as, Laryngitis, Emphysema, etc.

PNEUMONIA.

THREE hundred and fifty-eight deaths have been caused by Pneumonia. It prevails as a frequent cause of death at all periods of life, but its fatality is extreme in advanced age. We showed in our Preliminary Report, Diagram V., that it caused about 4 per cent of the mortality between 20 and 30 years, and nearly 12 per cent after 70 years. The following table gives a still better idea of its actual importance as a source of mortality:

TABLE XXV.

SHOWING THE ANNUAL MORTALITY FROM PNEUMONIA AMONG 100,000 LIVING MALES AT EACH DECENNIAL PERIOD OF LIFE IN NEW YORK CITY AND IN THE MUTUAL LIFE.

AGE.	NUMBER LIVING.	NUMBER OF DEATHS ANNUALLY.	
		New York City.	Mutual Life.
20 to 29 years.....	100,000	83	25
30 " 39 "	100,000	125	42
40 " 49 "	10,0000	172	64
50 " 59 "	100,000	355	110
60 " 69 "	100,000	511	248
70 and upwards.....	100,000	1181	647

The influence of age on the mortality from Pneumonia is seen equally in both columns, although the actual number of deaths differs greatly in the two. In our own experience we have, between 20 and 30 years of age, 25 deaths annually out of 100,000 living; between 50 and 60, 110 deaths; and above 70 years, 647 deaths out of the same number of lives. In New York City the mortality is far greater; between 20 and 30 years, there were 83 deaths in 100,000 lives, and of 100,000 living above 70 years of age there was the enormous mortality of 1181. This difference between the mortality of insured lives and the general population, is due to medical selection and to certain obvious distinctions between the two classes. Pneumonia, like Typhoid Fever, may attack the most healthy and robust, and no medical examination can detect a liability to it, but it is more particularly fatal among the weak, sickly, and intemperate, and these cases are easily excluded from insurance risks. Poverty and destitution, with their necessary accompaniments, also increase the fatality of the disease, and the poor and destitute do not insure their lives.

We found also in our Preliminary Report that the percentage of mortality from Pneumonia to the mortality from all causes was nearly equal at all periods of

insurance, varying from 7 to nearly 9 per cent. The following table shows its frequency in proportion to the lives:

TABLE XXVI.

SHOWING THE NUMBER OF DEATHS FROM PNEUMONIA IN PROPORTION TO THE NUMBER OF LIVES AT DIFFERENT PERIODS OF INSURANCE.

Duration of Insurance.	Number of Lives.	Number of Deaths.
1st year	100,000	52
2d "	100,000	52
3d to 5th year	100,000	62
6th " 10 "	100,000	79
Above 10 years	100,000	97

The proportional number of deaths is equal during the first and second years after insurance; but after this period the mortality increases with the duration of the insurance, from 52 per 100,000 in the first year, to 97 after 10 years' insurance. This increase is considerable, and probably arises merely from the correspondingly advanced ages of the lives at the respective periods.

The influences of Nationality and Residence were considered in our Preliminary Report, and we will now merely repeat that they were both found to be inconsiderable in amount.

PLEURISY.

Our records furnish little information concerning Pleurisy beyond that given in our Preliminary Report, and the mortality from it is not large enough to require any extended remarks. There have been 41 deaths in all. The death certificate states that the form of the disease was Hydrothorax in 12 cases, and Empyema in 3 cases. In some instances the disease was acute, and in others chronic, lasting one or two years. The following table shows the ages at death:

TABLE XXVII.

SHOWING THE NUMBER OF DEATHS FROM PLEURISY AT EACH DECENNIAL PERIOD OF LIFE, AND ACCORDING TO THE DURATION OF INSURANCE.

Age in Decennial Periods.	Number of Deaths.	Duration of Insurance.	Number of Deaths.
20 to 29 years.....	0	1st year.....	2
30 " 39 "	11	2d "	5
40 " 49 "	14	3d to 5th year.....	17
50 " 59 "	7	6th " 10th "	10
60 " 69 "	8	Above 10 years.....	7
70 and upwards.....	1		
	41		41

BRONCHITIS.

Forty-six deaths have occurred from Bronchitis. Thirteen cases are stated to have been acute, and 23 chronic, while in 10 no particulars are given. The following table shows the ages and periods of insurance:

TABLE XXVIII.

SHOWING THE NUMBER OF DEATHS FROM BRONCHITIS AT EACH DECENNIAL PERIOD OF LIFE, AND ACCORDING TO THE DURATION OF INSURANCE.

Age in Decennial Periods.	Number of Deaths.	Duration of Insurance.	Number of Deaths.
20 to 29 years.....	4	1st year.....	4
30 " 39 "	12	2d "	4
40 " 49 "	8	3d to 5th year.....	14
50 " 59 "	17	6th " 10th "	9
60 " 69 "	2	Above 10 years....	15
70 and upwards.....	3		
	46		46

We have noticed a great difference in the relative frequency of these acute inflammatory diseases, as they occur in our experience and in that of Scotch insured

lives. This difference is of considerable interest, and is well shown in the table given below. The proportion of deaths from diseases of the respiratory organs to the deaths from all causes is nearly equal in both cases; in the Mutual Life, out of a total of 5226 deaths, 648, or 12.41 per cent, were from respiratory diseases; and in Scottish Widows' Fund, out of 5633 deaths, 727, or 12.91 per cent, were from this same class of diseases. The percentages are thus almost exactly equal, but the individual diseases differ greatly.

TABLE XXIX.

SHOWING THE FREQUENCY OF PNEUMONIA, BRONCHITIS, AND PLEURISY IN THE EXPERIENCE OF THE MUTUAL LIFE AND IN THAT OF THE SCOTTISH WIDOWS' FUND LIFE INSURANCE COMPANY.

Diseases.	Mutual Life.	Scottish Widows' Fund Life.
Total respiratory diseases.....	648	727
Pneumonia.....	388	165
Percentage.....	59.88	22.69
Bronchitis.....	46	314
Percentage.....	7.10	43.19
Pleurisy.....	41	63
Percentage.....	6.33	8.69

Nearly half (43 per cent) the deaths among the Scotch are caused by Bronchitis, and less than one fourth (23 per cent) by Pneumonia, while in our own experience more than one half (63 per cent) are caused by Pneumonia and a very small portion (7 per cent) by Bronchitis. The difference in these two reports is due partly to an actual difference in the prevalence of the two diseases, and perhaps partly to a difference in the nomenclature and pathological opinions of the members of the profession in the two countries. The proportion of Pleurisy is nearly equal in both.

CONGESTION OF THE LUNGS.

