

ARTICLE VIII.

THE PRODUCTION OF VITAL FORCE.

BY EDWARD JARVIS, M.D.,
FELLOW OF THE SOCIETY.

Read at the Annual Meeting, May 30, 1849.

MR. PRESIDENT AND GENTLEMEN,

“THEY that be whole need not a physician, but they that are sick.” So we were taught near two thousand years ago by the highest authority, and so the world has practically told us ever since.

Our education has made our calling exclusively a curative and not a conservative one, and the business of our responsible lives has confined us to it. Our thoughts are devoted to, our interests are concerned in, and our employments are connected solely with, sickness, debility or injury—with diminution of life in some of its forms. But with health, with fulness of unalloyed or unimpaired life, we, professionally, have nothing to do.

Nevertheless, as the prudent seaman, before he takes his ship from the hands of the pilot, on the open sea, and assumes to guide it through the unmarked ocean, first ascertains exactly the position,

the latitude, and longitude of his own harbor, to which he is to bring his ship back again, in order that he may know when and where his voyage shall end, so it may be well for us, before we assume the care of the body in sickness, to ascertain precisely the state and condition of perfect health—the standard of power and action to which we wish to bring back the bodily organization and functions from their wanderings in the devious paths of disease. It is well to know the standard of perfect health, in order that we may compare the diseased state with it, and measure the extent of the error, and determine how much change shall be required for the perfect restoration.

This consideration may very properly interest us as healers of disease. But there are other considerations that ought to interest us, as philosophers and philanthropists, and engage our attention to see whether something may not be done for vitality, beside the mere battling with negations; whether the average standard of human health and strength, the usual quantity and duration of life, which the world now enjoy, are all that they can obtain from the means that are placed in their hands, and whether, after we have done all that our professional responsibility requires, and have set our patients free from disease, something more may not be super-added, and a higher degree and a larger expansion of life may not be given to mankind.

For this consideration of health, it is not necessary, now and here, to review the facts of Anatomy

and the principles of Physiology. We are sufficiently familiar with these. We know the organization of the living body and the functional action of its parts. We understand the conditions of life, the necessity of free play of all the organs, and the need of certain supplies and co-operation on our part. We recognize the want of food for nutrition, of air for respiration, of clothing and bathing for the surface, and of a certain measure of exercise for the brain and the muscular system. All these, we know, are essential to the maintenance of life, and without them life must diminish or cease.

There is no fixed measure for all or any of these actions, or for the supply of the animal wants, short of which we cannot come, and beyond which we cannot pass; but there is a wide range for all in which life may be kept up, or, at least, it is not extinguished; and yet, we know that life is not the same in all this variety of action and management; life is not a fixed quantity that cannot vary whatever may be the care bestowed upon it. But its extent or degree varies with all the circumstances affecting the organs and functions.

The original organization depends very much on parentage. The precise influence of the parent upon the child has not yet been determined. The parents can give to the child no other qualities than those which they possess when they give it the germ of life; and thus the qualities of the father and mother descend to their offspring, and health and disease, or rather that perfect organization which

secures regularity of action, and that imperfect organization which creates susceptibility of disorder, are transmitted from generation to generation.

HUMAN CONSTITUTION.—VITAL CAPITAL.—VITAL FORCE.

The aggregation of all the physical powers, the original organization, the united energies of the nutritive, respiratory, cutaneous, locomotive, and nervous actions, and the predominance of the vital over the chemical affinities, co-operate in the production of *vital force*; and these together make up what is commonly called the *constitution* of man—that is, his power for labor or endurance—his power of accomplishing his purposes, or resisting the causes of injury.

This constitution, or this quantum of vital force, may be considered as the *capital of life*, with which man operates, does all his work, enjoys all his pleasures, and sustains himself in his present being.

Some few persons have only vital force sufficient to barely sustain life. They can digest their food, and perform the other functions necessary for the replenishment of the exhausted powers, and no more. They can only keep their vital machines in operation. But most persons have more than this. After supplying their natural wants, and raising the power of the machine to its highest healthy point, then deducting all the vital force necessary for these from the whole constitutional force, there is in them a surplus of energy left to be disposed of otherwise; and this may be expended, at their own will, in ac-

tion of the muscles or of the brain, for profit or for pleasure.

If the constitutional power is considered as the capital of life, this surplus energy may be considered as the *income of life*. This may be expended daily, and yet leave that capital unimpaired. But this expenditure must be limited, in each day, to the quantity of vital force that is generated by each day's nutrition, and in each night's sleep.

This constitution, or quantity of vital force, must necessarily differ in different persons, and in some it differs very widely. There are differences in the primordial elements, in the original organization, in the distribution of strength through the several organs, in the tenacity of the vital principle, and in the early development of the powers.

There are also differences in the subsequent management of the system, and in the appropriation of the surplus energies. The animal organization is first determined by the Creator; the constitution is next developed by those who have the care of childhood and youth, and then it is entrusted to the hands of man himself, for preservation and for use. The Creator does not retain absolute control over the organs, nor has He endowed them with a certain and irresistible force, by which they shall supply their own wants, perform their functions, and regulate their actions in the manner which is best for the whole. All of these admit of various degrees; and, in this broad latitude, each one must seek out

for himself that degree which is best, and determine what degree shall be allowed.

ONE WAY PRODUCES THE MOST VITAL FORCE.

In the management of all the organs of the body, in the supply of the wants, in the use of the surplus energies, in the action of the brain and the muscles, in the discipline and the indulgence of the passions and propensities, and in all the circumstances with which a man surrounds himself, there is, in regard to each, only one way by which the greatest quantity of vital force is produced, health and strength maintained in their highest degrees, and life enjoyed in its widest expansion: and it requires watchfulness to discover that path, and unfaltering discipline to walk in it; because "strait is the gate, and narrow is the way, which leadeth unto life"—perfect physical as well as spiritual life—"and few there be that find it."

