

attention to dietetic and general therapeutic precepts should be inculcated.

In adults Mr. Thomson preferred the use of the actual cautery as a means of establishing counter-irritation. This was a much less severe remedy than was generally imagined. He had employed it on patients of the most nervous and timorous character, and they were all unanimous in declaring that the application was comparatively free from pain. The rapid destruction of the parts which occurred when the iron was applied at a white heat explained this fact. The efficacy of this application in quieting the pains incident to inflammation in the structures of the vertebral pile was signal.

He would relate a case that had recently come under his care, because the history of it would be found to illustrate many of the points he had dwelt upon. A gentleman, *ætat.* 38, who had always enjoyed good health, caught cold whilst shooting. A week after this event he felt a debility in the back, a dull pain became evident at the eighth dorsal vertebra; a general state of nervousness followed, and afterwards coldness and loss of sensation in the lower limbs; ultimately complete paraplegia. Alteratives were employed without benefit; the patient grew gradually worse; the involuntary twitchings (a symptom peculiarly characteristic of disease of the spine), gnawing pains, and the paraplegia already mentioned occurred in succession. Even the urine and *fæces* came away involuntarily, and the penis was incapable of erection. Besides these afflictions he had dyspepsia and occasional dyspnœa. He came to town and placed himself under the care of Mr. Thomson. He was lodged in an airy house in the vicinity of the Regent's Park. The actual cautery was applied, and the general remedies already indicated were exhibited. By these means he was perfectly restored in a few months.

Mr. Thomson now gave a description of the instrument he had recourse to, and the mode of applying it in making issues by cautery. The instrument is made of iron, and consists of two branches, at the end of which are two thick flat disks. These are distant about two inches from each other. They are brought to a white heat and then applied. Previous to the application a piece of very thick leather procured for the purpose, and made wet, and through which two apertures corresponding in shape and size to the disks described, are punched, is placed over the part to be cauterised, in order to limit the extent of the burn, and also in order to prevent the patient from feeling the warmth which the approach of the hot iron excites. As fear generally magnifies danger the patient should not be made acquainted if possible with the precise nature of the application. A fire should be kindled in the bed-room

under the pretence of procuring hot water, or some other purpose of the kind. The patient should be placed on the bed, and the irons should be applied promptly and firmly. The instant the iron is applied to the skin a loud crackling sound is immediately given out, and is followed by a hissing. Strange to say this occasions only a slight pain at first. A slough of about a quarter of an inch in depth is made, and is separated in due time by the assistance of poultices. After a few hours the inflammation excited in the neighbourhood of the slough of course produces pain. The effect of this application in removing the acute pain alluded to is remarkable; although the patient may previously have been incapable of resting on account of the constant annoyance, yet after being thus cauterised, he can sleep soundly.

After the constitutional irritation has been removed Mr. Thomson recommends the use of tonics, and he prefers, from amongst this class of remedies, the compound decoction of sarsa, and the strychnia. The compound decoction he generally administers in conjunction with nitric acid, and the strychnia in doses of one-twelfth of a grain. This last medicine he has found to be a most admirable tonic.

Mr. Thomson finally announced his intention of continuing his remarks on diseases of the spine on the ensuing Wednesday.

ON THE
MORTALITY AND SICKNESS
OF
ARTISANS IN LONDON.

By T. R. EDMONDS, *Esq.*

THE great and increasing amount of pecuniary engagements depending on calculations of the value of human life, is a distinguishing characteristic in the social advancement of the English population at the present day. Multitudes of individuals of all classes, rich and poor, are now accustomed to embark their property in securing provision against the casualties of life. They pay immediate or yearly sums to assurance, annuity, or benefit societies, as the consideration for other sums or benefits promised to be paid at remote periods, under certain contingencies. If, in any society of mutual assurers, the immediate sums or annuities in the course of payment are insufficient to provide for the larger sums promised to be paid at remote periods, this society will have been insolvent from the time of its institution, and serious losses will be sustained by the parties who last become claimants on a fund which has been already exhausted in the payment of prior claims. Such a state of insolvency may exist for many years in an apparently pros