In 61 cases the medical certificates give Congestion of the Lungs as the cause of death. These cases were sufficiently analyzed in our Preliminary Report. The term is indefinite in its meaning, and does not denote any particular form of disease. In two cases the duration of the disease was less than one hour, and in 7 cases, more than one month, with extremes of 30 minutes and 5 years. In some cases it probably signifies Bronchitis or Pneumonia. It is a little more frequent after 50 years than before that age.

DISEASES OF THE LARYNX.

THERE have been 14 deaths from various kinds of diseases of the Larynx: 8 are recorded as Laryngitis, 2 from Chronic Laryngitis, 2 from Chronic Disease of the Larynx, and 2 from Œdema of the Glottis. The ages were as follows: three cases between 20 and 29 years, four between 30 and 39, three between 40 and 49, three between 50 and 59, and one between 60 and 69 years.

MISCELLANEOUS.

THE remaining cases are too few of each disease to permit any analysis, and we will therefore merely give them a brief mention.

Epistaxis, 1 case, age 39, particulars unknown.

Asthma, 7 cases. Three died young, 1 at 29 and 1 at 33 years, 1 at 39 years, while the others were past 50 years of age, and 1 was 70. The case which died at 33 years had suffered from Acute Rheumatism before his insurance.

Emphysema. There have been 2 deaths from Em-

physema of the Lungs, at the ages of 41 and 56 years, and after a duration of insurance of 10 or 12 years.

Pulmonary Apoplexy, 4 cases, ages 46, 47, 50, and 63 years.

Gangrene of Lungs. Three cases, ages 35, 43, and 53 years.

Œdema of Lungs. One case, German, aged 42, insured 7 years and living in Germany at time of death. Duration of disease 4 hours. No other particulars given.

DISEASES OF THE DIGESTIVE SYSTEM.

THERE have been 493 deaths from Diseases of the Digestive Organs. These are chiefly affections of the stomach, bowels, and liver, and a few others, undefined and miscellaneous.

We have here to encounter the same difficulties, perhaps in a still greater degree, which we have experienced in other cases arising from indefiniteness of the terms employed, and the difficulties of an accurate diagnosis. The list of individual diseases is large, and the number for each disease small, and we will there-

fore group them together according to the organ affected, in the same manner as in the Preliminary Report, and will only occasionally give the particulars of the individual diseases. The following table will show the differences between the insured and non-insured in the comparative prevalence of this class of diseases.

TABLE XXX.

SHOWING THE PERCENTAGE OF DEATHS FROM DIGESTIVE DISEASES ON THE MORTALITY FROM ALL CAUSES, AND THE ANNUAL MORTALITY IN 100,000 LIVES, AT EACH DECENNIAL PERIOD OF LIFE, IN NEW YORK CITY AND IN THE MUTUAL LIFE.

Age in Decennial Periods.	Percentage on Total Mortality.		Annual Mortality in 100,000 Lives.	
	New York City.	Mutual Life.	New York City.	Mutual Life.
20 to 29 years.....	3.54	6.35	60	41
30 " 39 "	4.74	8.96	93	64
40 " 49 "	6.40	10.01	149	86
50 " 59 "	6.60	10.27	23	138
60 " 69 "	6.68	11.46	394	336
70 and upwards.....	5.69	4.73	874	388

We find here that the percentage of Digestive Diseases as compared to the mortality from all causes is considerably greater among the insured than in the population at large, and this difference exists at all periods of life. It does not, however, indicate a greater mortality, as is proved by the second portion of the table. It is there seen that out of an equal number of living persons, the number dying yearly is much less among the insured; between the ages of 20 and 30 years of age, there are 60 deaths in the New York City population, to 41 in the Mutual Life; between 40 and 50, there are 149 deaths in New York, and 86 in the Mutual Life; and between 60 and 70 there are 394 deaths in New York, and 336 in the Mutual Life.

DISEASES OF THE STOMACH.

THERE have been 78 deaths from Diseases of the Stomach, as follows: Inflammation of Stomach, 31 cases; Ulceration, 16; Hemorrhage, 9; Tumor, 2; undefined disease, 20. The following table will show the influence of age:

TABLE XXXI.

SHOWING THE PERCENTAGE OF DEATHS FROM DISEASES OF THE STOMACH ON THE MORTALITY FROM ALL CAUSES, AND THE ANNUAL MORTALITY IN 100,000 LIVES AT EACH DECENNIAL PERIOD OF LIFE.

Age in Decennial Periods.	Percentage on Mortality from all Causes.	Annual Mortality.	
		Number of Lives Exposed.	Number of Deaths.
20 to 29 years.....	.41	100,000	3
30 " 39 "	1.26	100,000	9
40 " 49 "	1.26	100,000	10
50 " 59 "	2.18	100,000	29
60 " 69 "	2.03	100,000	64
70 and upwards.....	2.96	100,000	259

We find an increase of mortality with each decade of life, and the rate of increase is very great after 50 years of age. There are 3 deaths in 100,000 lives between 20 and 30 ; 29 deaths between 50 and 60; 64 between 60 and 70; and 259 in those above 70 years. The rate of increase of Disease of the Stomach is greater than for all diseases of the digestive organs.

In our Preliminary Report we found that the rate of mortality, as compared with the mortality from all

causes was nearly equal at all periods of insurance. There was an increase during the second year, but this was probably accidental. We repeat the table there given, and also repeat the rate of mortality in proportion to the numbers insured:

TABLE XXXII.

SHOWING THE PERCENTAGE OF DEATHS FROM DISEASES OF THE STOMACH ON THE MORTALITY FROM ALL CAUSES, AND THE MORTALITY IN 100,000 INSURED LIVES AT DIFFERENT PERIODS OF INSURANCE.

Duration of Insurance.	Percentage on Mortality from all Causes.	Annual Mortality.	
		Number of Lives Exposed.	Number of Deaths.
1st year.....	1.31	100,000	9
2d "	2.23	100,000	17
3d to 5th year.....	1.44	100,000	13
6th " 10th "	1.22	100,000	16
Above 10 years.....	1.62	100,000	26

We find that there are few deaths from Diseases of the Stomach during the first year of insurance, and that they become more frequent in proportion to the time insured, from 9 in 100,000 living in the first year,

to 26 in 100,000 after 10 years of insurance. The number of deaths in the second year is disproportionally great; but we consider and treat this as purely accidental, on account of the small number of cases. In our Preliminary Report it was shown that the only apparent influence of Nationality is, that the Germans give the lowest and the Irish the highest rates of mortality, and for the influence of place of Residence, that the mortality from this class of diseases was highest in the Southern States. We have nothing further to add to these conclusions.

DISEASES OF THE BOWELS.