As in some mountain of regular acclivity there is a point of elevation which is higher than all the rest, and from which all divergence is descent, and he that would stand the highest must place himself there, and if he depart from this point, to the right or the left, he goes downward—it may be but a hair-breadth, but it is none the less certainly to that extent downward—so, in the maintenance of any one's life, there is a line of conduct which is above and better than all others; and there alone can he enjoy the largest amount of vitality, for there alone is the greatest amount of vital force produced; and

any departure from this line, however small, is inevitably followed by a corresponding depression of life. It may be but an infinitesimal of an error, but precisely to that extent is the vital deterioration.

We can approach this line of highest health—or the most perfect action and largest power—only by the most faithful compliance with the laws of nature, and the complete adaptation of the material to the wants of life, and of the exertions to the powers of action. The law of adaptation and fitness is as imperative in regard to the vital machinery, and to the composition of the materials of life, as it is in regard to the machinery of dead matter, or the composition of dead mixtures.—These are perfect, in their operations and effects, in proportion to the niceness of their workmanship, or the skill and success in their adaptation.

EVERY ERROR IN LIFE PRODUCES ITS PROPORTIONATE
DIMINUTION OF VITAL FORCE.

The laws of life are as fixed as the laws of matter. Cause and consequence, in exact relation and in inevitable succession, are as inseparably connected in one as in the other. In life, there is no effect without a corresponding cause. In any definite organization, the quantity of vital force which is generated, the amount of health, strength, and enjoyment, which is obtained, are in mathematically exact proportion to the fulfilment of the conditions of life. The fulfilment of any condition is

inevitably followed by a corresponding degree of vital power, and any failure in regard to any condition — any error, however slight — is as certainly followed by a corresponding loss of power, or a proportionate diminution of vital force.

The capital of life, and capital in trade, are both subject to somewhat similar conditions. Both need certain discretion in management; both are sustained, and even increased, by faithfulness to their conditions; and both are diminished by every error. As, with the merchant, every disadvantageous investment, every neglect of the means of due profit, every expense in the conduct of business beyond what is necessary for its success, and every other expenditure beyond the income, lessen the amount of his pecuniary capital; so, every neglect of the due means of recuperating life, every failure of proper food, in time or in quantity, every tax upon the digestive organs beyond what the nutrition of the body requires, every inhalation of weakened or vitiated air, every excess of labor by muscle or by brain, every privation of sleep, all expenditure of power beyond the average daily strength — each one of these, whether great or small, diminishes, in its proportionate degree, the vital capital.

EFFECTS OF ERRORS ACCUMULATE.

With the merchant, the effect of small and repeated pecuniary losses is accumulative; and, however little they may attract attention, yet, after many repetitions, for a long period, they compel him to

feel them in the diminution of his capital, perhaps in embarrassment. So, the consequences of errors in the management of life accumulate; and, at last, are felt in the slackened energies, perhaps in failure in some of the functions, in some marked debility, or acknowledged disease.

The unfortunate merchant may refer his embarrassment to some recent loss, to some absconding debtor, or to some shipwreck or fire; but if his estate had not been impaired by his previous and repeated losses, which had been individually too small for his notice, the last and perceptible loss might perhaps have been easily borne.

So, the man who, however slightly but perseveringly, errs in diet, at last becomes dyspeptic. He may not be a gourmand, yet he may be rather a free or merely a careless liver, and eat that which is not digested with perfect ease, or he may consume a little more food than his nutrition requires; he may repeat this for months, perhaps for years, without feeling any especial inconvenience. But after a long period, he begins to feel somewhat oppressed after his meals, and his oppression gradually increases, yet so slowly that he hardly recognizes its advancement, and refers it to no assignable cause. Yet, at last, he is compelled to see and acknowledge the connection between his diet and his suffering; and then he wonders that his free or thoughtless habits of living, which had been harmless and agreeable, should now become oppressive and injurious.

Some farmers, mechanics, and other laborers, overtask their muscular systems during the early and middle periods of life. They work twelve, thirteen, fourteen, and some more, hours a day, and expend more power in each day than they regain in the night. They continually overdraw their income of strength, and expend from their capital; until, at last, they can no longer make this extraordinary exertion; and then they are obliged to select lighter employments, for, before they are old in years, they are decrepit in power, because they have expended their capital of life too early.

In like manner, the ambitious student may overstep the average power of his brain, and give a little more time daily to his mental labor, than his nervous system can bear; or exhaust so much nervous energy in the operations of the mind, that there is not enough left to sustain the physical functions. He may carry on this exhaustive process for years, without seeming to suffer, until the accumulated consequences of his repeated errors become perceptible; and then he is manifestly an invalid, perhaps dyspeptic, and his brain is unable to do its accustomed work.

When any one dwells in the foul air of some jails, or of the houses of some of the poor, where whole families occupy a single apartment, or of the rooms of others who admit no fresh air; or when he accustoms himself to breathe the exhausted air of some crowded shops, or lecture rooms, no perceptible injury is at first felt, nor even any great

inconvenience, except the discomfort of unpleasant sensations, and some oppression; and even these seem to cease by the blunting of the sensibilities, and then he can live in such rooms, or work in such shops, or frequent such assembly rooms, without being conscious of suffering any injury. But, after a long period, the evil consequences of breathing impure air reveal themselves. The skin loses its ruddy hue, the muscles lose some of their natural hardness and contractility, the mental faculties are less clear, and the moral powers weaker; the functions are carried on with less energy, and the body is more susceptible of diseases, especially those of the adynamic order: and, moreover, for want of recuperative energy, all disorders are overcome with more difficulty, injuries are healed with less ease, and sometimes they break out afresh, after they have been once cured.

In these and in similar cases, the production of vital force is gradually diminished, or the expenditure of power is gradually increased; and, in either way, it is manifest that the tone of the constitution is lowered.

