

Physiology, animal and mental : applied to the preservation and restoration of health of body and mind / by O.S. Fowler.

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Fowler, O. S. 1809-1887.
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Publication/Creation

Stoke-on-Trent : G. Turner [printer], 1853.

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PHYSIOLOGY,⁵
ANIMAL AND MENTAL:

APPLIED TO THE

PRESERVATION

AND

RESTORATION OF HEALTH

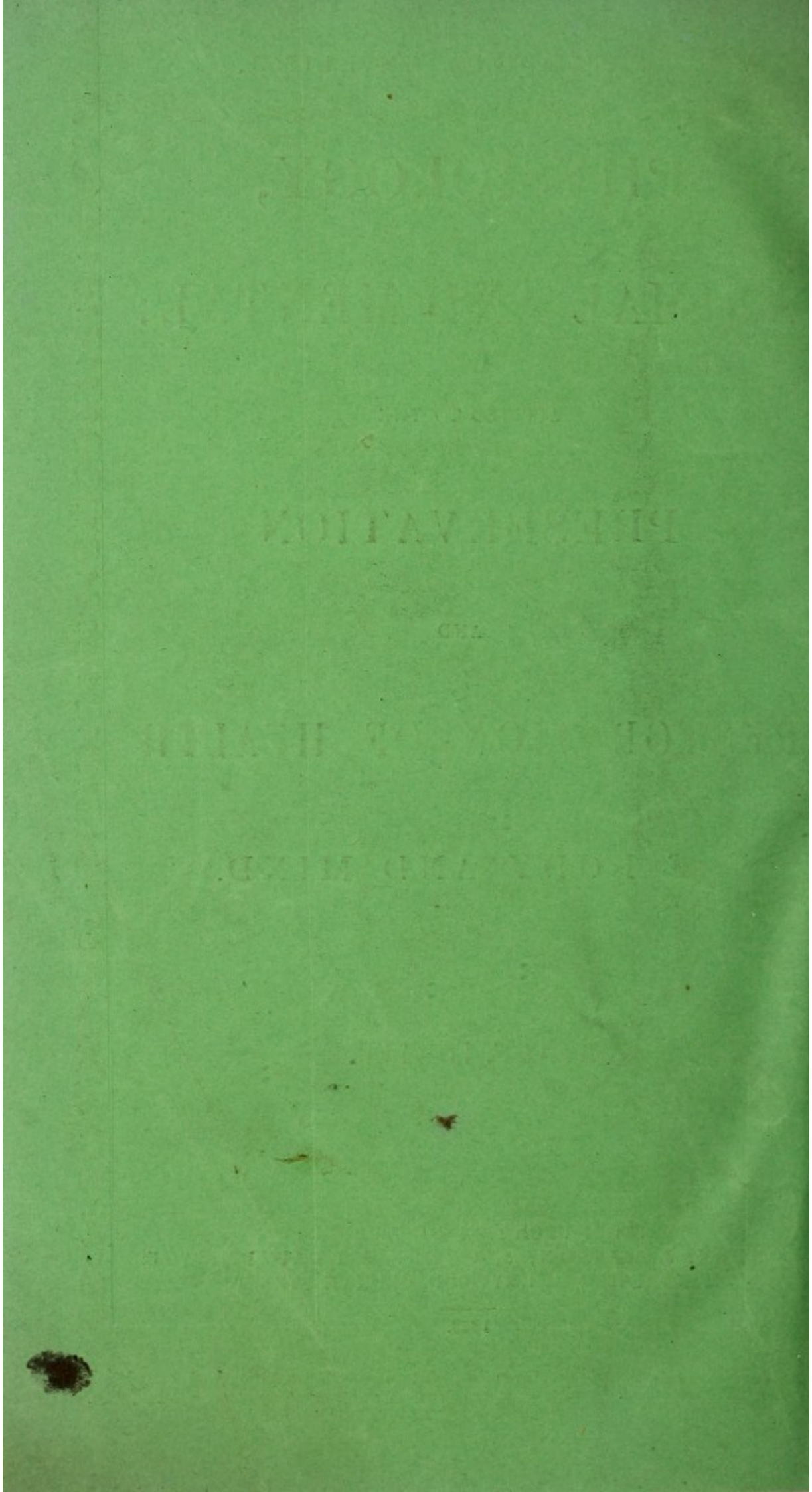
OF BODY AND MIND.

BY O. S. FOWLER.



STOKE-UPON-TRENT, G. TURNER ;
LONDON, J. WATSON, 3, QUEEN'S HEAD PASSAGE;
MANCHESTER, A. HEYWOOD, OLDHAM STREET;

1853.



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PHYSIOLOGY
ANIMAL AND MENTAL

EMBRYOLOGY AND REGENERATION OF TISSUES OF BODILY
AND MENTAL NATURE

BY C. S. FOWLER.

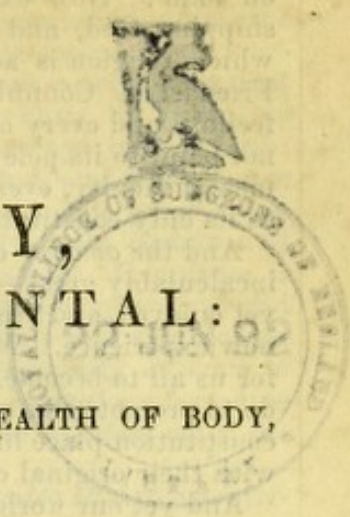
CHAPTER I.—HEALTH, ITS VALUE AND CAUSES.

Happiness is the result of the harmonious action of all the organs of the body, every organ performing its proper function, and in all its relations to the other organs of the body, and to the external world. It is the result of the harmonious action of all the organs of the body, every organ performing its proper function, and in all its relations to the other organs of the body, and to the external world. It is the result of the harmonious action of all the organs of the body, every organ performing its proper function, and in all its relations to the other organs of the body, and to the external world.

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PHYSIOLOGY, ANIMAL AND MENTAL:

APPLIED TO THE
PRESERVATION AND RESTORATION OF HEALTH OF BODY,
AND POWER OF MIND.

BY O. S. FOWLER.

CHAPTER I.—HEALTH: ITS VALUE AND LAWS.

HAPPINESS AND SUFFERING, AND THEIR CONDITIONS.

HAPPINESS is the constitutional and only legitimate product of every organ of the body, every faculty of the mind, every element of our being. To what else are all our bones, joints, and muscles adapted, both in their functions themselves, and in all that labour and locomotion which they were devised to accomplish? What but enjoyment is the constitutional product, both of the mere act of seeing, and of that fund of information furnished thereby? Pleasure is the only natural function of respiration. The stomach was created to give us pleasure in eating, and in all its constitutional effects. And brain and nerve were created, to furnish us intellectual and moral enjoyment. And thus of every other organ and function.

Benevolence was created to bless the needy, to pour the oil of consolation into the wounded soul, to avoid causing pain, and adorn human nature, as well as to render the benevolent man himself happy; it being more blessed to give than to receive. Parental love is adapted both to render parents themselves happy in providing for their children, and children happy in receiving the bounties thus bestowed on them. Ideality, exercised in harmony with its primitive function, enjoys a perpetual feast in contemplating the beautiful and perfect in nature, as well as in refining the manners and purifying the feelings of its possessor, and elevating and gracing his entire nature. Acquisitiveness was designed to give pleasure both in acquiring property and the necessaries and comforts of life, as well as in providing Appetite with food, Benevolence with the means of doing good, Cautiousness with the requisites for shelter and safety, the Social Affections with family comforts, Inhabitiveness with a home, Intellect with books and the means of prosecuting scientific researches, and all the other faculties respectively with the means of their gratification. Appetite, besides yielding much gustatory pleasure, nourishes body and brain, and thereby enables them to perform with pleasure the various functions of our nature, and thus minister to enjoyment. Causality experiences happiness in studying the laws and operations of nature, adapting ways and means to ends, and thus attaining pleasure. Language, normally exercised, affords pleasure in the mere act of talking, besides supplying an exhaustless source of happiness in the interchange of knowledge, ideas, motives, feelings, in reading, hearing sermons, lectures, and the like, and in communing with one another. How vast an amount of happiness is Memory capable of conferring

on man! How exalted the enjoyment we can experience in worshipping God, and in those holy emotions and purifying influences which religion is adapted to diffuse through the soul! And thus of Friendship, Connubial love, Ambition, Perseverance, Hope, Moral feeling, and every other faculty of the human mind! The needle does not point to its pole more universally, than every physical organ, every mental faculty, every element and function of man, points to *happiness* as its only constitutional product.

And the *amount* of happiness of which our natures are susceptible is incalculably great—far greater than the happiest of mortals has ever yet enjoyed, and almost infinitely greater than the generality of mortals now experience. We little realize how inexpressibly happy it is possible for us all to become. Our Creator has done all that even a *God* could do to promote this end of life. In what a paradise does man's primitive constitution place him? If he would exercise his powers in accordance with their original constitution, how holy and happy would he become!

And yet our world abounds with suffering and woe! Pandora's box, filled with all manner of diseases and miseries, has been opened upon man! Poverty, wretchedness, loathsome and distressing sickness, the heart-rending decease of friends, children, and companions, and even premature death itself, tearing its victims from life and all its pleasures, afflict most of mankind! Millions suffer beyond description,—many are tortured into the wish that they had never been born, or that death would hasten to their relief; while many consider our world a path of thorns, and look on life itself as a lingering, living *death*!

Yet little of this suffering forms any *necessary* part of any constitutional arrangement or function of our nature. Teeth are created and adapted to masticate food, not to ache; nor need they ache. The head was not made to ache, nor the stomach to occasion griping pains. Nor are the lungs adapted to torture us, or waste away in lingering consumption, blasting all our hopes and happiness. Neither malignant fevers, nor distressing rheumatism, nor torturing gout, nor loathsome, life-eating cancers, nor any other kind or degree of disease or suffering, form any part of man's original constitution, nor of nature's ordinances.