THERE have been 146 deaths from Diseases of the Bowels, as follows: Inflammation of Bowels, 94; Congestion, 4; Ulceration, 16; Hemorrhage, 16; Obstruction, 6; Perforation, 2; Internal Strangulation, 1; undefined disease, 7. The term "Inflammation of Bowels" does not always indicate the same disease, signifying sometimes "Peritonitis," and sometimes "Diarrhœa," and we shall not, therefore, analyze this disease by itself, although the number of cases is large,

but will take the whole group together, as we have done in our Preliminary Report. In fact, we shall have but little to add to the tables and remarks in that report, except tables giving the mortality out of the whole number of lives insured.

We shall give first the table showing the influence of age:

TABLE XXXIII.

SHOWING THE PERCENTAGE OF DEATHS FROM DISEASES OF THE BOWELS ON THE MORTALITY FROM ALL CAUSES, AND THE ANNUAL MORTALITY IN 100,000 LIVES AT EACH DECENNIAL PERIOD OF LIFE, IN THE MUTUAL LIFE INSURANCE CO.

Age.	Percentage on Mortality from all Causes.	Annual Mortality.	
		Number of Lives Exposed.	Number of Deaths.
20 to 29 years.....	3.07	100,000	21
30 " 39 "	3.22	100,000	23
40 " 49 "	2.52	100,000	21
50 " 59 "	2.55	100,000	33
60 " 69 "	3.14	100,000	89
70 and upwards.....	.79	100,000	44

We find that the mortality is almost exactly equal for the first three decades—about 20 deaths in 100,000 lives; after 50 years it increases somewhat, and rises exceptionally high between 60 and 70 years to 89 deaths in 100,000 lives. This increase, though decided, is still very small, compared with that occurring in Diseases of the Stomach.

TABLE XXXIV.

SHOWING THE PERCENTAGE OF DEATHS FROM DISEASES OF THE BOWELS ON THE MORTALITY FROM ALL CAUSES, AND THE ANNUAL MORTALITY IN 100,000 INSURED LIVES AT DIFFERENT PERIODS OF INSURANCE.

Duration of Insurance.	Percentage on Mortality from all Causes.	Annual Mortality.	
		Number of Lives Exposed.	Number of Deaths.
1st year.....	4.49	100,000	29
2d "	3.26	100,000	27
3d to 5th year.....	3.19	100,000	30
6th " 10th "	2.06	100,000	23
Above 10 years.....	2.06	100,000	33

The rate of mortality is remarkably equal for all periods of insurance. It varies slightly at different

periods, as might be expected, but the variation is irregular. The extremes are 23 and 33 deaths in 100,000 lives. There are 29 deaths in 100,000 in the first year of insurance, and 33 deaths in the same number after 10 years of insurance.

The only apparent influence of nationality is with regard to the Irish, who gave the highest mortality for Diseases of the Stomach, and now give the lowest mortality for Diseases of the Bowels.

As regards locality: The Eastern States gave the smallest mortality and the Western States the highest.

DISEASES OF THE LIVER.

THERE have been 148 deaths from Diseases of the Liver, recorded as follows: Inflammation of Liver, 31; Congestion, 10; Abscess, 14; Cirrhosis, 25; Enlargement, 4; Fatty Degeneration, 2; Acute Yellow Atrophy, 1; Jaundice, 10; Impacted Gall Stones, 3; Obstructed Hepatic Duct, 1; Rupture of Gall Bladder, 1; undefined Disease of Liver, 46 cases.

We shall take the whole group together in our tables:

TABLE XXXV.

SHOWING THE PERCENTAGE OF DEATHS FROM DISEASES OF THE LIVER ON THE MORTALITY FROM ALL CAUSES, AND THE ANNUAL MORTALITY IN 100,000 LIVES AT EACH DECENNIAL PERIOD OF LIFE, IN THE MUTUAL LIFE INSURANCE CO.

Age.	Percentage on Mortality from all Causes.	Annual Mortality.	
		Number of Lives Exposed.	Number of Deaths.
20 to 29 years.....	.20	100,000	1
30 " 39 "	1.89	100,000	13
49 " 49 "	4.11	100,000	36
50 " 59 "	3.64	100,000	49
60 " 69 "	3.14	100,000	84
70 and upwards.....	.79	100,000	43

We find here a very low mortality under 30 years, increasing in the next ten years, and after 40 becoming very high.

TABLE XXXVI.

SHOWING THE PERCENTAGE OF DEATHS FROM DISEASES OF THE LIVER ON THE MORTALITY FROM ALL CAUSES, AND THE RATE OF MORTALITY IN 100,000 LIVES AT DIFFERENT PERIODS OF INSURANCE.

Duration of Insurance.	Percentage on Mortality from all Causes.	Annual Mortality.	
		Number of Lives Exposed.	Number of Deaths.
1st year.....	1.87	100,000	11
2d "	2.06	100,000	17
3d to 5th year.....	3.25	100,000	31
6th " 10th "	2.74	100,000	33
Above 10 years.....	3.16	100,000	50

We find few deaths during the first and second years of insurance, but after that time they increase steadily. These two tables give the results which we might have anticipated. We had previously found that the proportionate rate of mortality was small under 40 years of age, and we now find the verification of our previous conclusions. So also, Diseases of the Liver are usually chronic in their nature, and the first symptoms are manifested long before the final

issue; consequently a proper medical examination will detect the approach of the disease in applicants, and there ought to be but few deaths within a few years after insurance. There will be some such deaths, however, because some of these diseases are acute in their nature, and may attack individuals in an apparently sound state of health.

Our records do not show any decided influence resulting from Nationality or place of Residence.

MISCELLANEOUS.

THERE have been 58 deaths from Peritonitis. These were sufficiently analyzed in our Preliminary Report, as the number is not large enough for exact conclusions. The only result deduced from our records is, that Peritonitis is a disease frequently occurring in youth, and soon after insurance in healthy persons. Consequently the mortality from it, compared with that from all causes, is larger in these classes of persons, although the actual frequency increases with age. Fourteen deaths have been recorded from "Gastro-enteritis," or Inflammation of the Stomach and Bowels,

and 1 from Congestion of the Stomach and Bowels, 1 from Hemorrhage of the Stomach and Bowels, 7 from undefined Disease of the Abdominal Organs, 3 from Dyspepsia and Indigestion, 1 from Constipation, 2 from Tympanites, and 4 from Colic. In all these cases the diseases are too indefinite to require more than a mere enumeration, except that one of the cases of Colic was lead colic, the subject of which was a painter 38 years of age, and who had been insured only 5 months.

There have been 10 deaths from Ascites, in which the cause of the dropsy is not mentioned. All but 2 were over 40 years of age, and in 1 case, where death occurred only 8 months after insurance, the physician states that the disease was of some months' standing.