In all these cases, the effect corresponds to the cause. They hold an exact relation to each other, but no relation to the amount of vitality with which they are connected. As the removal of the first grain of sand from a mountain diminishes, by so much, the weight of the immeasurable mass, as certainly as it would diminish the weight of the tiniest mole-hill, so the first slight error in diet of

the robust man overtasked his digestive powers, the first hour's excess of toil overtaxed the strength of the stout farmer, the first hour's study by the midnight lamp impaired the health of the vigorous student, the first privation of the accustomed and needful sleep reduced the vital energies of the buoyant youth, and the first respiration of vitiated air failed in some degree to remove the waste from the blood — all these errors, so slight, perhaps, that they were not noticed nor deemed worth considering in comparison with the power of endurance, yet all were followed by their natural and proportionate consequences of evil, as certainly as the last in the series, which was followed by gastrodynia, debility, headache, or languor.

In these and all other errors in the management of the human constitution, there is, from the beginning, a departure from the original standard of health, by degrees so small, and by processes so slow, that their measure is rather to be calculated than determined by observation; and it is only after a long series of these departing steps, when their effects on the body have accumulated, that they can be recognized. But the very first step in this wayward course, though infinitely small, was, to that extent, disease, disorder, or debility, certainly a failure of the fulness of life.

There is in man a large vital capital to be expended, a large power of endurance that may be exhausted in wrong management; and, therefore, he does not regard his errors, nor perceive his losses. But all

undue expenditure is none the less a loss, and all endurance is weakening; and the day of reckoning and suffering, sooner or later, inevitably comes. The consequences grow out of and hang upon the causes, and they cannot be separated.

It is plain, then, that the separation of perfect health from acknowledged sickness is not by a distinct and narrow line, on one side of which, all is soundness, and on the other, indisputable disease. But, between perfect health—as good as the original constitution admits—and recognized disease, there is a wide space, a sort of neutral or disputed ground occupied in part by both, and exclusively claimed by neither.

GREAT DIFFERENCES IN VITAL FORCE.

The result of all this variety of organization, development, and self-management, is, that between the strongest and the weakest man, both in the enjoyment of their average, or what they call good health, there is an interval almost as wide as that between life and death; and, in this wide space, there is every grade of power in which men live and enjoy all that they suppose is allotted to them. Whatever the grade may be, in which any one stands, that is his own standard of health, in which he hopes to sustain himself, and thinks himself sick, only when he falls below it.

It must be obvious, that these standards of health and of constitutional power have a very wide range, and that among them there are very various amounts

of vital capital. Between the house-bred, inactive lady, whose muscles are small and soft, and to whom all exercise is an exhausting burden, and the robust laborer, whose stout frame and large limbs are covered with well-developed and hard muscles — between the pale and languid student, whose appetite is small, and digestive power less, and the hardy sailor, who eats and digests large quantities of the most concentrated and stimulating food—between the uneducated recluse, to whose sluggish brain thought is a burden, and mental labor painful, and the man of strong and cultivated mind, to whose brain all mental labor is but child's play—between the timid, doubting, desponding, and anxious, and the bold, decided, hopeful, and buoyant—between one and the other of these, there is an immense difference in the power and the energy, the availability and the enjoyment of life; and, if all the stronger and higher qualities are united in the one, and all the weaker and lower qualities in the other, the difference is immeasurably increased. And yet both may be in their usual health, enjoying, as it may seem to them, all that their constitutions and their temperaments allow to them, and no more. The one is not in any unnatural state of exaltation, nor is the other in any unnatural state of depression.

SICKNESS.

Notwithstanding persons, who have these different degrees of vital force, suppose themselves to be well, yet the depressing causes which have produced

these differences frequently continue their wasting work, and produce disease; or, they often act as predisposing causes, and prepare the system for the action of other and exciting causes, which produce specific disease. Consequently, we find sickness of various kinds and degrees; and this is most frequent among the poor who must endure privations, among the weak and foolish who mismanage themselves, and among the wicked who abuse themselves. We have no means of certainly knowing how much sickness there is in any community. The Health Insurance and the Benefit Societies have done the most to explain this matter;¹ but as yet they have not had sufficient opportunities of varied observation to determine the amount of disease in all the classes of people, and in all countries.

Some of the best authorities on this subject suppose that for every person that dies, there are two constantly sick; that is, for every death there are seven hundred and thirty days of sickness; and where the deaths are two or three per cent. of the living population, the individuals of that people will have, on an average, two or three weeks² of sickness in each year.

The report made by Mr. Finlaison to the British Parliament, respecting the amount of sickness, shows that, among the industrious poor who are members of the Benefit Societies in London,

¹ See Note A, Appendix.

² 14.6 or 21.9 days.

There are constantly sick, among 1,000,000 of males,¹ —

At the age of 23,	19,410	At the age of 53,	27,060
“ “ “ “ 28,	19,670	“ “ “ “ 58,	36,980
“ “ “ “ 33,	19,400	“ “ “ “ 63,	57,000
“ “ “ “ 38,	23,870	“ “ “ “ 68,	108,040
“ “ “ “ 43,	26,260	“ “ “ “ 73,	317,230
“ “ “ “ 48,	26,140		

But these calculations include only those cases of sickness in which a person is precluded from attending to any of his ordinary concerns, and are, by no means, all the deductions that are made from the vital forces.²

Taking any one's own standard of usual health, there are very few, probably none, that do not, sometimes, and perhaps frequently, fall below it. All the short sicknesses of less than a week, all the little ailments—the headaches, the slight colds, the heaviness after a full meal, the languors after a late night spent in labor or pleasure, the fatigues after over-exertion—all these, and many others, are so many and so far deductions from vitality; and, in each one of them, the total sum of life, its labors and its enjoyments, are, thereby and to that extent, diminished.

MORTALITY.