So of the mental faculties. Was Benevolence created to torment us with the sight of pain which cannot be relieved? Or Combativeness to brawl, quarrel, and fight? Or Destructiveness to devastate whole nations with woe and carnage, making lovely wives lonely widows, and happy children desolate orphans, besides creating all the horrors of the battle field itself? Was Appetite created to gormandize at the expense of all that is virtuous and happy? Or Approbativeness to pinch the feet of the suffering Chinese, or flatten the head of the savage Indian, or deform the waists of simple would-be beauties? Or Self-Esteem to wade through seas of blood to thrones of despotism? Or Veneration to create all the abominations of Paganism, or all the bigotry of Christendom? Or Constructiveness to make implements of torture and death? Or Acquisitiveness to cheat and rob? Or Causality to plot mischief and devise evil? Or Adhesiveness to mourn in hopeless grief the loss of near and dear friends? Or Parental Love to torture us with inexpressible anguish by the death of a dearly beloved child, or perhaps entire groups of beautiful and happy sons and daughters? Or Connubial Love to weep, disconsolate and distracted, at the grave of a dearly beloved wife, or devoted husband—perhaps, too, after every means of support has been exhausted, every child buried, every earthly hope blasted, and while torturing disease is preying upon life itself, and opening the yawning grave at our feet? *Never!* Cold and heat are not more contrary than these results are contrary to nature's adaptations.

What, then, has caused all this wide-spread misery? Eve's eating the forbidden fruit; But that affects all human being alike; so that, for all *its* influences, all *could* be as happy as any one ever has been or

ever will be. What then is its cause? Hear nature's answer. The sentient world, in common with the physical, is governed by *law*, the violation of which causes pain, and its obedience pleasure.

Unless pain existed, sentinel-like, to watch and warn us against violating law, we should be perpetually liable to burn, or bruise, or freeze ourselves to death, or mutilate ourselves in ways innumerable. This same principle governs equally the laws of mind, and for the same purpose; namely, to secure their observance also. The greater and more uniform the pleasure of obedience, and the more certain and fearful the pain consequent on disobedience, the better. Happiness is the most persuasive motive to goodness, and suffering the most powerful preventative of sin, which even a *God* could invent; and this double invention of rewards *and* punishments—the former sweetly enticing to obedience, and the latter sternly *enforcing* it—is as perfectly adapted to secure man's highest good, as anything that Infinite Wisdom could devise and Infinite Benevolence execute!

That same wisdom which devised these laws has also affixed a contrivance by which they are their own executors. They are *self-acting*—necessarily inducing, in the very nature of things, their appropriate rewards and penalties. In the very *act* of obedience consists its pleasures, while in the very transgression itself, consists its penalty. To obey any law is to secure its legitimate blessings; to transgress it is to insure its consequent sufferings. No escape, no evasion of either can possibly occur throughout God's vast dominions. Obedience and its consequent happiness are linked inseparably together; while sin and suffering go hand in hand throughout the universe! Neither can ever be separated from the other!

Be it then remembered by every human being, that *all* suffering is the constitutional and inevitable *consequence* of violating law, and that all enjoyment flows naturally and necessarily from obedience. Nor is it possible, in the very nature of things, to obey or violate any law whatever, without inducing these results; nor is it possible to experience these results except in and by such violation. No pain was ever sent by God, nor any blessing ever conferred by him, except in conformity with these unalterable institutes of nature. Hence happiness is in as exact proportion to obedience, and suffering to sinfulness, as the God of heaven can make them.

THESE LAWS COGNIZABLE.

Nor are these laws a sealed book to man. This would render them useless. They are open, palpable. Those who cannot discern them, are blind or stupid.

Man can apply them. He can adopt means to ends; he can control effects by applying causation so as to bring about desired ends. He is, moreover, endowed with that power of choice or will which enables him to obey or violate them at pleasure, and thus to render himself good or bad, and therefore happy or miserable, according as he may determine.*

AND OUR HAPPINESS AND SUFFERING ARE ANALOGOUS TO THE LAW OBEYED OR BROKEN. Each bears a resemblance to its origin. Thus the violation of the law of appetite disorders the stomach, corrupts the blood, and causes disease and suffering throughout this whole department of our nature. Those who violate the law of chastity experience an entirely different kind of pain, occurring in the sexual departments of their nature and its dependencies. Yet such will enjoy the benefits of whatever laws they obey.

* Though some inherit painful diseases and vicious predispositions from parents, and thus suffer for sins not their own, and though our inter-relations with our fellow-men often cause us to suffer through their sins, yet, in the main, we obey and enjoy, or sin and suffer, *for ourselves*, and reap the consequences of our *own* conduct. Hence, by avoiding all sin, we can escape all suffering. If we obey all the laws of our being, we shall become as happy as it is possible for human nature to become.

This analogy of enjoyment and suffering to the law obeyed or broken, renders it easy to trace our respective pains and pleasures to their respective causes, that is, to the particular laws obeyed and broken, and thus enables us to find out the *causes and the remedies* of every evil experienced.

Let us then apply ourselves to the *study* of these laws. Ignorance of consequences is the great parent of most of man's sufferings, and knowledge is the first great cure. A knowledge of the conditions of enjoyment and of the causes of suffering, is the great thing wanted.

To *expound the laws* of man's being, and enforce their observance, should be the end of all education. As happiness is the 'end of man,' all education should be directed to its attainment. Yet how foreign to this object is education as at present conducted! Pupils are taught scarcely anything concerning themselves, and, of course, taught scarcely anything as to how to render themselves happy. Our educational system requires to be completely re-modelled. We require a new set of school-books too; school-books which shall make men acquainted with *nature*, especially with their *own* nature. The school-books now in general use teach little or nothing of nature, especially of human nature.

What then are the principal laws of our being, by knowing and obeying which we may increase our happiness, and escape the suffering to which so many are subjected? Phrenology and Physiology answer this question. Physiology explains the laws of our physical constitution, or the conditions of life, health, and animal enjoyment? while phrenology unfolds the laws of mind. Both combined embody man's entire nature, with all its laws.

The mind and body of man are most intimately related. There exists between them a perfect and a ceaseless sympathy. This truth is established by our own experience. Thus a clear cold morning powerfully excites the mind, by its exciting effect on the body. Fevers enhance, and even derange, the feelings and mental manifestations, by over-exciting the action of the brain; while hunger, debility, and the like, produce a directly contrary effect. Indigestion, by deranging the physical functions, causes gloom and mental debility, and renders people irritable, misanthropic, disagreeable, and miserable. Physical inaction causes mental sluggishness; while bodily exercise quickens intellectual activity, and increases happy feeling. Excess and deficiency of food and sleep affect the mind in a similar way. Experience has taught many of our best speakers to prepare their minds for powerful effort, by attention to their diet. They have found that certain kinds of food stimulate some of the propensities; while other kinds increase their ability to think and study. Temperance promotes virtue; while excess strengthens sinful desires. So with sickness and health. Many forms of sickness enfeeble the mind; while health invigorates it. Inflammation of the brain causes insanity; while utter inaction of the brain causes mental stupor. Both morality and talent are more affected by food, drink, physical habits, health, sickness, &c., than most suppose. When men have eaten to excess, or in any other way clogged or disordered their physical functions, it is impossible for them to bring their intellectual energies into full and efficient action. Our thoughts and feelings are constantly influenced by changes in our body. Changes can never take place in our body without corresponding changes in the mind. We may as well doubt our existence as question the doctrine that the body and mind reciprocally affect each other.

This reciprocity is effected by means of the brain, the great agent or organ of thought and feeling. There is a most intimate connection between every portion of the body and the brain, which makes the sympathy existing between every part of the body and the brain perfect and universal. The state of the mind is influenced by the state of the brain, and the state of the brain is influenced by the state of the body. Mind,

brain, and body, bear a perfect reciprocity to each other. Those natural relations between the body and brain, and between the brain and the mind, are perfectly systematic and universal. There are no exceptions. Everything in man is related. Nothing exists in man independent of any other parts of man; and no change can take place in one portion of man, without in some way affecting every other portion. That which excites the body, excites the brain; and that which excites the brain, affects man's mental manifestations. That which invigorates the body, invigorates the brain, and that which invigorates the brain, invigorates intellect and feeling. That which weakens or disorders the body, disorders or weakens the mind. That which restores the body, restores the mind; and that which really improves the mind, improves the body also. The body and the mind are as effectually and completely interwoven with each other, as the warp and woof in the cloth we wear.

This principle shows us how to control the mind and all its operations. It shows us how to quicken or retard its emotions, how to impair or restore its strength, how to lessen or increase its power. It shows how, by influencing the body, to throw the mind into any particular state.

It is of the utmost importance, therefore, that men should understand this principle. It is only by attention to this principle that they can secure their mental and moral improvement. Intellectual and moral excellence are man's perfection, and nothing is so important to man as rightly to understand the means by which he may secure his perfection. This is the highest order of knowledge, and gives the highest order of power. No charioteer can manage his well-trained steed more easily or effectually, than the man who possesses this knowledge can manage and control his state of mind and feeling. The object of this volume is to impart this knowledge. It is intended to answer the questions, What physical conditions induce certain mental manifestations? Into what states shall we throw the body, in order thereby to promote particular moral emotions and tendencies, or enhance particular intellectual powers and manifestations?

HEALTH,—ITS VALUE,—THE POWER OF SECURING IT,—THE DUTY OF SECURING IT.