There have been 5 deaths from Hernia. As these cases are important from the fact that the existence of a rupture is considered as causing a special risk of death, we will give the particulars as far as possible, although the records are very deficient. In 1 case the certificate merely states "Double Hernia" to be the cause of death; the patient was an agent 47 years of age, had been insured 13 years, and had a Hernia at the time of insurance. In the second case the certificate states Umbilical Hernia as the cause of death; the

person was a farmer 35 years of age; had been insured two and a quarter years; there was no rupture at time of insurance. In the third case the only statement on the certificate is Hernia, in a mechanic 41 years of age, insured 5¾ years, who had no Hernia when insured. The fourth case, cause of death Strangulated Hernia, a banker, aged 38 years, and insured 2 years; no Hernia at time of insurance; fifth case, cause of death, Strangulated Hernia, a merchant, aged 24 years, insured a little over 1 year, who had a Hernia when insured. In none of the cases is it stated that an operation had been performed for the relief of the Hernia; in only two of the cases did the Hernia exist at the time of insurance. We should judge from this record that the presence of a Hernia adds little to the risk of death, provided the person wear a proper truss; the Company has insured h e life of large numbers of persons with Hernia, and yet in all their experience only two such persons have died from the effects of this trouble.

There have been 4 deaths from Tumors, 2 recorded as Tumor of Stomach, and 2 as Abdominal Tumor. Also 2 deaths from Fistula in Ano, 1 from Stricture of the Œsophagus, and one from Gangrene of the Tongue.

There have been 4 deaths from Diseases of the Spleen, recorded as follows: Enlargement, 2; Abscess, 1; Congestion and Rupture, 1; also 3 deaths from Leucocythæmia, all three occurring in the years 1871 and 1872.

DISEASES OF THE URINARY ORGANS.

THERE have been 290 deaths caused by Diseases of the Urinary Organs, divided as follows: Diseases of the Kidneys, 148; Diabetes, 40; Diseases of the Bladder, 18; Prostate Gland, 7; External Organs, 4; Gravel, 2; Addison's Disease, 1.

It will thus be seen that two thirds of the deaths are caused by diseases of the Kidneys, and less than one half the remainder by diseases of other urinary organs, while quite a large number are attributed to Diabetes, the pathology of which is still obscure.

Taken as a class, Diseases of the Urinary Organs are generally chronic in their nature, and most prevalent after middle life, although most of them occur occasionally in the young.

DISEASES OF THE KIDNEYS.

THERE have been 148 deaths from Diseases of the Kidneys, recorded as follows: Bright's Disease, 85; Inflammation or Congestion of Kidneys, 7; Abscess, 2; Tumor, 1; undefined disease, 53. A large number of these undefined cases were probably Bright's Disease, as well as some of the others, and we will therefore consider them all under one heading. We will except, however, the case of Tumor of the Kidney, and merely state with regard to it, that we have no knowledge of its nature other than is implied by the above record.

It is only within a comparatively few years that the importance of Diseases of the Kidneys has been recognized, and their diagnosis made easy, and consequently, in the earlier records of the Company, there were very few deaths from these diseases reported. In the first series of 1000 deaths occurring in the Company, as shown in Table I., of the Preliminary Report, there were no deaths from Bright's disease, and only 7 from any form of Kidney Disease; in the second series of 1000 cases ending in 1868, there were 11 deaths from Bright's Disease, and 12 from other Kidney diseases; in the third series there were 28 deaths

from Bright's Disease, and 9 from other forms, and the mortality has since remained at about this figure. The first record of death from Bright's Disease was in 1862.

For this reason we are unable to give a comparison between our rate of mortality and that in New York City, as we have done for other diseases. The New York reports are for recent years only, and of course would show an extremely high rate in comparison with ours, drawn from a much longer and older time.

TABLE XXXVII.

SHOWING THE PERCENTAGE OF DEATHS FROM DISEASES OF THE KIDNEYS ON THE MORTALITY FROM ALL CAUSES, AND THE ANNUAL MORTALITY IN 100,000 LIVES IN THE MUTUAL LIFE INSURANCE COMPANY, AT EACH DECENNIAL PERIOD OF LIFE.

Age in Decennial Periods.	Percentage on Mortality from all Causes.	Annual Mortality	
		Number of Lives Exposed.	Number of Deaths.
20 to 29 years.....	1.23	100,000	8
30 " 39 "	1.47	100,000	11
40 " 49 "	2.52	100,000	20
50 " 59 "	3.91	100,000	52
60 " 69 "	5.54	100,000	173
70 and upwards.....	5.51	100,000	345

This shows the rarity of Kidney diseases in the earlier periods of life, and their frequency after 50 years of age. Between 20 and 30 years of age there are annually 8 deaths, and between 30 and 40, 11 deaths in 100,000, while between 60 and 70, there are in the same number 173 deaths, and after 70 years, these figures are even doubled.

TABLE XXXVIII.

SHOWING THE PERCENTAGE OF DEATHS FROM DISEASES OF THE KIDNEYS ON THE MORTALITY FROM ALL CAUSES, AND THE MORTALITY IN 100,000 INSURED LIVES AT DIFFERENT PERIODS OF INSURANCE.

Duration of Insurance.	Percentage on Mortality from all Causes.	Annual Mortality.	
		Number of Lives Exposed.	Number of Deaths.
1st year.....	1.31	100,000	8
2d "	1.20	100,000	9
3d to 5th year.....	2.06	100,000	20
6th " 10th "	3.50	100,000	41
Above 10 years.....	4.44	100,000	74

We find that there are few deaths in the first and second years of insurance; after this time it increases

in frequency in proportion to the length of insurance, so that while there are only 8 deaths in 100,000 lives during the first year of insurance, there are 74 deaths in the same number of lives after 10 years of insurance. This is what we should have anticipated, partly on account of the increased age of those who have been long insured, and partly from the chronicity of the disease, and the elimination of those affected with it at the time of insurance.

In our Preliminary Report we tabulated the facts bearing on Nationality and Residence, and found that no special influence was properly attributable to either.

DISEASES OF THE BLADDER.

SIXTEEN deaths have been caused by Diseases of the Bladder, recorded as follows: Undefined Diseases of the Bladder, 6 cases; Inflammation, 5; Inflammation of Bladder and Kidneys, 3; Hemorrhage of Bladder, 1; Rupture, 1. Ten of the 16 cases were persons over 50, and 7 were over 60 years of age. Seven had been insured more than 10 years. There were no other points of interest, or requiring further consideration.

MISCELLANEOUS.

THERE were 2 cases of Urinary Calculus in persons aged 57 and 68 years, and insured 3 and 22 years; also 2 cases where the medical certificate states the cause of death to have been Gravel, in persons aged 55 and 58 years, and in the fifteenth and sixteenth years of insurance.