persons assurance, benefit, or annuity society, and yet remain undiscovered by the members and by the public. Even if the premiums charged by such societies should be adequate to the benefits promised, yet the state of insolvency may exist, either in consequence of an undue portion of the premium being absorbed in the payment of expenses of management, or in consequence of misappropriation, as surplus or profit, of what is really capital, and forms part of the money indispensable for the satisfaction of the society's engagements. The best protection which can be afforded to the public against the danger of enrolling themselves as members of societies resting upon insecure foundation, is the diffusion of sound information respecting the value, under different circumstances, of life in England. When it is known what is the lowest scale of premium which can be adopted with safety to the assured, there will remain only to be exercised a certain degree of vigilance in observing that no encroachment is made on the funds of the members, by undue appropriation for expenses, surplus, or profit.

The persons assuring against the casualties of life are commonly such as are dependent for support on an income which ceases with their lives; they sacrifice a portion of this income in order to obviate the loss which would be sustained by their wives or children in the event of their premature decease or incapacity for labour. These persons are divisible into two principal classes, the members of assurance societies, and the members of benefit societies. In the former class the sums assured vary from 100*l.* to 5000*l.*; in the latter class the benefits consist commonly of a sum under 50*l.*, payable at death, and a weekly payment of about ten shillings during sickness and in old age. The assurance societies do not comprehend any large portion of the very rich class, whose property descends to their children on their decease; nor do benefit societies comprehend any considerable portion of the poorest class of labourers, the whole of whose earnings is expended in providing for their immediate and pressing wants, and who, of necessity, depend on the public for the support of their wives and children in the event of death or sickness. The mortality experienced by these two classes, the members of assurance societies and the members of benefit societies, is not often the same; the mortality of the former being commonly less than that of the latter. The difference of mortality is probably consequent on the more careful exclusion, by assurance societies, of applicants for admission whose health is feeble or impaired. It is uncertain whether there is any difference between the mortality of the rich and of the poor, generally, in any European country; it is only in large towns that the

difference in favour of the rich becomes manifest, the poor apparently suffering a deterioration of health from undergoing labour in a confined and impure atmosphere.

For several years recently past statements of an extraordinary improvement in health and longevity of the English population have been extensively circulated and very generally credited by persons not having the opportunity of weighing the evidence adduced. The effect of these statements has been to induce the public to demand a reduction in the usual rates of premium for assurance of life or health, and (when the more wealthy offices refused to comply with this demand) to give their support to societies of inferior repute, who, professing to embrace the popular view of a decreased risk, adopted scales of premium of doubtful sufficiency. If there had not been a strong resistance made in the most respectable quarters against the demand by the public for a reduction in the rates of premium, great mischief would have ensued, it being now ascertained that at all ages above twenty years the mortality and sickness experienced in England had not varied in a sensible degree from the estimates which had been previously acted upon. The erroneous impression propagated was founded upon the fact that the mortality of the total English population, without distinction of age, had diminished nearly 30 per cent. in the thirty years preceding 1820. From this fact it was inferred, by Mr. Milne and others, that the mortality of the English population had diminished at every age 30 per cent. This groundless inference led to the recommendation of the Carlisle Table, as a correct standard of the mortality of the English population, this table exhibiting at all ages above twenty years, a mortality 20 per cent. lower than had ever been stated to have been observed in any population not consisting of select lives. From observations subsequently made and published four or five years ago, the fact was ascertained, that the diminution in the mortality of the total English population, without distinction of age, was attributable solely to the very great and unexampled diminution in the mortality of children, the mortality of adults not sensibly differing from previous estimates.

The law of mortality, according to age and sex, to which the English population were subject during the eighteen years 1813—30, was first communicated to the public in *THE LANCET* of the 5th and 12th December, 1835. This communication appeared shortly after the publication of the first observation which had ever been made of the numbers of the English population living and dying in each decennial interval of age from birth upwards. The statements of English mortality previously made were no more than

rough estimates, or suppositions, as there existed no direct observations on which they could be founded. In the communication mentioned the law of mortality suffered in each county, and in each of seven principal towns of England, was separately stated. The mortality of these different portions of population varied considerably from each other; the mortality in the towns was always found to exceed that of the adjacent country. In all the different portions of population there was a general agreement in the manifestation of a lower mortality of children than had ever been previously observed under any circumstances.