Health consists in the vigorous and regular, or natural action of all our organs or powers; while disease consists in their weak or irregular action; and death in their suspension. Health and life, therefore, are proportionate to the amount of regular or natural action of our organs and powers. Hence by increasing the regular action of our organs, we increase the amount of our life and health; while by enfeebling or disordering our organs, we diminish the amount of our life and health, and of all our highest pleasures. Health is life, and life is health. The value of health is, therefore, infinite. Health is enjoyment. It gives the greatest attainable relish to life and to all its blessings. We cannot enjoy life without health; nor can we enjoy it except in proportion to the perfection of our health. When disease has destroyed appetite, the most delicious food and fruit only nauseate; while a keen appetite, the result of perfect health, gives a relish to the homeliest meal. The rich invalid is poor, because he cannot enjoy his possessions; while the healthy labourer is rich, because he enjoys all things. Those who have *always* enjoyed health, do not fully know its value. We measure health, as we do our other blessings, by its loss. We really prize it as we ought till it declines. What folly to trifle with health! Esau's folly in selling his birthright, was wisdom compared with the folly of those who carelessly barter a life-time of vigour for one of weakness and disease; or who barter life itself for some momentary indulgence.

An ambitious youth, to show how much he could do, worked till he was utterly exhausted;—worked till he lamed his side. He has now for fifteen years been an invalid. He can scarcely do half the labour he

formerly could. Some kinds of labour he cannot do at all. And when he works, he works in almost perpetual pain. That single day's over-work did him more injury than all the wealth of the world could do him good. It caused him more pain than any amount of money could ever give him pleasure. It lessened all his powers of enjoyment, and increased the amount of his sufferings for life, and will probably shorten his life a number of years. How foolish in men thus to sacrifice their happiness and life on the altar of pride! Yet such instances of folly are not rare. Nay, multitudes are chargeable with greater folly. How many diminish their joys and shorten their lives by vicious indulgence! Not one in twenty, perhaps, do justice to themselves. Almost every one, by some unwise exposure or indulgence, has injured his health, diminished his enjoyments, and cut short his days. The men who take pains to invigorate health and prolong their lives, are but few; while those who ignorantly risk or madly squander health and life, are numbered by millions.

Health is every way valuable. Health is gain, while sickness and disease are loss. Health allows you to be regular in your attention to business; while sickness takes you away, and compels you to entrust the management of your concerns to others. Sickness suspends the labourer's wages, while health and vigour increase them. Sickness brings doctor's bills and other expenses, and occasions endless loss; while health enables you to look around and make the best of every opportunity that offers for bettering your condition. How many of our readers are now poor, who, if they and their families had been always well, would have been comparatively rich! In this country (America) the healthy need never be poor.

Attention to health is dictated by every motive. Disease is *painful*. It not only diminishes positive enjoyment, but causes positive pain. The pain it causes in some cases is indescribable, intolerable. The stone, the gout, the toothache, the tic douloureux, inflammations, fevers, &c., often cause a degree of pain which amounts to positive and unendurable misery. Nervous disorders cause mental anguish as intolerable as the acutest and most aggravated bodily pain. Even a common cold, a tickling cough, an attack of influenza, a fit of indigestion, a bilious stomach, are no slight matters. The difference between a *slight* attack of disease and perfect health is by no means trifling. Who then would willingly pursue a course, the tendency of which is to injure his health, and entail on himself disease?

Let it also be remembered, that no human being can injure health, at any period of life, without proportionately shortening his days. Every one will, in effect, be brought to account at the close of life, and compelled to resign it as much sooner than he otherwise would, as he has injured his health during his life-time. The man therefore who trifles with his health, cuts off a portion of his life. The man who has money in the bank, cannot waste a portion daily without sooner exhausting his store. And so it is with life. Men cannot incur disease without expending a portion of the life prepared for him, and thus prematurely exhausting his stock. The more reckless you are of health, the more speedily do you bring your life to a close. Every instance of over-eating, over-working, over-straining; every piece of imprudence or profligacy; or whatever else injures health, is a draft of life; it not only enfeebles your powers while life continues, but brings your life to an earlier close. On every account, therefore, should men be careful of their health. Whether they wish to prosper in business and raise themselves to wealth and independence, or enjoy, to advantage, the pleasures of animal life, or promote the welfare of their fellow-men;—whether they wish to acquire knowledge, reach to eminence in any department of science, or excel in any description of useful labour, let them use the necessary means to secure good health. Whatever be the end men aim

at, if that end be great and good, they should do their best to perfect and perpetuate their health.

And health, to a great extent, is in our power. Some contend that sickness and death are providential,—that they are not governed by regular laws. A child dies, and a parent is taught to regard it as an interposition of Providence. A man is afflicted, and he is taught to regard it as the command of the Lord. There is a sense in which afflictions are the work of God. Afflictions are the consequences which God has annexed to the breach of his laws. But in every case affliction is the result of violated law, either in the party afflicted, or in other parties under whose influence he is placed. All is cause and effect. Every one can see that some things promote health, while others injure it; that some things cause death, while others prevent it. Every one acts on this principle. Else why do they give medicine to remove disease, and turn the hand of death aside? Can they believe that God desires them to be ill, and yet use medicine to make them well? Sickness and death are no more providential than the rising of the sun. They are the necessary effects of certain causes. One man poisons himself, another shoots himself, another drowns himself;—are these things providential? No one will say they are. Yet they are quite as providential as the diseases under which men generally suffer. You see a man dying under *delirium tremens*; he has as really caused his death by his drunkenness, as the suicide caused his death by his pistol. Another is dying of fever: he caused it by over-exertion and imprudent exposure. So with respect to other sufferers. Some suffer in consequence of the sins of their parents, and others in consequence of their own sins; but weakness, sickness, disease, and pain, are in all cases the result of violated law. What we call death is natural; but when life has been well and wisely spent, men suffer as little in death, as they do in life, except where they suffer through the transgression of others.

How mournful that the teachers of the people should not endeavour to enlighten men on this important subject! How mournful that some of them should preach, and strive to perpetuate, an error so injurious to mankind, as the notion that sickness and premature death are visitations of Providence, and not the results of violated law! Men kill themselves and their children: at times they kill them with misguided kindness, and at other times by criminal neglect; and their religious teachers, instead of revealing the awful truth to them, ascribe the whole to Providence. We wish to explode such ruinous errors, and to make men feel, that health and life are placed in their own hands, and that it depends on their own conduct, to a great extent, whether they and their children are healthy and happy, or sickly and miserable. When men have done the best they know, they have a right to comfort themselves with the thought that they have done so, but they ought always to remember the principle we are inculcating, and labour to learn still more the real cause of disease and untimely death, and to employ their discoveries in improving and perfecting their modes of life.

A belief that everything is providential, according to the common notion of Providence, is calculated to perpetuate existing evil; while a belief that Providence governs men by general laws,—a belief that men are entrusted with their own destiny, would have a tendency to make them thoughtful, studious, and careful of their proceedings.

The following are Mrs. Sedgwick's remarks on this subject:—

‘WAS IT PROVIDENCE ?

‘Take, for example, a young girl bred delicately in town, and shut up in a nursery in her childhood—in a boarding-school through her youth—never accustomed to air or exercise, two things that the law of God makes essential to health. She marries; her strength is inadequate to the demands upon it. Her beauty fades early. She languishes through her hard offices of giving birth to children, suckling, and watching over

them, and dies early. 'What a strange Providence, that a mother should be taken in the midst of life from her children!' Was it Providence! No! Providence had assigned her three score years and ten; a term long enough to rear her children, and to see her children's children; but she did not obey the laws on which life depends, and of course she lost it.

'A father, too, is cut off in the midst of his days. He is a useful and distinguished citizen, and eminent in his profession. A general buzz arises on every side: 'What a striking Providence!' This man has been in the habit of studying half of the night; of passing his days in his office or in the courts; of eating luxurious dinners, and drinking various kinds of wine. He has every day violated the laws on which health depends. Did *Providence* cut him off? The evil rarely ends here. The diseases of the father are often transmitted; and a feeble mother rarely leaves behind her vigorous children.

'It has been customary in some of our cities, for young ladies to walk in thin shoes and delicate stockings in mid-winter. A healthy, blooming young girl thus dressed in violation of heaven's laws, paid the penalty—a check circulation, colds, fever, and death. 'What a sad Providence!' exclaimed her friends. Was it Providence, or her own folly? A beautiful young bride goes night after night to parties, made in honour of her marriage. She has a slightly sore throat; perhaps the weather is inclement; but she must go with her neck and arms bare; for who ever saw a bride in a close evening dress? She is consequently seized with an inflammation of the lungs, and the grave receives her before her bridal days are over. 'What a Providence!' exclaims the world. 'Cut off in the midst of happiness and hope!' Alas, did she not cut the thread of life herself?

'A girl in the country, exposed to our changeful climate, gets a new bonnet instead of getting a flannel garment. A rheumatism is the consequence. Should the girl sit down tranquilly with the idea that providence has sent the rheumatism upon her, or should she charge it on her vanity, and avoid the folly in future? Look, my young friends, at the mass of diseases that incurred by intemperance in eating and in drinking, in study or in business; by neglect of exercise, cleanliness, and pure air; by indiscreet dressing, tight lacing, etc.; and all is quietly imputed to providence! Is there not impiety as well as ignorance in this? Were the physical laws strictly observed, from generation to generation, there would be an end to the frightful diseases that cut life short, and of the long list of maladies that make life a torment or a trial. It is the opinion of those who best understand the physical system, that this wonderful machine, the body, this 'goodly temple,' would gradually decay, and men would die as if falling asleep.'

We may further remark, that health is in general, *easily* attainable by men. Not only is it governed by laws, but its laws are such as men in general may readily understand and obey. Obedience to the laws of health is, in general, easy and natural. We have not to do some great thing in order to preserve health. We have only to live in accordance with our own nature, and nature itself will secure our health. As we have said before, health is simply the natural and perfect operation of all our organs. And nature has taken the utmost pains to secure this. She has formed our bodies with the utmost skill. She has formed our bodies thus perfectly, thus skilfully, on purpose to secure corresponding perfection in every function. And unless we prevent it by violating nature's laws, every organ will go on from the beginning of life, till worn out by extreme old age, performing its office with all the regularity of the sun, with a power commensurate to the demands of our being. Health is as natural as breathing, eating, or sleeping. Do yourselves and nature justice, and health, and life, and happiness, will flow on as freely and plentifully as the river to its ocean home. All

we have to do is, to forbear doing *violence* to our nature—to forbear doing violence to our natural instincts and the laws of our being. That man is often *tempted* to violate the laws of his being, is true; and it is also true, that it is sometimes difficult to resist temptation; but *supposing* men to resist temptation, and persist in the course which God or nature has laid down for them, health, life, and enjoyment are the natural and necessary consequences.