There have been 7 deaths from Diseases of the Prostate Gland; Inflammation, 2; Enlargement, 2; Undefined Disease, 3. The youngest was 51 years of age, and the others above 60 years. The shortest period of insurance was 3 years, and the others ranged from 6 to 25 years.

There were 3 deaths from Stricture of the Urethra, at the ages of 36, 38, and 52 years, and from 3 to 7 years after insurance. There was 1 case reported as Mortification of the Scrotum and adjoining parts, supposed to have been the result of an injury, in a person 40 years of age, and in the second year of insurance.

There has been, also, 1 death from Addison's Disease of the Supra-renal Capsules, in a person aged 36 years, and insured a little over 1 year.

DIABETES.

THERE have been 40 deaths reported as caused by Diabetes. This number is larger than we should have expected from the rarity of the disease, and it is likely that the diagnosis was erroneous in some of the cases. For this reason, and on account of the obscurity concerning the true nature of this disease, or symptom, rather, we shall have but few remarks to make. The principal facts were tabulated in our Preliminary Report, and no particular inferences were to be drawn from them. They were generally in persons past middle age, only one case being under 40 years. In 9 of the cases the disease was said to be Diabetes Mellitus, and in 1 Diabetes Insipidus, while in the remaining 30 the form of the disease was not mentioned.

MISCELLANEOUS AND UNKNOWN DISEASES.

WE place under the above heading 133 cases. In some the cause of death is absolutely unknown, from deficiency in the records; in others, the statement of

the disease is too indefinite or general to convey any information ; or, again, the cases of a disease are solitary, or too few to allow any grouping. There are 27 cases in which there is entire deficiency of the record concerning the cause of death. In 12 others, there are unmeaning terms used. There were 5 cases reported as sudden death, or found dead—cause unknown. Three of these last were between 30 and 40 years of age, and 2 between 50 and 60 years. The duration of insurance varied from 1 to 17 years.

There have been 49 deaths attributed to Debility, and the following terms have been used in describing it: Debility, General Debility, Prostration, Nervous Prostration, and Exhaustion. In the large majority of these we have no suggestion as to the cause of the Debility ; in 3 cases the Exhaustion was attributed to over-exertion in a storm, extreme labor, and business ; in another case there was Nervous Exhaustion attributed to the effects of heat, and one of Cerebral Exhaustion ; in another, said to result from dissipation ; and in others, associated with chronic rheumatism, bronchitis, and indigestion.

Two thirds of these cases were above 50 years of age, and two above 70 years ; these latter might, perhaps, be considered as deaths from old age. The

duration of insurance was about the same average as that from all diseases.

There have been 21 deaths from Abscesses. In the majority of instances, this is the only record, and the locality of the abscess is not stated. In 8 cases it is given as follows: Glands of neck, 1; Thigh and hip, 1; Iliac, probably from foreign body in appendix vermiformis, 1; Back, 1; Bowels, 2; Abdomen, 2; caused by strain or injury of back, 2 cases. Half the number occurred between 40 and 50 years of age, and few at the extremes of life; there was one death, however, at 72 years of age.

There have been 12 deaths from Tumors. We have already mentioned 5 of these among the local diseases of abdominal organs. Of the remainder, 1 was called intra-thoracic, and in the others the locality was undefined.

There have been 8 deaths from Hemorrhage, in addition to the cases of Hemorrhage from the lungs, bowels, etc., previously considered. These have been reported as follows: Rupture of a bloodvessel, 3; Internal Hemorrhage, 2; Hemorrhage of liver, 1; Arterial Hemorrhage from throat, 1; Hemorrhage, 1; in one of the cases of Internal Hemorrhage, the cœliac plexus is said to have been the source of Hemor-

rhage. It is possible that the cases of Rupture of bloodvessel may have been Phthisis, as Hæmoptysis is frequently spoken of in this manner.

There has been 1 death from Arthritis and 1 from Inflammation of the Hip-Joint, in persons aged 59 and 67 years. Also 1 death from Paronychia of Finger, with the inflammation extending to the arm, in a merchant, aged 48 years, living in New York, and 1 death from a "Putrid Sore on Hand," in a farmer, 51 years of age, living in Massachusetts.

OLD AGE.

THERE have been 13 cases in which death was attributed to Old Age solely. In addition, there have been 3 cases in which it is mentioned as a cause of death, associated with Debility, Diarrhœa, and Disease of the Kidneys, and, as previously stated, 2 persons, aged 72 and 74 years, are said to have died of Debility. We think that all of these cases may properly be considered as deaths from Old Age. The ages at death were as follows :

69	years.....	1 case.	78	years.....	2 cases.
70	"	1 "	79	"	1 case.
72	"	1 "	80	"	1 "
73	"	1 "	81	"	1 "
74	"	1 "	82	"	1 "
76	"	3 cases.	91	"	1 "
77	"	3 "			

All but 1 reached or exceeded the expectation of life, and this one entered insurance at a very advanced age, as follows: insured at 73 years of age; expectation of life, 7.2; actual realization, 6.9

The most advanced age reached was 91 years, the case being that of a Scotch merchant, insured at 63; expectation of life, 12 years; actual realization, 28.

Twelve were natives of the United States, and 6 were foreigners—the proportion of the latter being slightly above their average. The occupations were as follows: Merchants, 3; Cashiers, 2; Clergymen, 3; Lawyer, 1; Superintendent, 1; Agent, 1; Lumber dealer, 1; Farmers, 2; Mechanics, 2; Hatter, 1; Miller, 1. The proportion of clergymen is large compared with the number of them insured.

The total number of deaths from Old Age—18 out of a mortality of more than 5000—may appear to be extremely small; but, in estimating it, we must take into consideration the age and history of the

Company. Although it has been in existence over 30 years, at first the business was small—and it is only in the last half of this period that it has increased so enormously—and consequently it has not had time for the lives insured to grow old, and there are not only few deaths from Old Age, but few deaths at advanced ages compared with the experience of some older companies. For instance, in the Mutual Life, out of a total mortality of 5224, only 135 deaths have been at ages of 70 years and upwards, or 2.39 per cent, while in the Scottish Widows' Fund, out of a total mortality of 5633, 1129 deaths were at 70 years and upwards, or 20.22 per cent.

Of the 135 deaths above 70 years of age in this Company, 17 only, or 13 per cent, were ascribed to Old Age. This shows how little important it is, of what causes, or what kind of disease a person may die. The thing to be desired for Insurance Companies is that as many as possible may die at an advanced age; and it is of no consequence whether, when arriving at this age, they die purely from Old Age, or of Consumption, or of some acute disease. Of 127 dying between 70 and 80, 15 died of Pneumonia, 6 of Consumption, and 8 of Old Age. A high mortality from Old Age of course shows a

favorable exhibit for Insurance Companies; but a large number of deaths from Pneumonia, Heart Disease, and Paralysis *may be* equally favorable. We have had 1 death at 69 from Old Age, 1 at 76 from Consumption, and 1 at 80 from Paralysis.