The same causes that open the way to, or produce, sickness, also diminish the recuperative energy, or the power of resisting its effects. Hence, wherever the most disease prevails, there is the most mortal-

¹ T. Southwood Smith. *Philosophy of Health*, vol. i., p. 123.

² See Note B, Appendix.

ity: and, in those classes and countries where the vital forces are the most depressed, there is the most frequent death and the shortest duration of life.

These are matters of record and calculation, in regard to some countries, and also, to some extent, in regard to various classes of people. These records and calculations show great differences of longevity among different people. The observations and calculations of the Life Insurance companies afford the best data for determining the value of life, and for comparing its duration in one country or class with that in another.

According to these calculations, the expectation of life, or the average duration of all, was —

Age.	England. ¹	Sweden. ²	Austria. ³	France. ⁴	Manchester, Eng. ⁵
At Birth.	41 years.	34 years.	29 years.	28 years.	24.2 years.
“ 20 years.	40 “	38 “	36 “	34 “	33.3 “
“ 60 “	14 “	12 “	13 “	11 “	10.3 “

Of 10,000 children, at 10 years of age, there will die,⁶ in

		New England.	England.	France.	Holland.
Before their	16th year.	300	322	364	436
“ “	41st “	2228	2692	2614	3341
“ “	71st “	6725	7077	6989	7263

and —

3275	2923	3011	2737
------	------	------	------

will survive their 70th year.

¹ English Life Table for 1841. Fifth Annual Report of the Registrar-General, p. 367.

² Nicander, quoted by Milne, on Annuities.

³ Sixth Report of the Registrar General, p. 347.

⁴ Duvallard, quoted by Milne, on Annuities, p. 548.

⁵ Registrar-General's Seventh Report, p. 558.

⁶ Tables prepared by James Hayward, for the N. E. Life Insurance Company.

The observations and calculations of the Life Insurance companies are limited to a few countries, and generally include only the better classes of people; at least, the poorest and the lowest are but rarely the subjects of their observation.

The average age at death, and the ratio of deaths to the numbers of the living, as means of estimating the force of mortality in any class or country, or as grounds of comparing the mortality of one place or class with that of another, are liable to some objections, because they necessarily bear some relation to the composition of the population, which differs in various countries and classes of people. All inferences, therefore, drawn from these data, must be admitted with some qualification.¹ Nevertheless, both of these data will afford some indication of the value of life, in any community, and lead to some approximation of the comparative value in different communities.

The average age of the dying ¹ was, in

England and Wales,	29.64 yrs.	Russia, ⁶ (males),	19.88 yrs.
Prussia, ²	27.77 "	Martinique, ⁷	41 "
Sweden, ³	27 "	Massachusetts, ⁸ (1842 to 1848,)	29.11 "
Austria, ⁴	23 "	Middlesex Co., ⁸ Mass., (1842,	
Ireland, ⁵	23 "	'43, '44, '45,)	28.19 "

¹ See Note C, Appendix.

² Calculated from London Statistical Society's Reports, vol. ii., p. 364.

³ Milne on Annuities, p. 534.

⁴ Sixth Report Registrar-General of England, p. 347.

⁵ Mr. Chadwick. Interment in Towns, p. 250.

⁶ Calculated from a Statement of the Mortality of Males in Russia, in "Journal des Travaux de la Société Française de Statistique Universelle," tome iii., p. 352.

⁷ Annales D'Hygiène, xviii., p. 271.

⁸ Calculated from the Annual Reports of Births, Marriages and Deaths.

Franklin Co., ¹ Mass., (1842, '43, '44, 45,)	37.64 yrs.	Plympton, ³ Mass., (1812 to 1845,)	41.4 yrs.
Concord, ² Mass.,	38.96 yrs.	Dorchester, ⁴ Mass.,	32.5 "

The proportion of deaths to the living population was, in ⁵

Norway, ⁶	one in 50.8	Roman States, ⁷ (1829,)	one in 28
England, ⁶	" " 45.6	Russia, ⁶ in the basins of the Dnieper, Don, and Wolga, " " 23 to 18	
France, ⁶	" " 40	Northern Russia, ⁶	" " 33
Holland, ⁷	" " 40	Maranham, S. A., ⁸	" " 25
Upper and Lower Austria, ⁶	" " 33		

Comparing the open country with cities, we find still greater differences, and that vital force diminishes, and the force of mortality increases, generally, with the density of population.

The average age at death, was, in

Massachusetts, (not including Boston), 1842 to 1848,	31 years.
Boston, 1842 to 1848,	21.64 "
England,	29.64 "
London,	27 "

¹ Calculated from the Annual Reports of Births, Marriages, and Deaths.

The Registration Reports of Massachusetts have been published seven years, and contain very important facts and deductions. Yet they fall very far short of what they should be; and the late reports are much less valuable than the early ones. The average age is stated in only two of the reports. The statements here made are approximations by calculation. Some important tables, which were in the reports previous to 1847, are not in the reports of 1847 and 1848. Neither the ages nor the causes of death, in reference to counties, are stated in the two last reports; and no means are given of comparing the mortality, longevity, or causes of death, in various sections of the State. It is to be hoped that, under the new law, more efficient service will be applied to this work, and the reports will take a new form, and give to science all the aid that the constantly accumulating facts will enable them to offer.

² Calculated from Bills of Mortality, from Nov. 17, 1778, to May 13, 1848.

³ Lewis Bradford. Town Clerk's Report, in the Fourth Mass. Registration Report.

⁴ Calculated from the Town Clerk's Records, 1817 to 1843.

⁵ See Note D, Appendix.

⁶ Calculated from Tables in Sixth Report of the Registrar-General of England.

⁷ Pritchard's Natural History of Man.

⁸ Tables of Commerce, Revenue, &c. of the United Kingdom, for 1834, Parliamentary Report, folio, Part iv., p. 454.