The law of mortality to which the general population of England is subject may not be a correct measure of the mortality of any one class of assurers; nevertheless, the law, when known, can hardly fail to be very valuable as a standard of comparison with laws of mortality observed in specific classes. It is to be expected that members of benefit societies will experience a law of mortality more nearly approaching this standard than will members of assurance societies, because the circumstances of the former class more nearly resemble the average circumstances of the total population. Among members of assurance societies the mortality suffered is considerably less than that of the general population, but this difference in the mortality does not appear to arise from any superior healthiness in the rich, but from the exclusion, after a careful investigation, of lives of unsound health applying for admission as members. The fact now mentioned may be considered as established by means of the published observations on the mortality of the members of the Equitable Life Assurance Society, the results of which observations appeared in *THE LANCET* of 28th October, 1837. Among these results it was shown that the mortality at any given interval of age was very much higher among members of long standing in the Society, than among members recently admitted; and that, exclusive of such persons as had been members less than ten years, the mortality experienced in the Equitable Society differed, in an inconsiderable degree, from the mortality observed in the general populations of Sweden or of England. In benefit societies there exists a similar difference at given ages between the mortality of new and old members; at least one instance of such difference will be presently adduced, in the case of the experience of a benefit society, which forms the subject of the present communication.

Simultaneously with the call for reduction of the rates of premium for the assurance of life, there arose a call by the public for a similar reduction in the rates of premium for the assurance of health. The publication, by the Highland Society of Scotland, of an extensive observation on sickness was

the occasion giving rise to the belief that the sickness of the English population had been previously over-rated to the amount of 30 or 40 per cent. Although this observation of the Highland Society is one of the most valuable that has been made on the law of sickness, yet its applicability to the ordinary circumstances of the population of England is more than doubtful. According to this observation no more than one and a half per cent. of the population between the ages of 20 and 50 years are constantly sick; according to the tables in general use, $2\frac{1}{2}$ per cent. is the proportion of the living constantly sick between these ages. The lower rate of sickness in the Scottish societies may be accounted for, in part, by the societies observed having consisted of a greater than ordinary proportion of members of the agricultural class, among whom the rate of sickness, as well as the rate of mortality, is always lowest. In opposition to the extreme low rate of sickness of the Highland Society may be cited the high rate of sickness observed in the English Army stationed at home; the proportion of English soldiers constantly under treatment for sickness is $4\frac{1}{2}$ per cent. of the strength. To adopt, as the general standard of sickness, the high rate observed among soldiers, would be as indefensible as to adopt the low rate alleged to have existed in the Scottish benefit societies.

In all populations there prevails a fixed or nearly fixed relation between the rate of sickness and the rate of mortality; when either of these rates is known, the other may be determined therefrom with a degree of exactness sufficient for practical purposes. The relation commonly found to exist, is two years of sickness to each death; if ailments of the lighter kind are included, the proportion of sickness rises to $2\frac{1}{2}$ years to each death, as is the case in the English Army at home. During the Peninsula war the proportion of two years of sickness to each death was observed in the English Army employed; the absolute quantity of sickness suffered was four times as great as among soldiers at home (see *LANCET*, 28th April, 1838). Among European troops in the East Indies there were $1\frac{1}{4}$ years of sickness to each death; among the native troops in the East Indies the proportion of sickness exceeded two years to each death (see *LANCET*, 23rd June, 1838). Assuming two years to be the proportion of sickness to each death at every age, it will follow that the proportion of the living constantly sick at any age will always be double the proportion of the same population dying in one year. For example, if the deaths at any age are at the rate of 2 per cent. per annum, the proportion of the living constantly sick will be 4 per cent.

At the several ages of life the rate of sickness, like the rate of mortality, is continually