In the Scottish Widows' Fund Life Assurance Society, out of 480 deaths above 70 years, 73, or 15 per cent only, died of Old Age, and out of 132 deaths above 80 years, 51, or 38 per cent, died of Old Age, and in several of these cases some disease existed at the time of death. So seldom does man die merely from natural decay.

This designation embraces all deaths by accidental causes, as drowning, injuries received in various ways, homicides, etc., and also deaths by suicide.

CASUALTIES.

THERE have been 359 deaths from accidents of all kinds. This class is of interest to Life Insurance Companies, because the deaths may occur to the young and healthy, and very frequently in a very brief time after insurance. The usual methods of selection are

directed to the discovery and elimination of the diseased and those likely to be short-lived; but are of no avail in guarding against deaths from accident. The Company may to a slight extent protect itself by rejecting persons whose occupations expose them to more than ordinary risks, but many kinds of accidents are more or less incidental to all conditions of life.

In our Preliminary Report (Tables II. and III.), it was shown that casualties rank high among the causes of mortality in early life, and become less with age; for instance, they cause nearly 10 per cent of the mortality between 20 and 30 years of age, and 3 per cent of the deaths after 70 years. So, too, they caused 11½ per cent of the mortality in the first year of insurance, and only 4½ per cent after 10 years. We then believed that this proportional maximum of mortality in youth indicated an actual higher rate of mortality at that period of life, and explained it by a not unreasonable presumption. We wrote: "Casualties cause a large percentage of deaths among the young, because they are more reckless and more exposed to danger in travelling and active business occupations." We now find, however, by computing the deaths in comparison with the numbers exposed, that the interpretation of the figures, and consequently the reasons assigned,

were erroneous, and that, in fact, the actual rate of mortality is not greater among the young than the old. The large percentage of mortality from accidents among the young, and at the early periods after insurance, arises solely from the absence of many other causes of death which become prevalent with the advance of age. This is illustrated by the following tables:

TABLE XXXVIII.

SHOWING THE PERCENTAGE OF DEATHS FROM CASUALTIES ON THE MORTALITY FROM ALL CAUSES, AND THE ANNUAL MORTALITY IN 100,000 LIVES AT EACH DECENNIAL PERIOD OF LIFE, IN THE MUTUAL LIFE.

Age.	Percentage on Mortality from all Causes.	Annual Mortality.	
		Number of Lives Exposed.	Number of Deaths.
20 to 29 years.....	9.84	100,000	65
30 " 39 "	8.96	100,000	64
40 " 49 "	7.42	100,000	63
50 " 59 "	4.64	100,000	64
60 " 69 "	2.59	100,000	74
70 and upwards.....	3.15	100,000	172

TABLE XXXIX.

SHOWING THE PERCENTAGE OF DEATHS FROM CASUALTIES ON THE MORTALITY FROM ALL CAUSES, AND THE MORTALITY IN 100,000 LIVES AT DIFFERENT PERIODS OF INSURANCE.

Duration of Insurance.	Percentage on Mortality from all Causes.	Annual Mortality.	
		Number of Lives Exposed.	Number of Deaths.
1st year.....	11.61	100,000	74
2d "	9.09	100,000	73
3d to 5th year.....	6.94	100,000	66
6th " 10th "	6.02	100,000	75
Above 10 years.....	4.44	100,000	68

We find by these tables that the mortality is nearly equal at all periods of life and insurance. The mortality increases slightly between 60 and 70, and decidedly after 70 years of age; but, as the actual number of deaths in persons over 70 was very small (4), the number cannot be depended upon as a true proportion. Hence, we would infer that any recklessness and greater exposure to risk among the young is counterbalanced by their activity in escaping threat-

ened dangers, and by their power of recovery from injuries received.

So, too, with regard to the period of insurance. The proportion of deaths is nearly the same at all periods, though with some fluctuations. The large percentage of mortality in early years arises from the elimination of the sickly at the time of insurance, while it is impossible to eliminate the danger of violent death.

We do not give a comparison between the mortality among the insured and that of the city population, because the dangers to which the two classes are exposed are so dissimilar that such a comparison would not only be useless, but might be misleading. We have found, however, that the deaths in New York City are nearly the same at all periods of life, with a slight increase at advanced age.

We may subdivide and examine these cases according to the nature of the accidents which caused death. Beginning with the most numerous class, we find 71 deaths of *Shipwreck and Drowning*. Fourteen of these have been caused by accidents to ocean steamers, as by the wrecks of the Arctic, Atlantic, Evening Star, Brother Jonathan, Oneida, and other vessels; 12 deaths have occurred from similar accidents on

river and lake steamers, and 14 have been reported as "lost at sea" or "fell overboard." Of these 40 deaths, 26 appear to have been passengers or travellers, and 14 mariners or employés on the vessels. In addition to the above, 31 persons have been accidentally drowned in various other places and ways.

Railroad accidents have caused 55 deaths, including one killed by horse-cars. The mode of the accident is not always described, but, as far as can be ascertained, 32 of these cases were of persons travelling on the trains, either by collision or other accident, or in getting on and off the cars. Six of the 32 were persons employed by the railroad companies. In 20 cases death was caused to persons who were struck or run over by moving trains, and of these 20, 4 were connected with railroads.

Thirty-six deaths have been occasioned by *Horses and Wagons*, 25 of which were persons thrown from a wagon, and 3 thrown from a horse; 3 were run over or struck by a wagon, 2 recorded as "killed by a horse," and 3 were killed by "a kick of a horse."

Comparing the number of deaths from these three kinds of conveyances and modes of travelling, we have as follows:

Deaths by water.....40
" " railroad.....32
" " horse and wagon.....28

These numbers embrace both the passengers proper and the employés, as in the last class a distinction would be impossible.

There have been 36 deaths from *Falls* of various kinds; as, through the hatchway, 5; from elevators, 2; buildings, 10; windows, 2; trees, 2; down-stairs, 3; undefined, 14.

Twenty-four deaths have been caused by the accidental *discharge of Fire-arms;* two of these are reported to have occurred in hunting, and one by a gun set to kill deer.

There have been 26 deaths from accidental poisoning: opium, 17; chloral, 1; chloroform, 2; aconite, 2; corrosive sublimate, 2; arsenic, 1; unknown, 1. Of the 17 deaths by opium, in 3 cases it was taken by mistake for some other medicine; in one case it was administered hypodermically by a physician, and in 13 cases it was taken without any physician's direction. In 7 of these 13 cases it was taken to procure sleep, and in 6 for some sickness. The chloral was also taken to procure sleep without a physician's direction. One death from chloroform was in conse-

quence of its inhalation, preparatory to a surgical operation. The other cases of poisoning call for no special notice, except that the poisons were taken by mistake.