The ratio of deaths to population was, in

London, ¹	one in 39	Belgium, (towns) ²	one in 36.9
Surry, ¹	" " 55	City of St. Petersburg, ¹	" " 37
Lancashire and Cheshire, ¹	" " 38	Province of do. ¹	" " 24
Liverpool, ¹	" " 33	Austria, ¹	" " 30
Sweden, (country), ¹	" " 44	Vienna, ¹	" " 21
" (towns), ¹	" " 28	France, ¹	" " 39.9
Belgium, (country) ²	" " 46.9	Paris, (Dep't of Seine), ¹	" " 33

The same difference in mortality is shown in different parts of the same city. In the six most healthy registration districts of London, with a population of 261,728, the deaths, in 1839, were one in 41.7, at the average age of 32.81 years; while in the five worst districts, with a population of 238,518, the deaths were one in 39.72, at the average age of 22.04 years. The deaths of children, under ten years of age, were, in the best districts, 34 per cent., and in the worst districts, 56 per cent. of the whole.³

This difference of mortality is connected with, and, probably, in part owing to, the differences of circumstances and of domestic condition. In another classification, which included in one class the wide, well paved and drained streets, and good houses, inhabited principally by the prosperous, and, in another class, the narrow, badly paved and drained streets, and small and crowded houses, occupied principally by the poor—each class containing the same population—while only 315 died in the best, 613 died in the worst, streets and houses.

¹ Calculated from Tables in Sixth Rep. Reg. Gen. ² Quotet on Man, chap. v.

³ See Note E, Appendix.

Villermé says, that the mortality of the indigent class is, in some places in France, just double of that of the wealthy. "Taking together the whole of the French population, human life is protracted twelve years and a half, among the wealthy, beyond its duration among the poor.¹

Sickness and mortality seem to go hand in hand with poverty. The want of intelligence and skill in self-management accompany the want of pecuniary means to procure the comforts and even the necessaries of life. Poverty refers to vitality, and to bodily and mental health, as well as to estate.

The Secretary of the English Poor Laws Commissioners classified the persons who died in several towns and places, according to their occupations, and domestic conditions; and the result² was, that in the families of the

Prosperous,	1088	died at an average of	42.6	years.
Middling Classes,	4791	" " "	29	"
Poor,	19,849	" " "	20.4	"

In the families of the prosperous, 20 per cent., and in the families of the poor, 50 per cent., of the deaths were under 5 years of age.

In the prosperous, 28 per cent., and in the poor, 66 per cent., died under 40.

¹ T. Southwood Smith. *Philosophy of Health*, vol. i., p. 108.

² Condensed from pages 153 to 161 of the *General Report on the Sanitary Condition of the Laboring Classes of Great Britain*, by Edwin Chadwick, Esq. These classes are thus described:—"1. Professional persons and Gentry, and their families. 2. Tradesmen, Farmers, and their families. 3. Mechanics, Operatives, Laborers, Servants, and their families."

Among the prosperous, 46 per cent., and among the poor, only 8 per cent., survived their 60th year.

These statements are corroborated by the reports of Villermé, in France, and by some few partial inquiries made in this country. According to Mr. Shattuck's report on the census of Boston, the average age of those who were buried in the Catholic cemetery, at South Boston, 1836 to 1845, including principally the poor foreigners, from the most crowded parts of the city, was only 13.49¹ years, while the average for the whole city was 21.64 years.²

Thus we see that man's length of life, instead of being continued to his fulness of years—three score and ten—is, in the most favored country, less than half, and, in some, less than one third, and in some classes less than one quarter, of what is supposed to be the natural longevity. England, and the rural part of Massachusetts, are among the most favored countries in this respect; and yet, in Massachusetts 40 per cent., and in England 47 per cent., die while they are going through the process of development, and before they enter upon self-sustaining life, in their 16th year. In Massachusetts only 16 per cent., and in England only 14 per cent., of those who died had fulfilled the natural destiny, and passed their 70th year.

To these deductions or losses of life by premature death, must be added the losses by sickness, little ailments, and want of fulness of power, and it is

¹ Census of Boston, p. 157.

² Calculated from Bills of Mortality.

plain that mankind fall very far short of that completeness of life which it is supposed that they have the means of enjoying on earth.

CAUSES OF THE DIFFERENCES OF VITALITY.

It is, then, a matter of the utmost interest, to know, why mankind suffer these losses of life, and whether they are necessary conditions of their being here.

Much of the difference of vitality is owing to difference of organization — much to development — but much more to self-management. The last is certainly within the control of man himself; the second is within the control of his parents; and the first is more under the control of the world than they are now willing to admit. Why, then, does not man avail himself of these means of life, and create for himself, or his children, the highest health?

There is a general ignorance of the laws of vitality. Men do not understand the connection between their conduct and vital force; and they feel but little responsibility for the maintenance of health. They lay their plans and carry on their operations, without much regard to the conditions of their existence. Life and its interests are not always paramount considerations; but they are made subordinate to matters of inferior importance. They are sacrificed or made to yield to common conveniences and concerns: a man postpones his regular meal, or perhaps goes without it, for want of time

to attend to it; or, he eats too much, in order to gratify his appetite, or perhaps to please his friends; he exposes himself to inclement weather — cold, storms, and heats — in pursuit of pecuniary profit; he fashions and wears his clothing, not according to the necessities of his temperature, but according to the varying taste of the world; he works late at night, or early in the morning, and expends in the day more vital force than the night brings back to him; or, he devotes some of the hours needed for sleep to pleasure, or to the calls of charity.

In the management of the organs and powers, the question, generally, is not — What does life require, for the development and maintenance of its fullest power? but — What will it bear without extinction? Doubtful questions are determined against life, which must bear the risk of the loss. As an imprudent merchant looks only to the possible chance of escape from bankruptcy, when he considers his expenditures and burdens, and expends or assumes whatever he thinks will not break him, although, to its extent, it is a tax upon his capital; so, unwary men look upon life as a sort of integer, which, whether complete or impaired, seems to be all the same — and, in considering burdens and expenditures, they ask — not, whether they will expand life, but — whether life can bear them without utterly failing.