varying. Among adults, as the age increases the rate of sickness increases; so does also the rate of mortality. The law of variation according to age in the *mortality* of a population, is sufficiently well established by numerous observations. From the ages of 15 to 55 the rate of mortality increases three per cent. for each year of age, or 34 per cent. in ten years; from the age of 55 to the end of life the increase is at the rate of eight per cent. for each year of age. The law of variation according to age in the *sickness* of a population may also be considered as sufficiently well established; since the few observations on the law of sickness which have been made agree in indicating an identity of increase, according to age, of sickness and mortality. At the three decennial intervals of age, 20-30, 30-40, and 40-50, the rates of mortality in any population are as the numbers 55, 74, and 100, respectively; the increase corresponding to ten years advance in age being 34 per cent., or one-third part nearly. In the only two observations on the law of sickness hitherto published, the relative sickness observed between the ages of 20 and 50 years agrees very nearly with the above numbers. According to the observation of the Highland Society the relative sickness at the same decennial intervals of age was represented by the numbers 57, 67, and 100. According to an observation on members of English benefit societies made by Mr. Ansell, the corresponding numbers were 60, 71, and 100. According to the observation on London artisans now to be adduced, the increase in the sickness coincided with the increase in the mortality at three intervals of age out of four intervals observed. The relative extent of these three observations may be gathered from the following summary of the facts observed between the ages of 20 and 60. By the Highland Society there were observed between these ages 97,187 years of life, and 88,298 weeks of sickness: by Mr. Ansell there were observed at the same age, 24,323 years of life, and 34,823 weeks of sickness; in the present observation on London artisans are comprehended 30,223 years of life, and 53,059 weeks of sickness. In all three observations the number of years of life, and the number of weeks of sickness, were separately stated for each quinquennial or decennial interval of age. The rate of sickness observed by Mr. Ansell is considerably greater than that stated by the Highland Society; and the rate of sickness deduced from the present London observation is considerably greater than that stated by Mr. Ansell as applicable to the general population. The rate of sickness stated by Mr. Ansell, however, sufficiently harmonises with that herewith stated for London, on the assumption that the rate of sickness in London exceeds the rate of sickness in the

country as much as the mortality of the London population exceeds that of the country population.

The same London benefit society from which I obtained returns of sickness has also furnished me returns of the mortality experienced in the assurance department of its business. The extent of this observation is represented by 523 deaths, and 27,698 years of life corresponding, or a mean population of about 2500 observed for eleven years. The observation on which the Carlisle Table is founded comprehended no more than 406 deaths, between the ages of 20 and 60 years, which is the usual extent of the period of age observed in the present and other benefit societies. The result of the present observation is a rate of mortality exceeding that exhibited in the Carlisle Table, at the same ages, by 50 per cent. very nearly. With regard to the effect of selection, the present observation presents a result in agreement with that of the experience of the Equitable. The mortality, without distinction of time of membership, increases at the rate of 16 per cent. for every five years advance in age. But, if all the members be divided into two classes, according as they had been members more or less than five years, it is found that the mortality suffered between the fifth and tenth year of membership is more than 40 per cent. greater than the mortality suffered during the first five years of membership. If, however, the mortality had not increased as the time of membership increased, independently of the increase according to age, the increase in both cases would have been the same, or 16 per cent.; for the difference of five years, reckoned according to the time from admission of all the members, is manifestly equivalent to a difference of five years in age.

The materials on which the present observation is founded consist of returns supplied me in the year 1833 from the "Mutual Benefit Institution," in Threadneedle-street, and comprehended all the mortality and sickness experienced in that institution from its establishment eleven years before. This society contained two classes of members, those who assured against sickness, and those who assured against death; about one half of the total members being subscribers to both the sickness and the death funds. I obtained for each fund, separately, the date of admission, the age at admission, and the date of retirement (if not remaining) of each member, and also the date of each death. The number of weeks and days of sickness suffered by each subscriber to the sickness fund was also stated. In these returns the members were classified according to ages at admission; seven classes, according to successive quinquennial gradations of age at admission were thus formed, beginning with those admitted between the

ages of 20 and 25 years, and ending with those admitted between the ages of 50 and 55 years. The returns from the death fund comprehended a list of 6581 admitted members, of whom 2246 remained at the termination of the observation in 1833; the returns from the sickness fund comprehended a list of 8911 admitted members, of whom 3039 remained members at the termination of the observation. The mean duration of membership of all the subscribers to the death fund was $4\frac{1}{2}$ years, whilst that of the subscribers to the sickness fund was $3\frac{1}{2}$ years; the first half-year from admission, during which members are not "free," being included.