There have been 12 deaths from sunstroke and effects of heat, 1 death from cold, and 1 from lightning. The localities where the sunstrokes occurred were as follows: Connecticut, 1; Massachusetts, 2; New York, 3; Ohio, 4; Michigan, 1. The death from cold is recorded as "frozen to death," and occurred in Nashville, Tennessee.

Twenty-nine persons were killed in battle during the war of the Rebellion, and there was 1 other death due to the war, a naval officer who was lost in the Cumberland, and whose case has been included among those lost at sea.

There have been 18 deaths from homicide, 12 of which are recorded as "murdered" or "assassinated;" the other 6 are accounted for as follows: 1 killed in a fight in New Orleans, 1 killed in Texas in a fight with Mexicans, 2 killed by Indians, 1 in Minnesota, 1 in California, and 1 shot in opera-house riot in New York.

There have been 50 deaths from other kinds of accidents, which are so varied as not to admit of any

grouping or classification. The most interesting are as follows: injuries by machinery, 6; explosion of nitro-glycerine, 2; explosion of boilers, 3; burns, 3; fall of floor of court-house in Richmond, Va., 3; traumatic tetanus, 7, in all of which the disease originated from some trifling injury; and one death attributed to traumatic delirium, caused by the extraction of a tooth.

SUICIDES.

THERE have been 62 deaths from Suicides. A large majority (39) of them were reported to have been insane, but these reports are not good evidence of the fact, in a medical point of view. The decision of the question concerning the state of mind generally depended upon the verdict of a coroner's jury, or the testimony of friends whose judgment was biased by their sympathies for the feelings and pecuniary wants of the families of the deceased, and who, therefore, on slight evidence, would decide the person to have been insane. We do not know how this statement would compare with the suicides in the population at large. The number of suicidal deaths is much

greater in New York City than among the insured, but the city mortality reports do not state the condition of mind, or give the number of sane and insane. In the Scottish Widows' Fund Life Assurance, the experience is similar to our own, and the majority of the suicides were reported to be in persons of unsound mind.

These two classes of cases are both interesting and important, and we will carry out the distinction in our analysis.

The means used to produce death were, for each class, as follows:

	Total.	Sane.	Insane.
Hanging	11	3	8
Cutting throat	8	2	6
Other wounds	3	0	3
Drowning	7	1	6
Poison	3	3	0
Fire-arms	18	10	8
Unrecorded	12	4	8

Hanging, drowning, and cutting the throat were the favorite methods of death among the insane, though fire-arms were not neglected. Fire-arms were first among the sane, though all the other methods were employed also. All the deaths from poison were

among the sane and none among the insane. In these three cases, strychnine was the poisonous article employed. We find that age, to a certain extent, influences the selection of the means of death, and that for persons above 50 years of age, hanging and drowning have been comparatively most frequently selected.

The ages at death were as follows:

TABLE XL.

SHOWING THE AGES AT DEATH OF PERSONS DYING BY SUICIDE AND THE PROPORTIONAL NUMBER IN 100,000 LIVES AT EACH DECENNIAL PERIOD OF LIFE.

Age.	Number of Deaths.			Proportion in 100,000 Lives.
	Sane.	Insane.	Total.	
20 to 29 years.....	2	1	3	4
30 " 39 "	8	14	22	10
40 " 49 "	6	10	16	9
50 " 59 "	5	10	15	19
60 " 69 "	2	4	6	30

There are fewest suicides, in proportion to the number of lives exposed, between 20 and 30 years, and most after 60 years, with a gradually increasing pro-

portion between these limits. The only age at which the number of sane is greater than the insane is under 30 years, when there were two sane and one insane.

The following table shows the relation of suicidal deaths to the period of insurance.

TABLE XLI.

SHOWING THE MORTALITY FROM SUICIDES AND THE PROPORTION OF DEATHS IN 100,000 INSURED LIVES AT DIFFERENT PERIODS OF INSURANCE.

Duration of Insurance.	Number of Deaths.			Proportion in 100,000 Lives.
	Sane.	Insane.	Total.	
1st year.....	8	5	13	15
2d "	3	5	8	12
3d to 5th year.....	8	13	21	13
6th " 10th "	2	8	10	9
Above 10 years.....	2	8	10	13

The proportion of deaths to the number insured is nearly equal at all periods of insurance, but there are certain differences in the two classes of cases.

There are some deaths of both sane and insane at all periods of insurance, but the sane are more nume-

rous at the earlier periods, especially in the first year of insurance, and very rare among those who have been insured more than five years.

As we remarked in our Preliminary Report, these deaths have occurred equally among the natives of the United States and foreigners, though there have been none among the Irish. They have occurred in all sections of the country, most numerously in the North-western and Pacific States.

REPORT

ON THE

MORTALITY OF FEMALES.

Among the females insured in this Company there have been 161 deaths. This number is too small for a reliable estimate of proportions and averages, and, moreover, the actual number of female lives exposed has not been ascertained. We will not attempt, therefore, to analyze the cases as we have done for males, but merely give a few tables enumerating the principal facts. The causes of death, and the number dying from each disease, were specified in Table I. of the Preliminary Report. The following tables will give the particulars of age at death, nativity, and duration of insurance for each general class, and also for some of the most important special diseases. There is also a table of the relative frequency of these causes of death in both males and females.

TABLE I.

SHOWING THE CAUSES OF AND AGES AT DEATH FOR FEMALES, IN THE EXPERIENCE OF THE MUTUAL LIFE.

CAUSE OF DEATH.	AGE AT DEATH.						
	All Ages.	20 to 29 yrs.	30 to 39 yrs.	40 to 49 yrs.	50 to 59 yrs.	60 to 69 yrs.	70 to 79 yrs.
TOTAL.	161	15	39	43	29	25	9
ZYMOTIC DISEASES..	25	2	4	8	8	2	1
Typhoid Fever...	7	1	1		4	1	
CONSTITUTIONAL ...	37	2	12	13	5	4	1
Consumption.. ..	27	2	10	8	3	4	
Cancer	8		1	4	2		1
NERVOUS SYSTEM...	19	2	1	4	6	6	
Apoplexy	6			2	2	2	
Paralysis	5		1	1	2	1	
CIRCULATORY SYSTEM	11		3	2	3	3	
RESPIRATORY SYSTEM	25	2	5	8	1	5	4
Pneumonia	15	1	2	6	1	4	1
DIGESTIVE SYSTEM..	16	3	3	3	3	2	2
URINARY SYSTEM...	2		1		1		
PUERPERAL DISEASES	17	4	10	3			
CASUALTIES.....	2			1	1		
OLD AGE.....	2					1	1
UNCLASSIFIED	5			1	1	2	

TABLE II.