The safety of using *alcoholic* drink is yet an unsettled question. Few suppose that it is ever beneficial to men in complete health: the only question

is, whether it is injurious or not. But, notwithstanding there is no doubt that it is not beneficial, and there is a doubt as to its harmlessness, the world is waiting for this last doubt to be removed, and for the positive proof that, in all cases, it produces injury, before they are willing to banish it utterly from use.

Tobacco comes under the same category. It does no good to men in health. Life is neither energized, nor exalted, nor prolonged by it. Its effects are, at best, but negative; and, to some, it is, in a greater or less degree, injurious. Certainly it is reasonable to suppose, that the mixture of so strong a narcotic as tobacco juice with the gastric fluid must change its character, and probably weaken its solvent powers; and the mingling the smoke of tobacco with the pure air must interfere with the chemico-vital processes in the lungs, by which the venous is changed into arterial blood.¹ In either case, the nervous system is unnaturally affected by it; and yet, because this is not demonstrated, the doubt is usually settled in favor of the use of tobacco.

Even more than this, the tobacco-smoker not only continues to experiment on his own vital forces, but he compels others, however unwilling or however unable they may be, or however much they may suffer by it, to try the same experiment on theirs. A man compels his family in his own house, some travellers, boarders in hotels compel the other occupants of the public rooms, and passengers in

¹ See Note F, Appendix.

the streets compel others in their vicinity, to inhale their tobacco smoke. Any one, who desires it, takes this liberty of forcing others to join with him, by vitiating their atmosphere, which, it seems, was given to man in a state of purity, that all might have the privilege of breathing it in the condition that would most effectually serve the purposes of life.

There is a law in this city, prohibiting the smoking of cigars in the streets; but this law is made, not for the security of man, but for the security of buildings. It is intended merely for the prevention of fires, not for the preservation of the purity of the air. It is not even in the chapter relating to public health, but in that which relates to the fire department.¹

These, and other common and familiar customs, show how little the principles of vitality, or the care for life, weigh upon the anxieties of the world, and how far these are from being paramount considerations in the general plans of action.

The tenor of early education, the influence of public opinion, and the example of general habits, give men wrong notions of the value, the uses, and the purposes of life and its elements. The world talks much of the sacredness of life, and allows no man to extinguish it in himself or others. Suicide and murder are too shocking to be tolerated. But

¹ City Ordinances of Boston, page 111. "An Act to secure the Town of Boston from damage by fire." § 10. "Every person who shall smoke or have in his or her possession, any lighted pipe or cigar, in any street, lane, or passage-way, or on any wharf, in said town, shall forfeit and pay for each and every offence the sum of two dollars."

the foundation on which life is established, the organs and means by which it is sustained, the powers and faculties which are its products, and the labors and enjoyments which are its objects, have no such sacredness attached to them. These may be expended or wasted, and life thereby diminished, or even ultimately extinguished—and thus partial murder or partial suicide may be committed—and no law of authority prohibits it, no public opinion is disturbed by it.

A man does not this voluntarily; but he deliberately lays his plans, and pursues his course, by which these consequences are inevitably produced. He indulges his appetites and passions beyond their proper limit, he works too laboriously with his hands or his brain, he deprives himself of sleep, he engages in an unhealthful occupation, or establishes himself in an unhealthful climate or miasmatic country, and thus he reduces his vital forces, and partially destroys life, or entirely wastes it away.

The common sense of mankind is not shocked by these things; on the contrary, a willingness to incur the partial loss of life, and run the risk of its entire loss, is esteemed, with some, a sort of virtue; while the cautious guarding the integrity of life is deemed reproachable.

COMPARATIVE CARE FOR LIFE AND PROPERTY.

The care with which mankind guard the interests of property, the pains they take in every way to increase it, and the anxious attention to prevent its loss, compared with the devotion to the interests of

life for the same purposes, show that property is a primary, and life a secondary object.

The improvements that relate to life are few, and when they are made, they make but slow advancement in popular estimation and use. But the improvements that relate to the facilities or profits of business are manifold, and quickly find their way to the confidence and adoption of the people.

Although air-tight stoves were injurious to life, by stopping the chimney ventilation, yet, inasmuch as they lessened the consumption of fuel, they were at once adopted, and they were used throughout the country very soon after their invention. The improvements in tools, in like manner, are taken into general favor. But the means of artificial ventilation, which have been long before the public—some of them almost a century—are rarely used, except in some public buildings, and in the dwellings of the few who care the most for these matters—and these few are mostly confined to this and other cities and their neighborhoods. And this means of supplying the needful air to inhabited rooms is so far from being in general use, that most men, if they think at all of these things, consider them as only needless luxuries to be enjoyed by the wealthy and the self-indulgent, but by no means necessary for the security of life.

The same inference may be drawn from the comparative care which we bestow on the means of sustaining life, and upon the management of our ordinary affairs. Our digestion and nutrition depend very much upon the kind of food which we eat, or

the material that is to be converted into flesh. It would seem, then, that those who provide and prepare our food should understand its nature, and the effect of the various methods of cookery upon its digestibility and nutritiousness; and that they should carry on their culinary processes with such discipline, that they could not fail of producing that aliment which is best fitted to nourish the living body, and which will produce the greatest amount of vital force. With these means, success in culinary operations may be as certain as in those of the mechanic arts.

But so far is the general practice from this, that those who are entrusted with the preparation of our food are usually the least educated; most of them are ignorant of the principles of their art, and some of them incapable of conducting any series of operations with exactness and certainty to a definite conclusion. Consequently their work is uncertain, and it is but an accident that their results are satisfactory. Hence, luck and chance too often govern the preparation of food; and, in this matter of vital importance, people submit to that degree of unskillfulness and uncertainty that they would not in ordinary affairs. Hence, we are sometimes told, as if it were fair philosophy or inevitable necessity, that the cook was lucky with the bread when it is good, and unlucky when it is bad. This explanation is often received as satisfactory, and thus life is lucky or unlucky, with its chance of energizing or depressing sustenance.