In the investigation of the law of mortality among the subscribers to the death fund, each quinquennial class of admissions was separately observed, and all its members were assumed to be of the same mean age. The quantity of life enjoyed whilst members of the society was obtained by adding together the difference between the dates of admission and the dates of retirement of the members of each class. By dividing the deaths of each class by the corresponding years of life, the rate of mortality of that class was obtained for a period of age commencing with the mean age at admission, and extending to all intermediate periods from 0 to 11 years older. The mean extent of the period of age observed has been assumed in the tables to be five years from the age at admission, an assumption almost coincident with the fact. In Table 1, wherein the results of this investigation are exhibited, the mortality of 1.32 per cent. per annum, stated to exist between the ages $22\frac{1}{2}$ — $27\frac{1}{2}$, expresses the observed mortality, from the institution of the Society, of all who had been admitted between the ages of 20 and 25 years, or who had entered at the mean age of $22\frac{1}{2}$ years. Although the assumption of five years as the mean extent of the interval of age observed in each of the seven quinquennial classes may not be exactly correct, yet the relative mortality indicated for successive quinquennial intervals of age will not be affected thereby, as the proportional error will be the same in all the results.

The law of mortality obtained by the above mode of proceeding has been confirmed by a second method of investigation adopted for the purpose of determining whether the mortality of the members was influenced by selection. In this second investigation the observations in each quinquennial class of admissions were divided into two separate portions; the life and death observed in the 6th, 7th, and higher years of membership, were separated from the life and death observed in the first five years of membership. This having been done, the life and death in the first class above the fifth year of membership, were

added to the life and death in the second class observed under five years of membership; similarly, the older portion of life and death in the second class was combined with the younger portion of life and death in the third class; and so on of each class in succession. The members entering into these combinations will manifestly be all of the same mean age, the inequalities of distribution over the quinquennial periods being of no significant amount. Then, by dividing the combined deaths thus obtained by the corresponding years of life, the mortality for successive quinquennial intervals of age has been deduced, the results being exhibited in Table 4. The general agreement between the results exhibited in this Table and in Table 1 is sufficient to show that the former of the two modes of investigation is sufficiently accurate for any useful practical purpose.

In the construction of Table 4 a correction has been made by excluding the life and death observed in the first half-year of membership. Such a correction was judged necessary, because members dying within half a year from the time of admission were not entitled to any benefit, not being "free" members. As no money was paid on such deaths it was thought right to exclude the statements relating to them as doubtful. In confirmation of the propriety of this course, I may state, that the alleged mortality on the sickness fund was considerably less than that on the death fund, although the majority of the members of one fund were members of the other fund also. The discrepancy arose, in all probability, from there being no money paid on the death of many persons belonging to the sickness fund, and from there being no official cognizance taken of such deaths.

In Table 2, the rate of sickness is exhibited for quinquennial intervals of age. The mode of construction of this table is similar to that of Table 1; the weeks of sickness, instead of the number of deaths, having been divided by the corresponding years of life. The years of life have been corrected, in this table, by deducting the first half-year of membership, during which no sickness was reckoned. A similar correction was not made in Table 1, because several deaths are included which are stated to have occurred during the first half-year of membership.

Table 3 has been constructed from the Tables 1 and 2, by combining in pairs the successive quinquennial observations, and thus obtaining decennial gradations of age. The results deduced from this combination, being founded on a broader basis of facts, are more to be relied upon, and are more suitable for comparison with each other, and with statements derived from other sources. In the fourth column of this table is contained a representation of the rate of mor-