It is not enough to say that it is easy to secure health and enjoyment. If we act aright, it is impossible to prevent ourselves from being healthy and happy. It requires great or long-continued violence to arrest the healthy and pleasurable functions of our being. The power of the human constitution to resist disease is quite astonishing. Many will violate the laws of their being for years, and still enjoy considerable health. Some will even shatter their constitutions, and yet recover. What would the health and enjoyment of such men have been if they had done their duty to themselves? The men who thus violate the laws of their being, must of course suffer in proportion to their transgressions; but their case still serves to illustrate the principle, that health is *natural* to man—that health is comparatively easy to be secured, and that disease can be occasioned only by unnatural modes of life.

Such is the ignorance of most men in reference to the laws of their being, that they are almost always doing something calculated to injure health. They sit in-doors too much, or remain too long in heated rooms. Some take too little exercise; others labour too much. Most people sleep in close rooms. Many eat too much, or eat wrong things. Some over-tax their minds, while others exercise their minds too little. They sit in unwholesome postures. They neglect the skin, and are inattentive to cleanliness. Some dress too warm. Many drink injurious drinks, take injurious drugs, or do a thousand other things at variance with the laws of health, or neglect a multitude of things which the laws of health require. Yet in spite of all this ignorant transgression, how healthy, comparatively speaking, many continue, even till they are sixty, eighty, and some even a hundred years of age.

Alcohol is rank poison. Yet how many drink it daily, and even to drunkenness, for thirty, forty, or fifty years, and yet retain a measure of health and strength! What quantities of poisonous drugs some take, and yet continue to live! In short, nature has done her utmost to bestow vigorous and uninterrupted health on men. She has done her utmost to protect men from disease, and to prolong their lives; and if men in general would but do *their* part, or refrain from thwarting nature in her plans, disease would soon be rare, and health, and vigour, and enjoyment, and long life, become the general lot of all men.

Even children that inherit diseases from their parents, might generally, by careful observation of the laws of health, diminish their hereditary indisposition, and enjoy good health to a good old age. The fact that people have health sufficient to enable them to become parents is itself a proof that their offspring generally may secure a fair amount of health, and a moderate length of life. These points are illustrated and proved in our work on *Hereditary Descent*, and confirmed by the fact to be proved in this volume, that all diseases, taken in season, may be cured by a proper physiological regimen. Men generally, therefore, if not men universally, may preserve health and escape disease, if they will study and obey the laws of their being.

It becomes then, not only our *duty* to preserve our health, but one of our *most important* duties. Neglect of this duty disables as from discharging other duties. We can neither provide for our families, nor do good to our neighbours as we ought, if we allow our health to be injured. Instead of helping and comforting our families and our fellow men, we injure and distress them when we subject ourselves to disease or premature death. The anxiety and pain which men frequently

cause their relatives and friends in this way are often most distressing. If we consider the good which men disable themselves from doing, and the grief and pain they entail on their friends and kindred by neglecting the laws of their being, we shall be led to the conclusion, that such neglect is one of the greatest sins a man can commit. It is as much our duty to consult our health, as it is to refrain from wantonly tormenting or destroying people. We have no more right to trifle with our health, than we have to commit robbery, suicide, or murder. In neglecting our health we are, in truth, committing robbery, suicide, and murder. In neglect of health all crime is included. We ought, therefore, to make the study of the laws of health a matter of conscience. To obtain a knowledge of the laws of health should be one of our principal objects.

To aid our readers in the accomplishment of this object, is the design of this work. We shall first call attention to the laws of our being respecting FOOD.

CHAPTER II.

FOOD.

Man is so constituted, that every function of life, every exercise of muscle, brain or nerve, every operation of his being, is accompanied by an expenditure of VITALITY. We can no more propel the machinery of our frames without such expenditure, than we can propel the steam engine without an expenditure of fuel. Now unless this expenditure be met by a constant supply of the *materials* of life or vitality, life cannot be sustained.

To supply ourselves with the proper kinds and proper quantities of food is, therefore, a matter of the first importance. Food is not only the material from which vitality is made, but from which all loss in the solid parts of our system is repaired. The waste in the material of which our bodies are composed, is computed to equal one-seventh of the entire body annually, or the whole weight of our body every seven years. It is probably greater. All this waste, we say, is to be supplied from food by the process of digestion. If this waste be unsupplied, as is the case when food cannot be obtained, or when, though obtained, and eaten, it happens not to be digested, our bodies are reduced, emaciated. If this waste continues unsupplied for a length of time, we are reduced to skin and bones, look haggard and ghastly, our strength fails, our spirits sink, and life ebbs rapidly away. So urgent is the demand for food, that when it is not supplied, the fatty matter about our bodies is taken up and used by the system; the muscular, nervous, cerebral, and other tissues follow, until all is consumed, when death at last ensues. Hence it is that fat or indolent persons can endure famine better than lean and active ones. Fat people have more within themselves to live upon than spare people; and active people live faster, consume what they have more rapidly, than indolent people.

All therefore should see to it that they furnish the system with the food which it requires. Starvation is certain and speedy ruin. Few can live without food many days. Most are rendered faint by fasting a single day; some by omitting only a single meal, or not eating at the usual time. It is of importance that this subject of food should be well understood. Our life, our health, and our enjoyment, depend on our attention to it.

MAN requires *organized* substances for food. Vegetables draw nourishment directly from the earth: not so man. *He* requires for food substances already organized. God has *provided* such substances

for man in endless variety and boundless quantity, both pleasant to the taste and rich in nourishment. From this variety and extensive provision of eatables, man is to make his selection. Nature neither restricts him in variety, nor stints him in quantity; she only requires him to select with wisdom, and to use with care and fidelity.

It is not *every* kind of food that is good for man. Different kinds of vegetables flourish most in particular kinds of soil, because they find in those soils the particular kind of sustenance which they require. It is the same with living things. Some are adapted to live on some kinds of food, and others on others. Lions, tigers, and other beasts of prey, require the flesh and blood of animals; while the horse, the cow, the sheep, loathe flesh, and thrive on a vegetable diet. Even the animals that live on vegetable substances, do not all live and thrive on the same *kinds* of vegetables. Some thrive best on fruit, others on grass, and herbs. Some feed on leaves, and others on bark. So with carnivorous animals. Some require *one* kind of animal food; others require other kinds.

Though man is well nigh omnivorous, yet all kinds of food are not equally good for him. He does, in common with other animals, require particular kinds of food. Particular kinds of food are constitutionally adapted to develop certain physical and mental qualities. The natural diet of the lion and the tiger is constitutionally adapted to develop *their* physiology and mentality. The natural food of the squirrel, the sheep, the shark, &c., is adapted to feed those powers by which those respective animals are peculiarly distinguished, and in which their perfection is placed, And thus with all other species of animals. This is a law of nature. Deprive animals of the particular kind of food adapted to them, and you weaken their peculiar powers, let down their nature, if not destroy their lives.

The simple fact that certain species of animals have a peculiar aptitude or adaptation for particular kinds of food, and that they thrive best on them—that the tiger is rendered fiercer by animal food, and loses his ferocity when fed on bread-stuffs—that feeding dogs on raw beef increases their ferocity, while feeding them on a vegetable diet softens their fierceness, and that thus it is with animals generally, proves the principle that we have just laid down to be a fixed and universal law of nature.

This provision of nature for increasing particular capacities in man and brute is not only beautiful, but exceedingly useful. It not only enables us to modify the natures of other creatures, but to augment or diminish particular powers or propensities in ourselves, and thus render ourselves more intellectual, more spiritual, as a regard to our highest welfare may suggest.

The question then becomes exceedingly important, What kinds of food naturally develop particular physical and mental powers? To obtain a satisfactory answer to this momentous question, should be the wish and endeavour of every human being. We ought to labour to understand this important subject thoroughly, that we may know exactly what influence particular modes of living are calculated to exert upon us. Our wish is to assist you in understanding this subject.

AN INFALLIBLE GUIDE.

We remark then, in the first place, that appetite *unperverted* is an infallible director with respect to food. Nature has not left either man or brute to ascertain what kinds of food are best for them by chance, but has kindly furnished us all with an infallible guide in the natural relish of each animal for the particular kinds of food best suited to support and perfect it. As we have said, appetite *unperverted* will always lead animals to choose those kinds of food which are best for them, both in general and on special occasions. This principle forms part of that great and beneficent plan by which nature seeks to secure

to all the greatest amount of happiness. God has rendered the choice and use of such kinds of food as are best for us, most agreeable and pleasurable. In this, as in every other case, he has connected obedience to his laws with the purest and highest enjoyment. He has caused the diet which is *best* for man to *taste* the best. He has so ordered things that eating that which nature requires, enhances both the pleasure of taste and the enjoyment of life in general. This great and beneficent law pervades the whole animal creation. Thus the lion, the tiger, and the eagle, which require for their full vigour and perfection animal food just killed, are so formed that they like such food the best; while the sheep, the horse, the rabbit, and the like, which are formed to thrive best on herbage, have the keenest relish, or the strongest liking, for herbage. And so with every other animal. Nor can any kind of animal enjoy any other than its natural diet, till a vicious course, or force of circumstances, has changed, perverted, vitiated its appetite. This law, I say, is universal; and reason says it *should* be so. For this infallible guide in the selection of our food, we should devoutly thank the Giver of all Good.

We may remark, therefore, that no one need deny this natural appetite. On the contrary, all should study how they can most completely *gratify* it. By gratifying in every way their *natural* appetite, men most effectually promote their health, and best develop all their god-like powers.