But these loose principles of action are not ad-

mitted in regard to common arts. The world is not satisfied with the joiner, who says he was unlucky when he made his door of a different size from his passage-way; nor does it sympathize with the painter or dyer, who deems himself lucky when he produces the intended colors by his mixtures. In these and other common matters, the world not only understands the value of correct principles and certainty of action, but it demands and obtains them. Yet it needs no philosophy to tell, that the preparation of materials that are to be converted into living flesh, and the adaptation of these to the powers of the stomach and the wants of the body, are matters that require more skill than any processes in the chemical or mechanic arts.

These and all other means and ways of producing and expending vital force are submitted to man himself for direction and use, to gain from them the highest or any lower degree of life, and there is no natural or insurmountable obstacle to their best improvement.

But there are intellectual and moral obstacles to this advancement, in the general ignorance of the laws of life, and of the connection of self-management with health, and of the origin of disease, in the misapplication of the religious element, by which sickness is referred to the direct and unaccountable interposition of a mysterious Providence, and not to man's violation of the laws established by the all-wise Creator for his conduct in all the minutia of his life—and in that sullen fatalism that refers sickness to some irresistible necessity. There are obsta-

cles in man's foolish selfishness which seeks present and temporary gratification in over-indulgence of passion and appetite at the expense of future and lasting pleasure, and in the unwillingness to conform his plans of action to the vital requirements. Even these obstacles may be overcome by man.

INFLUENCE OF PARENTAGE ON THE CONSTITUTION.
MARRIAGE.

But the difficulties that arise out of defects of organization, seem beyond the reach of human power to prevent; for, as the children's constitutions are primarily formed in the likeness of those of the parents, the hereditary strength or weakness must be traced back to the marriage relation for its cause. There it may not be possible to interfere. It is apparent that we cannot apply some of the means for the improvement of the human race that we do for the improvement of the lower animals and vegetables, by the selection of parentage.

The sensibilities of society would revolt at the thought, that only the healthy should marry. Mankind love to cherish some peculiarly holy and delicate notions in respect to marriage; the tenderest feelings of the heart, and the uncalculating affections, seem exclusively to be considered. People seem to marry for their own happiness alone, and cast no look beyond themselves. Yet other considerations are sometimes admitted. None can be blind to the future fact, that from this institution another generation shall spring; and, although these future events are forbidden subjects of discussion with

those who are most interested, and even all allusion to them in their presence is studiously avoided, yet, in reference to pecuniary matters, the probability of issue is occasionally considered. Some cautious women, in order to prevent the loss of their own estates, in the chances of their prospective husband's affairs, secure it before marriage to themselves and their issue. And some prudent persons, before contracting marriage, would consider it unwise to neglect to ascertain, whether the proposed partner had merely a life right in an estate in possession, or whether the estate was held in fee simple and would descend to the possessor's children. And so men and women do not hesitate to look at the probability of offspring when money is concerned, and to provide in the advance for the security and sufficiency of their estates.

If the world could be convinced, that health and strength descend from parents to children as certainly as property, and that the laws of man cannot guarantee to the future offspring the possession of estates that now belong to the contracting and marrying parties, as effectually as the laws of nature guarantee that their organization, and the physical, mental, and moral qualities, that grow out of it, shall descend to their issue; if this law of hereditary life could be as generally understood as the law of hereditary property, then men and women, in their matrimonial selections, would take into consideration the constitution and health of their proposed partners. And those, who now think it wise to ascertain whether wealth or poverty shall be entailed

upon their children, would think it still more wise to ascertain, whether a sound constitution, or insanity, epilepsy, consumption, scrofula, rheumatism, or any other disease, shall be their children's inheritance. Certainly no prudent man or woman can know that any one of these diseases, or that defect of organization which creates a susceptibility of any of them, belongs to the proposed husband or wife, without shrinking from the connection that would entail it upon their own children.¹

It is an essential element of our highest benevolence and cultivation to arrange all our plans of action in such a way that they will secure the greatest good, not only for the present time and for ourselves, but for the future and for all others that may be affected by them, however remotely. On this principle, wise and generous men and women, when they form their matrimonial plans, will look, not merely for those qualities of mind and heart that will give the greatest present enjoyment to themselves, but for all those qualities that will secure the greatest and most permanent enjoyment to their children and their remotest posterity.

For this purpose, it is necessary to learn, first, the law of hereditary descent, and, next, the facts in regard to the hereditary or acquired constitution, the present health, and the purity or impurity of the blood of those who are candidates for matrimony. When used for this object, the study of even "endless genealogies" will be profitable; not for the

¹ See Note G, Appendix.

mere purpose of finding a series of names that represent a succession of generations, nor of tracing out some root of external honor, but to determine through whose veins the blood has flown from even remote ancestors to the present generation.

In this view, the *registration of births, marriages and deaths*, becomes of great value, for it will show from whom any one is descended, what families have connected themselves with his family, who have contributed the elements of their life to the formation of his life, whether any taint has crept through any of these channels into his blood, and what fatal diseases have been in his family.

Although, by means of the registry of deeds, we can trace our estates through the successive owners to the first one who appropriated them, yet we have no vital registry that extends backward through a single generation. But when these records of life and death shall be more complete, and the world comes to understand its true interest, men will consult them to ascertain the purity or impurity of the blood of families before they enter upon a matrimonial connection, as they now consult the registry of deeds to ascertain the clearness or defect of the title to estates, that have passed through several hands, before they purchase them.