tality according to my theoretical Table of "City Mortality," at ages corresponding with the ages observed of the members of the benefit society. The agreement of the facts observed with the theoretical table will be found very close. The mortality according to this theoretical table is exactly 50 per cent. greater at every age than the mortality of the Carlisle Table. In the 6th column of this table the rate of sickness is expressed in weeks to one year of life; in the 7th column the rate of sickness to 100 of lifetime is expressed. For example, between the ages of $32\frac{1}{2}$ and $42\frac{1}{2}$, 11054 years of life corresponding to 18,263 weeks of sickness were observed; whence it results that between these ages there were $1\frac{1}{2}$ weeks of sickness to every fifty-two weeks, or one year, of life; which proportion is identical with 3.17 weeks of sickness to 100 weeks of life, or with 3.17 moments of sickness to 100 moments of life, or with 3.17 per cent. of the living constantly sick. With the view of comparing the rate of sickness at each age with the rate of mortality at the same age, the numbers in the last column of the table were obtained by dividing the numbers in column 7 by the numbers in column 3. For example, between the ages of $32\frac{1}{2}$ and $42\frac{1}{2}$ years, the rate of sickness being 3.17 per cent., and the rate of annual death being 1.86 per cent., the former number is 1.70, or $1\frac{3}{4}$ times the latter number; that is, there was one year and three-quarters of sickness to each death. Out of the four intervals of age observed, there are three in which the relation of sickness to death is constant, at the rate of $1\frac{1}{4}$ years of sickness to each death. In the fourth interval of age ($22\frac{1}{2}$ to $32\frac{1}{2}$) there is an exception to the general rule, there being at that interval more than two years of sickness to each death. The exception at this interval of age cannot, however, be regarded as of much weight, as it is opposed by the only two observations on the law of sickness which have been hitherto published,—that of the Highland Society, and that on English benefit societies by Mr. Ansell. There is another observation which I might have cited in confirmation of the views herein expressed,—that by Mr. Farr, on the mortality and sickness of labourers in the service of the East India Company, comprehending 20,343 years of life. But I have hesitated to do so, because the data on which that observation is founded were not complete in all respects, and because recourse was necessarily had to indirect methods of observation in order to obtain the whole of the facts requisite.

Although the proportion of one year and three-quarters of sickness to each death is indicated by the present observation, it would not be right to infer that the general proportion of sickness to death falls short of two years, which is the estimate publish-

ed by me seven years ago, and one year before the present observation was made. In all benefit societies a certain proportion of the members are yearly invalided or superannuated, so that the proportion of invalided or permanently sick to the number occasionally sick, will be continually increasing for some years after the formation of a new society. In forming a benefit society out of a section of the general population comprehending all individuals within a specified interval of age, the existing individuals of that section who have been invalided will be excluded. This exclusion will operate in reduction of the rate of sickness in the society, compared with that of the section of population from which the society has been formed, to the extent probably of one quarter of a year at least. It may, however, be objected, that in the benefit society, constituted as now assumed, the individuals of weakest health thus excluded, are also the individuals most likely soon to die, and that, consequently, the rate of sickness and the rate of death are both simultaneously diminished. This objection is, no doubt, of some weight, but it appears most probable that the rate of death would not be so much reduced by the selection made, as the rate of sickness would be reduced; for invalided men from the class of labourers, when relieved from the necessity of working, do not suffer a very high rate of mortality.

The sickness suffered in each month of the year by London mechanics being a subject of some interest, I procured from the same society monthly returns of the sickness experienced throughout a period of four years. On comparing together the monthly aggregates of sickness observed, no regularity of progressive increase or decrease was discoverable. It was only by adding together the observations of three successive months that any uniformity in the results was obtained. It was found that the maximum quarterly sickness was in the three months January, February, and March, and that the minimum quarterly sickness was in the three months May, June, and July; the maximum being to the minimum in the proportion of 4 to 3.

The foregoing statements and remarks on sickness all relate to the duration or amount of sickness endured by a mass of individuals, without regard to the number of individual cases or attacks of sickness from which the total sickness has been derived. The present observation yields no information as to the number of attacks of sickness in one year suffered by 100 individuals, nor as to the number of deaths at each age to every 100 attacks of sickness. It may, however, be of some advantage to notice what progress has been made in the knowledge of this branch of the laws of sickness.

The publication of the number of cases and the number of deaths, according to age.

which occurred in the London Fever Hospital during ten years, was the first step in the advancement of this branch of knowledge. In *THE LANCET* of Feb. 27, 1836, I exhibited the results of that observation, and showed that the mortality of cases of sickness increased according to age, in precisely the same ratio as the mortality of the general population increased according to age. The mortality of the general population increased at the rate of 34 per cent. for every advance of ten years in age, for the period between the ages 10 and 55 years: the mortality of cases of sickness in the London Fever Hospital, was found also to increase at the rate of 34 per cent. for every advance of ten years in age. I found the rate of increase in the mortality of cases at the London Fever Hospital to coincide with the rate of increase which I had adopted several years before in the construction of tables of mortality * of great extent, which have since been published. I subsequently found the same rate of increase according to age applicable to the mortality of patients in the London Hospital, both in the physicians' and surgeons' wards, as may be seen on reference to *THE LANCET*, Sept. 3, 1836. A third series of results, founded on very large numbers treated in the Small-Pox Hospital, confirming the existence of the same constant rate of increase has been published by Mr. Farr. Assuming the mortality according to age of cases of sickness of the total population to increase according to the law observed in the London Fever Hospital, in the London Hospital, and in the Small-Pox Hospital, it will follow, since the mortality of the total living population increases at the same rate, that the proportion of the living yearly attacked by sickness at every age is the same. Again, since the proportion attacked at each age is constant, and since the quantity of sickness at any age is proportional to the mortality at that age, the average duration of an attack of sickness