As that diet is best which *tastes* best, whenever the system requires particular kinds of food to meet particular exigencies, we may rest assured that appetite will crave that kind of food. We may also rest assured, that whatever natural appetite craves, the state of the system requires. The doctrine of self-denial, so far as our natural, unperverted appetites are concerned, physiology utterly repudiates. Both in the matter of food, exercise, and everything else, physiology not only sanctions but requires self-indulgence in the highest degree, so far as our appetites and cravings are natural and unperverted. To the man who is himself, whose system is in its natural and legitimate state, self-denial is sinful, and self-indulgence, or self-enjoyment, is virtue. Bear this in mind, ye lovers of good living. This volume does not aim at restraining you from any real dainty or luxury whatever, but simply at showing you in what way you may most effectually indulge yourselves, and enjoy all the luxuries and pleasures of your being.

But bear in mind that what we say of natural, unperverted appetite, is not to be taken as true in reference to perverted, vitiated appetite. When appetite is perverted it misleads; it loathes its proper food, and asks for poison. A cow on ship board, driven at first by hunger to eat flesh mixed with vegetables, came at length to relish flesh, and could hardly be induced afterwards to return to her natural diet. Tigers have been fed on farinaceous food till they have got a liking for it; and many kindred cases of perverted appetite have been known to occur. Man's relish can be so perverted that he shall like and greatly approve what is most injurious, and, naturally most loathsome. The hankering after tobacco, tea, coffee, ardent spirits, malt liquors, and the like among moderns, and the love of asfoetida among the ancients, are proofs of this. This perversion of appetite is so common in civilized life, that almost every one is more or less its victim. Hence the popularity of many dishes exceedingly nauseating to natural appetite, and equally injurious to the human system. Though nature tells us plainly what we should use and what we should refuse, when injurious diet is habitually forced upon her for a length of time, she first accommodates herself to it as well as she can, and ultimately comes to like it, and to crave it. Still, she never enjoys unnatural food, taking all things into account, so exquisitely, so keenly, as she does her proper food. Few have any conception of the amount of table enjoyment which we should all experience, if our appetites were

unperverted. An unnatural appetite is always accompanied with impaired digestion ; and impaired digestion robs life, so far as the palate is concerned, of its purest and its richest luxuries. The gratification of artificial and unnatural appetites, occasions hosts of diseases, and innumerable instances of premature death. Its ruinous effects are truly horrible. We cannot indulge the unnatural craving of perverted appetite, without enfeebling, first, and destroying, ultimately, both mind and body,—without both lessening the enjoyment of life for the time, and bringing life at length to an untimely close.

The appetites of many are perverted very early. The appetites of many are perverted in the cradle, if not before. This work may, therefore, recommend a system of diet which, at first, may be less palatable to many than the one to which they are at present accustomed. Still, if it recommend *nature's* system, our readers will do well to follow it. If it require a sacrifice at first, it will double and quadruple their pleasure afterwards. The author is no ascetic. Pains and penances form no part of his religion or philosophy. His simple object is to induce men to substitute the natural for the unnatural, and the pleasurable for the painful.

And it is right to observe, that even the breaking off of unnatural habits, and the formation of correct and virtuous ones, is not altogether a piece of self-denial. It is a *present* as well as a *subsequent* pleasure. Returning from transgressions is attended, on the whole, with more of pleasure than of pain. We have every encouragement, therefore, to endeavour to ascertain our natural diet, and at once adopt it. Duty and self-interest unite to induce us to sacrifice whatever is unnatural ; and however depraved our cravings may have become, we may, in time, bring them back to their proper tone. Let us hearken then to the voice of our instructor, and learn and practise the philosophy of Heaven.

Two dietetic systems, both capable of sustaining life, are presented to our choice, the animal, and the vegetable. The following questions therefore present themselves :—Is man constituted to live exclusively on either ? If so, on which ? Or is a mixed diet best calculated to develop all his powers ? If so, in what proportion should the animal and the vegetable diet be mixed ? These are very important questions. Let us endeavour to obtain from nature an answer to them.

What then are the influences of an exclusively animal diet on man's mind and body ? What are its influences on human happiness ? What are the influences of an exclusively vegetable diet ?*

And what are the influences of a mixed diet, and of a diet mixed in various proportions ? In short ; what shall we eat in order to attain the highest pitch of human perfection and enjoyment ? It is true we know of none who advocate an exclusively animal diet for man ; yet by considering the natural and general effects of an animal diet on the human system, we may be the better able to ascertain whether a mixed diet is best, and if it be, of what proportions of vegetable and animal food that mixed diet should consist. What, then, are the natural, the constitutional effects, of animal food ? And what are the effects of vegetable food ?

We answer, first, that the constitutional effect of animal food is to excite the animal propensities more than the intellectual and moral sentiments. This point is established by the natural history of animated nature generally, as well as by the experience of mankind. The most striking characteristic of all carnivorous animals are rapacity and ferocity. Their carnivorous habits naturally develop these character-

* By the term vegetable diet, used in this volume, is meant one composed of any or all kinds of grains, gums, fruits, and nuts ; of eggs, milk, butter, cheese, sweets, vegetable oils, and all edibles not strictly animal, as well as of vegetables proper. The term farinaceous will often be used in a kindred sense.

istics. Animal food, therefore, eaten by man, will naturally and necessarily develop a like rapacity and ferocity in him ; while a vegetable diet is constitutionally adapted to nurture and foster docility and goodness. It is vain to question the law that the natural diet of all animals is constitutionally adopted to nourish and develop the peculiarities of their respective natures ; and that law once established, it follows as a matter of course, that animal food constitutionally develops Combativeness and Destructiveness mainly. All animated nature attests that this is an ordinance of heaven. Men cannot therefore eat flesh without, to some extent, developing ferocity. The doctrine that a flesh diet constitutionally nurtures ferocity, is still further established by the fact, that ferocity is necessary in order to obtain a supply of such food. Carnivorous animals could not obtain the necessary supply of animal food, without this ferocity. Without ferocity, their sharp claws, their hooked tusks, and their powerful muscles, so strikingly adapting them to pounce upon and swallow their prey, would be as useless as swords to a sleeping child. What could a sheep do with claws and tusks ? Nature has nowhere furnished these instruments of death to animals without accompanying them with proportionate Destructiveness. Destructiveness and flesh diet as naturally and as universally accompany each other as fire and heat. Were it not so, nature would not be in harmony with herself.

This concomitance of propensity and flesh diet is proved by other facts. How frightful is the roar of the chafed lion ! How terrific the yell of the exasperated tiger ! Yet the roar of the lion and the yell of the tiger, are only expressions of the natural destructiveness of those animals. You provoke them at your peril.

Facts still farther attest this concomitance. As we have said, take a dog of medium crossness, and feed him for months and years on vegetables alone, and you increase his docility and gentleness. But feed him exclusively on raw flesh, and you make him fierce and dangerous. By a flesh diet, you inflame his Destructiveness ; by a farinaceous diet you calm and tame it. Hence the known ferocity of butchers' dogs. The ferocity of meat-glutted, blood-fed dogs is proverbial. But a tiger, caught while young, and fed on farinaceous food, became so tame, that it was allowed to go about the premises unchained. It would, even after it was grown up, eat its food from the hand. The effect of animal food on man is the same as on other animals. The ancients, in training their public fighters for their bloody conflicts, in which force and ferocity were mainly required, fed them chiefly on raw flesh. Experience taught them that there was something in the diet of the lion and the tiger which kindled in man the ferocity of those beasts of prey.

The principle for which we are contending has been demonstrated on the largest scale, from the earliest records of humanity to the present, time. Contrast the peaceable, life-sparing Egyptians, through the whole of their history, with the animal-killing and man-slaughtering Jews. The Egyptians considered the killing of animals to be a crime. The Jews regarded it as a religious ordinance. The Egyptians ate little or no meat, and were, accordingly, amiable and harmless. The Jews, from Abraham, and Isaac, and Jacob, throughout all their generations, were shepherds, and lived mainly on the flesh of their flocks, besides slaughtering immense herds on their altars, and then consuming the greater part of their sacrifices for food ; and a bloodier race is not on record. Look at their David ; he was truly 'A MAN OF BLOOD.' Look at the ravaging wars of the Jews, both with each other, and with their neighbours. They form the staple of their natural history. Then lastly, look at the terrible carnage which followed their final overthrow. In short, when was the tramp of war ever sounded amongst this people from the time that Abraham armed his household and slaughtered five kings, till the destruction of Jerusalem, without, as it echoed through their hills and dales, bringing together almost the entire

land, both old and young, in array of battle, eager to rush upon the field of deadly conflict? And is there no relation between this peaceable character of the Egyptians and their vegetable diet, on the one hand, and the fierce and bloody disposition of the Jews and their carnivorous diet, on the other?

Again; the Greeks and Romans ate meat in abundance, and the terror of their arms attests the ferocity of their temper and disposition. The ancients generally lived on animal food, and they were, accordingly, exceedingly warlike. A comparison of those who inhabit the middle and northern latitudes, who generally eat freely of animal food, with the inhabitants of the tropics, who eat but little animal food, is equally corroborative of the principle for which we are contending.

But we need not look to other climates, or other ages, for the confirmation of our doctrine. That animal food excites the propensities, especially Destructiveness, is proved by what we see in our own country, (America.) Savages generally live mostly on meat, and hence, to a great extent, their savage disposition. The war-whoop Indian lives mainly by the disease, and behold his unrelenting revenge. See him bury his teeth in the living flesh of his captured enemy, and, tiger-like, suck with eager exultation his warm blood. Hear him pow-wow round his helpless victims, and see him, fiend-like, torture them to death by slow degrees, by the most excruciating cruelties he can inflict. Wherever flesh is the food of the body, revenge is the food of the soul. Savage ferocity is the natural product of animal food. Point to a flesh-eating nation if you can, either in history or at present existing, that has not the marks of predominant Destructiveness.