There is a large moneyed institution in Boston which insures lives, and also loans money on the mortgage of real estate. With a wise caution, the directors receive no mortgage unless it is shown, by the public records, that there neither is nor has been any defect in the title to the estate, as it passed

through successive owners, from the earliest known possessor. But they insure lives without any such means of knowing, whether there may not have been some taint, consumption, epilepsy, scrofula, or other hereditary disease, in some of the predecessors of the insured, whereby he has a defective title to his life.

VITAL FORCE OF ANIMALS AND VEGETABLES INCREASED.

To all these matters the world will gradually turn its attention, and ultimately learn the way of enlarging human life, as they have already learned the way of enlarging property. What they have already tried with success in one field, they will try in another and richer one. Everywhere, men of high intelligence and practical habits devote time and talent to the study of the laws of nature, in order to expand the life of vegetables and of domestic animals.

By carefully observing the laws and requirements of its life, and adapting the soil, situation, exposure, nutriment, and all the circumstances of its being to its wants, and thus giving its vital principle the best means and opportunities of action, they have converted the small, bitter, indigestible and innutritious crab, into hundreds of varieties of large, delicious, digestible, and nutritious apples. By the same faithfulness to the conditions of their being, they have raised the wild sloe to the present rich variety of plums, and expanded the pear and multiplied it into almost a thousand kinds. In the same

manner, they have enlarged the vitality of other fruits, and of roots and grains, and made them manifold richer in all qualities of their respective lives, than they were before the skilful hand of man fed their wants.

So also flowers, which would seem to be the peculiar and perfect gifts of nature, have grown more luxuriantly, and become richer in living beauty, by the fostering hand of man.

By applying the same principles, men have multiplied and extended the living power and the qualities of cattle, sheep, swine, and other animals, to which they have thought it worth their while to devote their careful attention.

In making all these improvements, there has been no change in the laws of life; these remain universally the same as they were in the beginning. But, having learned these laws, in respect to these animals and vegetables, men have so arranged their circumstances, that they may have the best opportunities and means of development and growth, and thereby their vital forces have been increased, and all the desirable results of their life have been enlarged.

Associations of men have brought their united strength to aid in this work of vital improvement, governments have lent their influence and their treasuries to encourage it, by liberally rewarding those who have expanded the life of animals and vegetables.¹

¹ See Note H, Appendix.

VITAL FORCE OF MAN MAY BE INCREASED.

The laws of human life, also, are fixed and unalterable; but the circumstances amidst which those laws operate, the means by which that life is sustained, and the purposes to which its results are devoted, are various. They all affect very materially the quantity of vital force, and they are subject to human control.

Connected with the best circumstances and habits, life is the fullest, longest and happiest; and with the worst, it is the shortest, most meagre and wretched. But man is not placed in the lower condition by any inflexible law of his being, nor will any unconquerable necessity compel him to remain there through successive generations. In order to rise from the lower to the higher state, it is not necessary that there should be any alteration in the course of Providence, nor that man should be endowed with any new faculty or have any new field of action. It only requires that he should conform his plans and habits to those laws, which from the beginning have been established for his earthly being, and that he devote to this purpose the talents and the energies which he has already successfully devoted to the elevation and enlargement of animal and vegetable life, and then he may be confident of similar success in his own vitality.

As the world comes to care for these things, and to be willing to transfer their talents and energies for improvement from the lower to the higher field of life, they will want aid and instruction; for, when the facts are doubtful, or the application of

the principles uncertain, they will need competent men to investigate these matters and explain them, and will be as ready to reward the talent or the skill that saves them from deterioration or elevates their standard of life, as they now are to reward that which restores them their lost health and strength. And, as in the legal profession, no small proportion of the learning is occupied in advising men how they may conform themselves strictly to the requirements of the law, and thus save themselves from difficulties and losses, so, gradually, such a preventive branch of our profession may arise and find employment.

Even now such is occasionally demanded. Not long since, a cautious gentleman receiving a matrimonial proposition for his daughter, consulted a physician as to the propriety of the marriage. The proposed husband was a man of nervous temperament; his grandmother, his mother, and an aunt and cousin on her side, and a brother, all had been, or were then, insane. His friends thought him to be sound in mind, and secure from mental disorder; nevertheless, the physician thought there was some danger of his becoming insane, and a greater danger of transmitting the taint to his children. He therefore advised that the proposal be rejected. His advice was followed. Another, and somewhat similar case, was recently presented to the same physician, and a written opinion with the reasons requested. The same advice was given, but not followed.

In 1840, a gentleman fearing he had tubercles in

his lungs, asked the advice of his physician respecting the propriety of fulfilling a contract for marriage. The tuberculous condition was not very manifest, and there was some hope that his health might be invigorated, and at least that his children might not receive the taint, and he was advised to marry. In the course of six years he died of phthisis. In the mean time two children were born. One of these has died of tubercular disease, and the other very narrowly escaped death from pulmonary disorder, and is now very feeble, and probably has tubercles.

Consultations like these, and also in regard to other matters of a prophylactic nature, occur now and then. They ought to be, and, in course of time, they will be general, and we and our successors will have more and more opportunities of teaching the world the law of physical life.

In our teaching, and in the world's learning, there is every thing to gain and nothing to lose. Although a man cannot "by taking thought" alone, "add a cubit to his stature," yet, by careful observance of all the laws of his being, he may add a degree to his strength, an increase to his vital force, and days, perhaps years, to his longevity. How much of this expansion of life we may accomplish, or how many ages it will take for mankind to attain to its fullest measure of vitality, in duration, in power, and in enjoyment, we cannot tell, nor is it necessary for our present purpose that we should know. But, we may be assured, that, if in this matter we are faithful to the responsibilities that come upon us, from our edu-

cation, our opportunities, and our influence, we shall not only increase and prolong our own vital forces and actions, but guide others to make the same vital improvement, and then, dying, we shall have the satisfaction of leaving the world richer in all the blessings of earthly life than we found it.¹

¹ See Note I, Appendix.