will increase with the age in the same ratio as the mortality increases.

The average duration of an attack of sickness among English soldiers has been observed to be 2½ weeks nearly; so low an average is not, however, to be regarded as of general application unless attacks not rendering persons incapable of labour be included. The average duration of all cases of sickness admitted into English hospitals has been estimated at 35 days, or 5 weeks, by Mr. Farr. This latter number is probably applicable to benefit societies wherein the members are of the age of 40 years upon an average. Assuming the average duration of an attack of sickness to be 5 weeks, and observing, according to the present tables, that 100 individuals suffer yearly 176 weeks of sickness, we shall have (dividing the last number by 5) 35, as the number of persons out of 100 who are attacked by sickness in one year; that is, one-third of the living nearly; which proportion is applicable, it may be presumed, to every age of life. Since, also, according to the present observation, there are 1½ years, or 91 weeks of sickness to each death, and since 91 weeks of sickness proceed from 18 cases of sickness, there will be one death to every 18 attacks of sickness.

It having been found necessary to refer, as standards of comparison, to theoretical tables, which I have constructed on the basis of a fixed and determinate law of increase in the mortality, from birth to the end of life, I may here mention that these tables may be applied with advantage in the calculation of the premiums of all assurance, benefit, or annuity societies. Two of these tables are already in extensive operation, having been adopted for the regulation of their published rates of premium, by two of the most prosperous assurance offices of London. The two offices whose premiums of assurance are calculated by means of my theoretical tables, are the *Asylum* and the *Legal and General*. In the former office one of my tables has been used for *ten* years; in the latter, another of my tables has been used for two years. On comparing the rates of premium contained in the prospectuses of these two offices with the published rates of other offices using the common unregulated tables, no substantial difference will be observed in the amounts by which they respectively increase during any extended interval of age, as ten years. It is only by the measured mathematical regularity with which the premiums derived from my tables increase year by year, according to age, that they are distinguishable from the premiums derived from the empirical tables in common use.

London, 19, Regent-square,
April, 1839.

TABLE I.—

* The formula whence all these theoretical tables of mortality have been calculated is the following; wherein (y) represents the proportion surviving at any age (x) years.

$$\text{Logm. } y = \frac{k^2 a}{\log. p} (1 - p^x)$$

(k) is the modulus of the common system of logarithms and equals .43429.

(a) is the annual mortality at the age when x = 0.

(log. p) is the logarithm of the annual constant rate of increase of the mortality, and has three different values, —.17 from birth to age of 8 years, +.0128 from 8 to 55 years, and +.0333 from the age of 55 to the end of life.

(1.)—TABLE showing, for each of seven quinquennial intervals of age, the Annual rate of Mortality experienced by Members subscribing to the Death Fund; also, showing the Numbers of Deaths, Years of Life, and Members, on which the results are founded.

Mean Age.		Number of Members.		Life, or Time of Membership in years.	Death.	Annual Mortality per cent.
At Admission.	When last observed.	Admitted.	Remained.			
22½	Five years older.	1147	321	3855	51	1.32
27½		1017	304	3567	40	1.12
32½		1317	419	5048	89	1.76
37½		1069	395	4633	91	1.96
42½		1079	461	5188	106	2.04
47½		573	219	3363	76	2.26
52½		379	127	2044	70	3.42
TOTAL.....		6581	2246	27698	523	1.89

(2.)—TABLE showing, for each of seven quinquennial intervals of age, the average Annual amount of Sickness, in weeks, experienced by each Member subscribing to the Sickness Fund; also, showing the Numbers on which the results are founded.