And those who live *most* on flesh are most destructive. John Bull's roast beef bears some relation to his war-like valour, to his fierce achievements in the field of slaughter. Contrast with John Bull the vegetable-eating nations of the earth. The Hindoo eats no meat; he, accordingly has no delight in war. The Chinese eat but little meat, and they are inferior fighters. Contrast the amiable Japanese, who eschew meat, and consider the slaughter of animals a sin, with the fierce New Zealanders, who feed on little else but meat, and who even eat the flesh of their own race. All savage nations are flesh eaters, and the more exclusively they live on meat the more ferocious they are; whereas the humane, docile, good-dispositioned, peaceful nations of the earth, live on farinaceous food. As Destructiveness predominates in the head and character of all carnivorous animals, so does Destructiveness prevail in the heads and disposition of all flesh-eating nations; and as the organ of Destructiveness is small in herbivorous animals, so is it also small in granivorous nations. And what renders it certain that this difference is caused mainly by diet, in man as well as in brute, is, that Destructiveness is the constitutional concomitant of animal food, and is necessary in procuring such food.

Animal food also *inflames* Destructiveness, and renders it morbid, as well as large; thus rendering any given amount of it proportionally more destructive. Thus, this organ is relatively less in the Anglo-American head than in that of the Germans, Scotch, Russians, and many others; yet is relatively more **EXCITABLE**, as evinced by the Anglo-American's greater harshness, hatred, and severity of temper. The reason is, that the Anglo-Saxon American eats far more meat.

It is contended, that meat gives force and energy. Admitted that it does, yet mark the kind of force it imparts. It is the force of the tiger and the wolf,—force to dare and kill, not to plan and execute great works. Does the lion **ACCOMPLISH** so much more than the horse? Or is the wild bull so extra tame or feeble? Do not both the strongest and the fleetest of animals live on vegetables? The elephant and the rhinoceros eat no meat, yet their muscular power and endurance far transcend those of the lion and tiger. The deer, antelope, and gazelle, feed on herbage, yet they distance all flesh-eating animals in the open

chase. What flesh-eater is more sprightly and nimble than the gazelle and chamois? Since, therefore, the fleetest and the strongest of animals eat no meat, must man eat it or be weak and sluggish? Or to apply this principle directly to man: Is the Island Scotchman, who was brought up on oatmeal, and tasted meat no oftener than once a week, so very inefficient? Are the potato-fed Irish, when sufficiently fed, weak? Can our own beef-gormounds dig or carry more? Try, ye meat advocates. Are the meat-eating Indian and Laplander so *very* forcible? What have they ever accomplished—what triumphs ever achieved, other than with the scalping-knife and tomahawk? If meat alone gives force, one Indian would master two ‘pale-faces;’ whereas one white man is equal to a score of red ones. The white men eat less meat, yet under every disadvantage have driven the red men back and back again, farther and still farther upon the setting sun. Or are the New Zealanders so very forcible, at least for good? Or the Chinese so pusillanimous, except in war? If China is not forcible in butchery, she is not wanting in any of the essential elements of energy. Look at her canals, her commerce, and her products. To call her inefficient is to misapply terms. Knock off those shackles of antiquity which bind her hand and foot to past ages, and she would soon vie with our own nation in energy and productiveness. Or hamper us with the fetters of more than three thousand years, and see how every species of public and private enterprise would be held stationary as in a vice. The rice-fed Chinese will outdo ‘John Bull’ and ‘Uncle Sam,’ except in shedding blood. So will the herbivorous inhabitants of the Pacific isles. But if man’s CONSTITUTION demanded meat, those who fulfilled this ordinance of their natures, would far exceed those who do not; whereas the fact is the reverse, and this proves a meat diet to be unnecessary to strength.

Our conviction is, that animal food does not develop muscular strength so efficiently as vegetable food. Though flesh-eating animals are strong, herbivorous animals are still stronger. Since, then, meat develops propensity, while at the same time it is not necessary either to strength or force,—since it animalizes and depraves, while it does no good which a vegetable diet will not do, why injure ourselves by using it?

The facts already adduced are sufficient, in our view, to settle this question. It may not, however, be amiss to adduce a few others. Take, first, a chapter in the author’s history. In 1835, he changed his diet from mixed to exclusively farinaceous. Previous to this, his health was in a decline, and he was fast verging towards consumption. For a year or more following, he never tasted meat, and never enjoyed as good health before or since. Nor at any other period of his life could he ever perform as much mental labour, or, considering all the circumstances, write as vigorously as at that period. But the great difficulty of obtaining the diet he wanted, almost compelled him, in his peregrinations, to eat some meat, or else what he regarded as worse. And he exceedingly regrets a partial decline, though for twelve years his consumption of meat has been comparatively trifling; and he designs to render it still less, if not to suppress it altogether.

The experience of R. Goss is still more in point, because more thorough. He has abstained wholly from flesh eleven years, and finds grievous maladies to which he was before subject, now wholly removed, his strength greatly increased, and his state of mind far more happy. He has walked—or rather run—EIGHTEEN MILES IN THREE SUCCESSIVE HOURS and five minutes, and finds no trouble in walking fifty miles a day.

Take Sylvester Graham. Produce the man of his age—over fifty years—so sprightly and young in constitution as he is. Yet he was once a confirmed invalid, and driven to a farinaceous diet as his only salvation from impending death. The author has never seen any one

at any age more youthful and elastic. And he seems to grow younger in constitution as he becomes older in years. Behold the change! See whether another generation does not see him still young, in all the essential attributes of youth.

Many of his staunch disciples are living witnesses that meat is not necessary to health and strength. The finest children the author has ever seen—and he has examined professionally, and therefore minutely, many thousands—have never tasted flesh. Look at Graham's farinaceous boy. But his flesh-eating girl, whose regimen her mother insisted on controlling, is in her grave. I wish my own children had never tasted, and would never taste, a mouthful of flesh. Increased health, efficiency, talents, virtue, and happiness, would undoubtedly have been the result. But for the fact that my table is set for others besides my wife and children, it would never be furnished with meat—so strong are my convictions against its utility. Every thorough vegetable experimenter of whom the author has inquired—and they are many—has borne witness to the beneficial effects of the change from flesh to vegetables. A few who have half tried, have condemned it as injurious; yet such have not supplied the place of the meat with the kinds of vegetables required as substitutes. Meat is also a powerful tonic, and the reaction consequent on taking away this artificial stimulant, affected them much as leaving off ardent spirits, or tobacco, or opium, affects those accustomed to them; and they mistook the consequent prostration for permanent debility; whereas, in due time nature would have rallied, and they would have been the more vigorous from abating the unnatural stimulant. But more on substitutes for meat when we come to treat of animal heat.

To continue with our facts. Determined to investigate this subject of flesh-eating to the bottom, and to subject the dietetic principles of this work to the tribunal of facts, tried under all sorts of circumstances, besides inquiring by letter as well as verbally, of all whose experience he thought could shed any light over this mooted subject, and also reading somewhat extensively, he received the following answer to one of his inquiries concerning the EXPERIENCE OF THE BIBLE CHRISTIANS, a religious sect, one branch of which resides in Philadelphia, and other branches in the old country, whose creed interdicts flesh of every description, and some of whose ancestors, for several generations, have wholly eschewed its use. It runs thus:—

Kensington, Philadelphia, February 20th, 1846.

MR. FOWLER:

MY DEAR SIR—Yours of the 16th instant came duly to hand, and I hasten, with great pleasure, to give you whatever information I can, respecting the physical effects of vegetable diet on human life, and particularly on the lives of my self and those who constitute the little religious community over whom Providence has placed me as their spiritual pastor.

The name by which we are known as a religious society, is that of BIBLE CHRISTIANS. One of the peculiar doctrines of our denomination is, that 'Eating the flesh of animals is a violation of the first dietetic law, given to mankind by the Creator, as a guide to moral and physical health.' His laws are, like himself, 'The same yesterday, today, and for ever.' To transgress his laws by killing animals as food, we consider sinful, and equally so to drink wine, spirits, or any beverage having the power to intoxicate. In these doctrines you will perceive we fully concur with the apostle; 'It is good neither to eat flesh nor to drink wine.' So far as I am individually concerned, I may be permitted to add, that since September, 1809, I have so strictly conformed to these principles, that I have not even once tasted of either fish or flesh, or fowl; nor drank anything intoxicating.

Our little religious society had its commencement in Philadelphia,

in the year 1817, and consisted at that time, of only seven or eight members. By an act of incorporation, granted by the Legislature of the Commonwealth of Pennsylvania in 1830, it is ordained that 'none can be members of the Bible Christian Church but those who conform to the rules, regulations, and discipline of said Church; which rules require abstinence from animal food, spirituous and intoxicating liquors, initiation by Baptism, and partaking of the sacrament or Eucharist.' Our present number of members, according to the above criterion of membership, is seventy. Besides these, there are about thirty others, more or less connected with us, who abstain from animal food and intoxicating drinks, but are not yet considered full members. Of our members there are—

2	who have lived on the vegetable system	37 years, now			
	aged between	-	-	-	70 and 80
4	do.	do.	do.	do.	60 and 70
6	do.	do.	do.	do.	50 and 60
7	do.	do.	do.	do.	40 and 50
21	who have never eaten animal food nor drank anything				
	intoxicating	-	-	-	25 and 40
30	do.	do.	do.	do.	under 25

During the period between 1817 and 1846, ten persons have, at different times, fallen away from our principles, and returned to flesh-eating, and twelve of our number have died; four of these were children; of the others—

1	was aged 72 years, abstained from flesh, etc.,	36 years.	
1	do. 65	do.	30 do.
1	do. 64	do.	30 do.
1	do. 63	do.	25 do.
1	do. 59	do.	24 do.
1	do. 58	do.	29 do.
1	do. 39	do.	do. } each 10 do.
1	do. 36	do.	do. }

The two last died of puerperal (child-birth) fever.

The ability of our people to work, (for we all belong to the working class, and earn our bread by the sweat of our brow,) is fully equal to the flesh-eating community among whom we live, and in several instances considerably superior. Experience and observation have convinced us that neither flesh nor intoxicating liquors are essential to physical strength, or to the long-continued endurance of laborious exertions. In a mental point of view, it is generally conceded that a vegetable and farnaceous diet is more favourable to the development of the intellect and moral faculties than a flesh or mixed diet.