SHOWING THE CAUSES OF DEATH AND THE DURATION OF INSURANCE IN THE EXPERIENCE OF THE MUTUAL LIFE.

CAUSE OF DEATH.	DURATION OF INSURANCE.					
	Total.	1st year.	2d year.	3d to 5th year.	6th to 10th yr.	Above 10 yrs.
TOTAL.	161	20	22	43	33	42
Zymotic Diseases..	25	2	6	7	6	4
Typhoid Fever...	7		1	2	2	2
Constitutional ...	37	4	5	12	6	10
Consumption	27	2	4	9	4	8
Cancer.....	8	1	1	3	1	2
Nervous System...	19	1	2	7	4	5
Apoplexy.....	6	1		2	2	1
Paralysis.....	5		1	2	1	1
Circulatory System	11	1	2	1	5	2
Respiratory System	25	1	4	6	6	8
Pneumonia.....	15	1	2	5	4	3
Digestive System..	16	4	1	3	3	5
Urinary System...	2				1	1
Puerperal Diseases	17	7	1	6	1	2
Casualties.....	2				1	1
Old Age.....	2					2
Unclassified.....	5		1	1		2

TABLE III.

SHOWING THE CAUSES OF DEATH AND THE NATIVITY OF FEMALES DYING, IN THE EXPERIENCE OF THE MUTUAL LIFE.

CAUSE OF DEATH.	NATIVITY.							
	Total.	United States.	Germany	Ireland.	England.	Scotland.	Canada.	Unknown.
TOTAL.	161	124	8	15	8	2	2	2
Zymotic Diseases.....	25	18	3	2	1	1		
Typhoid Fever.....	7	4	1		1	1		
Constitutional.....	37	27	2	4	3			1
Consumption.....	27	21	1	2	2			1
Cancer.....	8	4	1	2	1			
Nervous System.....	19	15	1	1	2			
Apoplexy.....	6	5			1			
Paralysis.....	5	4			1			
Circulatory System..	11	7	1	3				
Respiratory System..	25	21		2	1	1		
Pneumonia.....	15	14			1			
Digestive System.....	16	13		1			1	1
Urinary System	2	1					1	
Puerperal Diseases...	17	16	1					
Casualties.....	2	1		1				
Old Age.....	2	1		1				
Unclassified.....	5	4			1			

TABLE IV.

SHOWING THE CAUSES OF DEATH OF MALES AND FEMALES, AND THE PERCENTAGE OF EACH CAUSE ON THE TOTAL MORTALITY.

CAUSE OF DEATH.	MALES.		FEMALES.	
	Number of Deaths.	Per-centage.	Number of Deaths.	Per-centage.
ALL CAUSES.	5224		161	
Zymotic Diseases.....	950	17.23	25	15.53
Typhoid Fever.....	334	6.39	7	4.35
Constitutional	1160	22.21	36	22.36
Consumption.....	920	17.61	26	16.15
Cancer.....	91	1.74	8	4.97
Nervous System.....	849	16.06	19	11.80
Apoplexy	307	5 88	6	3.72
Paralysis	132	2.53	5	3.11
Circulatory System....	325	6.22	11	6.83
Respiratory System....	648	12.41	26	16.14
Pneumonia	388	7.43	15	9.31
Digestive System.....	488	9.34	16	9.94
Urinary System.....	218	4.17	2	1.24
Puerperal Diseases.....			17	10.54
Violent Deaths	416	7.96	2	1.24
Old Age.....	13	.25	2	1.24
Unclassified & Unknown	157	3.01	5	3.11

We will briefly summarize the facts presented by these tables, and note particularly those points in which they differ from the mortality of males as previously given:

Of the 161 cases, 113 were married, 19 were widows, 9 were single, and in 20 the condition was not recorded.

The most important distinction in the mortality list of the two sexes naturally arises from the function of maternity. Seventeen deaths, or more than 10 per cent of the total mortality, have been due directly to this cause. One case was ascribed to "Disease of the Stomach due to Pregnancy," 1 case to "Abortion," and 15 to the direct consequences of childbirth. The ages at death were as follows: between 20 and 30 years, 4 cases; 30 and 40 years, 10 cases; 40 and 50 years, 3 cases. Seven of them were in their first year of insurance, the duration of the policies being respectively 13 days, 4 months (disease of stomach), 6 months (abortion), 8 months, 9 months, and 2 cases, 10 months. There is no record as to how long the women had been married or how many children they had borne. Sixteen were natives of the United States and 1 was a native of Germany.

The next most important difference in the mortality of the sexes is in violent deaths. Among males, deaths from violent causes (accidents and suicides) caused 7.96 per cent of the mortality from all causes, while among females there were only 2 such deaths, or 1.24 per cent. The mode of death was, in one case, by falling down-stairs; in the other, by being run over by a railroad-car. Men are far more exposed to accidents and injuries, by hazardous occupation and travel, than women, who are chiefly engaged in household duties.

The third point of difference between the sexes relates to the prevalence of Cancer. The proportion of Cancer to the total mortality was: for males, 1.74 per cent; for females, 4.97 per cent. There were 8 deaths in all, in 4 of which the uterus was the part affected. Four were natives of the United States, and 4 were of foreign birth, showing the same excess among foreigners as was found among males.

These are the only causes of death in which there is any marked difference in frequency between the sexes. Minor differences are observed in other cases, but not more than might be due to the small number of observations.

There were 25 deaths from Zymotic Diseases. The proportion is nearly the same as for males, but the mortality seems to come at a later period of life. There were 7 deaths from Typhoid Fever, 5 of which were over 50 years of age. There was 1 death from Alcoholism in a married woman 54 years of age, born in Ireland, and insured 1 year and 2 months.

There were 27 deaths from Consumption. There appears to be no material difference in the manifestations of this disease, as to age or other particulars, in the two sexes.

There were 19 deaths from Diseases of the Nervous System, and 11 deaths from Heart Disease.

Twenty-five deaths have occurred from Diseases of the Respiratory Organs. Fifteen of the sewere Pneumonia, and 6 Congestion of the Lungs. There were 16 deaths from Diseases of the Digestive Organs. One of these occurred after an operation for strangulated hernia; in this case there was no hernia at the time of insurance.

Only 1 death was recorded from Disease of the Kidneys, and 1 from Inflammation of the Bladder. There were 2 deaths from Old Age—1 a native of

Ireland, at 65 years, and 1 born in the United States, at 75 years.

Two deaths from Tumors were reported—in 1 the breast and in the other the uterus were affected.

There were also a few other miscellaneous cases requiring no comment.

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