Mean Age.		Number of Members.		Life, or Time of Membership, in years.	Weeks of Sickness ob- served.	Weeks of Sickness to one year of Life.
When Admitted.	When last observed.	Admitted.	Remained.			
22½	} Five years older.	2104	662	5644	8643	1.53
27½		1589	514	4644	6737	1.45
32½		1691	572	5417	8179	1.51
37½		1501	537	5637	10084	1.79
42½		1139	447	4512	8920	1.98
47½		568	212	2846	5719	2.01
52½		319	95	1523	4777	3.14
Total.....		8911	3039	30223	53059	1.76

(3.)—TABLE derived from the two preceding Tables, exhibiting the Rates of Mortality and Sickness for decennial intervals of age; also, exhibiting the constant ratio of Sickness to Death, after the first decennial interval of age.

Interval of Age observed.	DEATHS.			SICKNESS,			Rate of Sick- ness to Rate of Death.
	Number observed.	Rate per cent. per ann.	Rate ac- cording to City Table.	Weeks observed.	Weeks to one year of Life.	Rate to 100 of Life.	
22½—32½	91	1.23	1.26	15380	1.49	2.87	2.34
32½—42½	180	1.86	1.69	18263	1.65	3.17	1.70
42½—52½	182	2.13	2.26	14639	1.99	3.82	1.79
52½—57½	70	3.42	2.91	4777	3.14	6.02	1.76
TOTAL..	523	1.89	1.80	53059	1.76	3.37	1.78

(4.)—TABLE of Mortality obtained by a different arrangement of the Materials on which Table 1 is founded; the first half year of Membership being excluded, and the Membership above five years from admission being separated from that under five years, of those entering at the same quinquennial interval of age.

Age.	Life in Years.	Deaths.	Rate per Cent. per Annum.	
			Fact.	City Table.
22½—27½.....	2154	26	1.06	1.17
27½—32½.....	3067	38	1.24	1.35
32½—37½.....	4005	60	1.50	1.57
37½—42½.....	4201	85	2.02	1.82
42½—47½.....	4370	91	2.08	2.10
47½—52½.....	3571	78	2.18	2.44
52½—57½.....	2457	77	3.13	2.91
57½—62½.....	751	30	4.00	4.14
TOTAL.....	24876	485	1.95	1.99
22½—32½.....	5521	64	1.16	1.26
32½—42½.....	8206	145	1.77	1.69
42½—52½.....	7941	169	2.13	2.26
52½—62½.....	3208	107	3.34	3.47

(5.)—TABLE showing in how great a degree the Mortality of Members is dependent on, and increases with, the time of Membership; the Mortality of the last six years of Membership being nearly 50 per cent. greater than that of the first five years.

Time from Admission.	Years of Life observed	Deaths.	Ann. Rate per Cent.
½ year to 5 years	16132	271	1.68
5 to 11 years	8744	214	2.44
Above ½ a year....	24876	485	1.95

TRANSVERSE PRESENTATION OF THE FŒTUS.

REPLY OF MR. DAVIS.

To the Editor of THE LANCET.

SIR:—When a man writes an article and appends his name to it, no matter how severe or how galling to one's feelings that article may be, it looks bold, straightforward, and noble, and is, under some circumstances, calculated to do good; but when a man writes an article reflecting upon the professional character of another, and imputing to him ignorance of his calling, and then takes refuge from responsibility under the cover of an anonymous title, he proves himself to be mean, cowardly, and malicious. Your anonymous correspondent, in his remarks upon my case of transverse

presentation of the fœtus, which appeared in last week's number of THE LANCET, blames me, in the first place, for not having introduced my hand into the uterus for the purpose of searching out and bringing down the other foot of the fœtus, one of them being felt, upon the first examination, presenting through the membranes. What! Sir, would he have me, in the first stage of the labour, and when the os uteri was scarcely dilated to the size of a crown-piece, introduce my hand, and forcibly dilate it, by that means putting the patient to a vast deal of unnecessary pain, and, probably, by an untimely interference, producing irreparable injury? I am not one of those persons who, like "PRACTICERS," are in the constant habit of introducing their hand into the vagina during the process of labour, by which inflammation and mortification of