When the yellow fever broke out at the foot of Market-street, in the autumn of 1818, my residence was in the immediate vicinity of the infected district, namely, in Front near Market-street. There I continued with my family, while most of our neighbours fled from the site for fear of being affected with that dreaded malady; yet we all continued to enjoy excellent health. The year following, our experience was similar. During the period of the cholera, I am not aware that any of our members were in the least affected by that disorder. My duties as a minister frequently led me to the bedside of the sick and dying poor, and often to perform the last obsequies over the dead; yet amidst all these painful duties, the same kind and merciful Providence which 'tempers the winds to the shorn lamb,' protected and preserved me in the enjoyment of uninterrupted health. You doubtless remember there were many conflicting rumours of opinions among eminent physicians and others, about the propriety of avoiding vegetables and fruits during the continuance of the epidemic. I have no knowledge that any of our members made the least alterations in their accustomed mode of diet during that time, and yet they all escaped suffering from that fatal con-

tagion. In my own family, vegetables and fruits were as freely used as in former seasons, without any of us suffering any inconvenience.

In adopting a vegetable diet, and abstinence from inebriating drinks, our denomination was actuated by religious principle. We believe it to be wrong to take animal life for the purpose of satisfying appetite. This faith is founded on the testimony of the Bible, and when we took this advance we knew comparatively little of the laws of Physiology. We thought that kind of knowledge belonged exclusively to the province of the physician. We have since learned otherwise, and the more we have studied Physiology and Phrenology, and become familiar with their laws, in order to enjoy health and improve our race, the more perfectly have we been favoured with that invaluable blessing.

I regret that it is not in my power, at present, to give you any satisfactory information respecting the number of our denomination in England, or the nature of their experience. In Manchester there are three churches in which these views of dietetics are publicly inculcated as a religious duty; and I know many persons in various parts of the kingdom who are advocates and friends of a vegetable diet. I shall take pleasure in forwarding your interrogatories to some of my friends there, who, I am persuaded, will be happy in furnishing every information in their power.

You ask for information on the subject of works advocating the vegetable system of diet. I presume you are in possession of whatever is valuable from the American press—Graham, Alcot, Bell, etc., etc. I have already sent you my address, etc., and two or three other pamphlets. I forward you, with this, 'A System of Vegetable Cookery, etc.,' by my Friend in Manchester, Rev. Dr. Scholefield. The introduction may probably be useful to you. In a letter received from the Doctor, he informs me that a very useful work is just issued from the London press, entitled, 'Fruits and Farinacea the proper food of Man; being an attempt to prove from History, Anatomy, Physiology, and Chemistry, that the original, natural, and best diet of man is derived from the vegetable kingdom:' London, published by John Churchill, Princess-street, Soho, 8vo. Price in cloth, 9s. I have not yet seen the work. There is also a work on 'Water-Cure,' which has lately appeared in England, that goes strongly against flesh. I know of no other recent publications of the kind you are seeking.

With great respect, I remain,

My dear sir, yours, truly

To O. S. Fowler, Esq.

WILLIAM METCALF.

The author saw one of this sect in 1839, who was reputed to be the strongest man in Philadelphia. Inquire, reader, at the shrine of universal fact, as the author has done, and you will find the response, whether coming from masses or individuals, to accord with this testimony. When we see that the strongest, the nimblest, and the swiftest of animals, attain their speed and power on vegetables; that man can have all the force, strength, and endurance required, without flesh as well as with it; that flesh heats the passions—already many fold too strong—and that abstainers are the happier without than with, I repeat, why impair and debase the man by eating the animal?

ANIMAL FOOD BLUNTS MORAL SENTIMENT.

For what could the lion, or tiger, or butcher do with a active Benevolence or Conscientiousness? Sympathy for their poor victim would prevent its slaughter—would close the lion and the tiger's jaws, and stay the uplifted knife of the butcher. Large moral organs in carnivorous animals would starve them; and large moral organs in man, unless stifled or perverted, would interdict all destruction of life for food. What well-organized child ever beheld an animal slaughtered for the first time, without almost an agony of sympathy? Or can any highly benevolent adult, especially female, endure the distressing sight, unless

accustomed to it? How tender-hearted woman shudders thereat, and shrinks therefrom! Yet she is not unduly sympathetic. This alone brands needles animal butchery as wicked, because it necessarily violates those higher moral sentiments which constitute no inconsiderable portion of female perfection.

Condensed, the argument is this: Such slaughter blunts those finer moral feelings which should reign supreme—and, therefore, violates a fundamental law of man's nature. Of course all these violations occasion pain. Animal food is therefore injurious, because it can be procured only by violating man's moral constitution. Is God so shortsighted as to render animal slaughter—in necessary conflict with that exalted moral sentiment, Benevolence—essential to human perfection? Can any good come out of violated law? Especially of the highest order of laws? Is man COMPELLED to violate this moral law, in order to perfect his nature? Is nature thus in conflict with herself?

'But brute kills brute. Then why not man kill brutes? Has God denied to us a privilege he accords to brutes?' objects one. As those coarsely organized can do many things which excite disgust and repugnance in those who are keenly sensitive and fine feeling, so brutes can do what would shock the keener susceptibilities of humanity. Beasts of prey have little or no Benevolence to violate, and hence violate none when they slay to eat—but fulfil a law. If man had no sympathy for distress, he too might prey upon a brute or man; but he has, and therefore must not abuse it by butchering inoffensive animals.

Volume two will show that no one faculty should ever be so exercised as to clash with the normal function of any other; because such conflict necessarily occasions great mental anguish, and violates a moral law. Hence, since the exercise of Destructiveness in slaughtering animals necessarily pains active Benevolence, such slaughter is, of course, wicked. Habit may indeed harden the butcher's Benevolence, till it ceases to remonstrate; yet this leaves him just so far practically destitute of it, and therefore imperfect by the loss of an essential mental element, a faculty which his mental constitution imperiously demanded him to exercise.

'But the flesh-EATER does not kill, and, therefore, cannot incur this guilt of blunting the moral sentiments,' objects one. We answer, men do what they *cause* to be done; so the flesh-EATER is the real slaughterer, because he gives the butcher his *order*. The *consumer* is the virtual butcher. On him the chief responsibility rests; because he both requires the slaughter itself, and directs its kind, time, quantity, manner—everything. Unless he demanded it, the poor beast would not bleed. He is the monster of the slaughter-house; because every pound of flesh he eats increases the demand, and thus becomes a virtual death-warrant issued against helpless brutes.

Not that the butcher is wholly absolved. He is on a footing with the vender of intoxicating drinks—is a VOLUNTARY doer of wrong. As when two participate in murder, the guilt is doubled, not divided, so the guilt of the consumer does not lessen the sin of the butcher. Both violate nature's laws, and must abide their penalties;—the latter in the deterioration of his finer moral sensibilities, and the former in the injury a flesh diet necessarily induces. Butchers may be obliging, friendly, talented, and much more that is good, yet their daily occupation COMPELS them to become practically inhuman.* We thus censure their occupation with reluctance, yet truth is 'no respecter of persons, nor should its exponents temporize.

To kill animals, also violates Conscientiousness. The RIGHT to life is the highest of all rights, and inviolable; yet this right is trampled underfoot by needless slaughter. What RIGHT has man to snatch

* Hence the propriety of that law which, in some places, excludes them from being jurymen, on trials which involve life and death.

unnecessarily, even from brutes a prerogative so dear? Their right to life is derived from nature, and should be wantonly taken by none.

'But,' it is objected, 'brutes were made to SERVE man.' Granted; but all admit that man has no right to inflict wanton cruelty on brutes—then how much less to perpetrate this highest possible cruelty!

'But man renders them more happy in feeding and housing them during their life than miserable in their death;' says another. One would be required to feed and house me a long time, and render me superlatively happy into the bargain, before I should think him entitled to cut off my head;* and if animals suffer less in death, they also enjoy less in life, so that the proportion is thus preserved.

A FLESH DIET SUBJECTS MORALITY TO PROPENSITY.

We have already seen, first, that animal food unduly stimulates animal propensity, and, secondly, that it blunts the moral sentiments, exactly the reverse of what man's perfection and happiness require. He is almost all propensity now. His animality vastly preponderates over his morality and intellectuality; whereas the governing law of virtue and enjoyment requires the supremacy of morality and intellectuality. Since meat constitutionally tends to enlarge and inflame propensity, and as this is the very opposite of what human happiness and perfection require, a flesh diet must be wrong. How despicable the disposition of the tiger, shark, and hyena! Does man require to make himself like them? Would becoming more tiger-like render humanity more perfect? Is predominant propensity human glory and happiness? Would you have your children become more turbulent, quarrelsome, fierce, revengeful, hating, and hateful—more like beasts of prey? Then give them meat. Would you not rather render them more lamb-like, and heavenly-dispositioned? Then feed them on a vegetable diet.

We all justly complain of the evils of society. The best of us are bad enough, and the worst are almost devils incarnate. And what but PERVERTED PROPENSITY causes the aggravated evils under which society groans? In what else does depravity consist? Or how can human wickedness and woe be obviated, except by subjugating and purifying propensity by intellect and moral sentiment? Volume two DEMONSTRATES that virtue and happiness consist mainly in this ascendancy of the higher faculties over the lower, and that depravity and mental suffering consist in predominant and perverted propensity. These conditions of perfection and happiness on the one hand, and of sin and misery on the other, are FUNDAMENTAL. Hence, since animal food necessarily

* SLAUGHTER-HOUSE CRUELTIES.—The text condemns, in the strongest manner, those unheard-of cruelties perpetrated on animals while killing them, in order to render their meat less bloody, and more tender. To keep the feet of calves and sheep tied together, in the most painful posture possible—tumble them into carts on top of one another—bang them about as if they were so many boxes and barrels—keep them for days together without a morsel of food, and then, after all this living death, to hang them up by the hind feet, puncture a vein in the neck, and let them hang in this excruciating torture, faint from loss of blood, and struggling for life, yet enduring all the agonies of death, for six or eight hours;—meanwhile pelting them with might and main, to beat out the blood, and render the meat tender, so that every blow extorts a horrid groan, till tardy death ends their sufferings with their lives, and all perpetrated on helpless, unoffending brutes—is a little worse than anything else, except human murder; yet this is but the legitimate fruits of flesh-eating. Hear the piteous wail of these wretched animals on their passage from the farm-yard to the slaughter-house; see their upturned eyes rolling in agony; witness the desperate struggles, and hear the terrible bellowings of the frantic bullock who apprehends his fate, as he is drawn up to the fatal bull-ring; or even look at the awful expression of all amputated heads, as seen in market, or carted through the streets, and then say whether the slaughtering of animals is not an outrage on humanity—on every sentiment of right.

develops and perverts propensity, but blunts moral sentiment, man should abstain from eating flesh. He who does not do so, deteriorates his heaven-bestowed endowments, and plants thorns in the pillow of enjoyment.

A flesh diet is confessedly a powerful, though unnatural stimulant, and, like alcohol, excites and inflames, only prematurely to exhaust. This is its *constitutional* effect—a *necessary*, not accidental one. It therefore hurries its participants through life, and out of life. All the mental and physical functions of vegetable eaters proceed with little friction; run smoothly and wear but little; while flesh-eating renders them hot and grating, as though the axles of life ran on gravel-stones, and this makes them wear out rapidly. Hence very aged people will generally be found to have eaten but little meat through life, and to have begun to eat that little after their constitutions had become matured. The herb-eating elephant is reputed to live nearly twice as long as the flesh-eating lion—the longest liver of all carnivorous animals.

Animal food also irritates the stomach and fevers the blood, and thus lashes up the brain, and goads on all the passions to excessive and turbulent action. What else causes that restless, dissatisfied, longing, high-pressure, grasping, envious, rapacious selfishness of the public mind, now everywhere so rife? Our fathers ate but little flesh, and were proportionably contented and pacific. Flesh-eating induces a faint, sunken, gnawing, craving, 'gone' sensation at the stomach, akin to that of inebriates, but wholly unknown to vegetable-eaters; and this irritation of the stomach fevers the brain, especially the passions—, and jenders this tendency to public rapacity and vice just described; and this shortens the public life, on the principle maintained by all physiologists, that turbulent passions hasten death, while contentment prolongs life. Animal food, therefore, kindles those propensities which shorten life, and blunts those moral virtues which prolong it. All this, besides the many diseases its use engenders and aggravates, and the cure of which it retards.

Again, the forms of the teeth of all animals coincide with their natural dietetic character. On this point President Hitchcock observes: 'From a single bone or tooth of any animal, its character, food, habits, haunts, and all the circumstances of its existence may be correctly inferred. Comparative anatomists have, from a single tooth, described, and made drawings of the extinct creature to which it belonged, which have been found to agree exactly with a skeleton afterwards discovered.' In short, that the teeth of every animal, known and unknown, accord perfectly with its natural food, is universally admitted; so that the form of the human teeth will determine with absolute certainty, the natural dietetic character of man. If constituted to eat meat, the shape of his teeth will approximate towards that of lions and tigers—his front teeth will be small and sharp; his eye teeth, which correspond with the tusks, hooked and enormously large, and his back teeth sharp, for tearing, instead of broad for crushing; whereas, if his natural diet is vegetable and farinaceous, his back teeth will be adapted to grinding, and his eye teeth not longer than their neighbours.

The cow furnishes a standard sample of herbivorous teeth, as does the tiger or the cat of the teeth of carnivorous animals.

And now reader, see with your own eyes, towards which of these two forms the teeth of man approximate. See for yourself that his front teeth are usually larger than his eye teeth; and his double teeth flat, for grinding, instead of sharp, for tearing. Not one index of the carnivorous form is found in his teeth. This might settle the matter. The absence of claws in man has a kindred bearing.

'But,' objects one, 'a man has hands with which to kill, and reason, to supply by cookery, the place of tusks.' This is sheer evasion, and leaves this *teeth* argument wholly untouched. It simply tries to account for the admitted omission of *tusks* in man, but is anything but a flesh-

eating argument. As far as it has the least force, it tends to overthrow this principle, that the teeth determine the natural character of the food—a principle too fully established by nature to be set aside by this mere may-be.

To render assurance doubly sure, let us contrast the teeth of the monkey tribes, with those of man. We know that flesh is not their natural diet, else they would kill and eat animals; yet the form of their teeth approximates towards that of carnivorous animals much more nearly than man's do.

Since, therefore, the form of the human teeth recedes from that of carnivorous animals far more even than that of the monkey and ourang-outang species, which are confessedly not carnivorous, human teeth cannot have been made to eat flesh. What can more conclusively prove the natural diet of man to be herbivorous?

To this conclusion nearly every sound physiologist has been impelled, by this dental, and other kindred arguments. The immortal Linnæus sums up this argument thus: 'Fruits and esculent vegetables constitute his most suitable food.' Cuvier, the highest authority on this point, sums it up thus: 'The natural food of man, therefore, judging from his structure, appears to consist of fruits, roots, and other succulent parts of vegetables; and his hands offer him every facility for gathering them. His short and moderately strong jaws on the one hand, and his cuspidati being equal in length to the remaining teeth, and his tubercular molares on the other, would allow him neither to feed on grass nor devour flesh, were these aliments not prepared by cooking.'

That distinguished physiologist, Professor Lawrence, sums up an elaborate argument on this point as follows: 'The teeth of man have not the slightest resemblance to those of carnivorous animals, except that their enamel is confined to the external surface. He possesses, indeed, teeth called canine, but they do not exceed the level of the others, and are obviously unsuited for the purposes which the corresponding teeth execute in carnivorous animals.' 'Whether, therefore, we consider the teeth and jaws, or the immediate instruments of digestion, the human structure closely resembles that of the semixæ or monkeys, all of which, in their natural state, are completely frugivorous.'

Dr. Thomas Bell, in his 'Physiological Observations on the natural food of man, deduced from the character of his teeth,' declares that 'every fact connected with human organization goes to prove that man was originally formed a frugivorous animal.' Cullen and Lamb took similar ground, and the Abbe Galani ascribed all crimes to animal destruction. Pope protests against 'kitchens sprinkled with blood,' and insists 'that animal food engenders crime.' Plutarch tells us that Pythagoras ate no pork, and wondered what first 'led man to eat carcasses.'

These conclusions, however, unpopular, have been extorted from every rigid physiologist who has ever examined this subject. They are confirmed by the length of the alimentary canal, which is short in carnivorous animals, long in herbivorous ones, and long in man,—about ten times the length of his body.

These two arguments, derived from the structure of the teeth and alimentary canal, do, of themselves, completely establish the dietetic character of man to be vegetable; and, taken in connection with those converging principles already adduced and yet in reserve, establish this anti-flesh eating principle as a fundamental ordinance of nature.

A FLESH DIET WASTEFUL.

Our earth is soon to be crowded with as dense a population as its utmost powers of sustaining human life, combined with the most rigid economy of its necessaries, will support. This is undoubtedly the economy of nature. Hence, since a given amount of land will sustain more human beings, by about ten to one, if its products are consumed directly by man, than when given to animals, and the animals eaten as

food, the economy of nature could never have been to submit to this THOUSAND PER CENT. loss, in order to sustain flesh-eaters; unless one flesh-eater enjoyed as much as ten vegetable eaters. If the economy of nature had really required, and therefore favoured a flesh diet, it would have arranged things so as to have supported a far greater number of flesh-eaters than vegetable-eaters; whereas, since it can sustain ten times as many exclusively vegetable-eaters as exclusively flesh-eaters, a flesh diet is in opposition to nature's general plan of economy.

To examine this matter in the light of facts. A given amount of territory will sustain probably a thousand Anglo-Americans by agricultural, to one Indian by the chase. Suppose the earth already fully stocked with human beings—shall this one Indian be allowed to engross what would support a thousand human beings better than he is sustained? If the Indian will be content with his thousandth part of this territory, let him remain; but he has no right to interrupt the existence of nine hundred and ninety-nine human beings, still better capacitated to enjoy life than himself. Hence nature has so ordered it, that the Indian shall recede before the march of civilization, unless he incorporates himself with it; because a vegetable diet can sustain so many more happy beings than the savage state. And the incorrigible Indian's punishment is just.

Carnivorous animals furnish another phase of our argument. To support one lion requires thousands of acres. Hence, since nature abhors prodigality as much as vacuums, she ordains that the lion and all lea-ts of pray shall retire at the approach of man; that is, yield their dominion to him as fast as he requires it, because he puts it to so much better use than they. The principle here stated is a law of things. Shall, then, one flesh-eater be allowed to keep ten vegetable-eaters from enjoying all the luxuries of life? Human happiness is nature's paramount object. To this law *numbers* of human beings are indispensable. Since, therefore, ten vegetable-eaters can enjoy more than one flesh-eater, they should take the precedence. And flesh-eating must decrease as population increases. In fact, one vegetable-eater enjoys much more than one flesh-eater. This waste of the necessaries of life by flesh-eating, and this deterioration of human enjoyment, therefore, clash fundamentally with human numbers and happiness, which condemns a flesh diet as necessary to the nature of man.

It may here be argued, that domestic animals, such as swine, hens, and the like, are usually kept on offal food, which man does not eat, and that the offals of the farm yard and sty enrich the land, and thus increase its productiveness more than animals decrease its products. This argument has some force as regards a very few domestic animals, but these few would not furnish a tithe of the meat now consumed, the main bulk of which is fattened on land or vegetables set apart EXPRESSLY for that purpose. The manure made by animals can doubtless be made quite as well by piling up straw, weeds, and refuse vegetation, and letting nature fit them for enriching soil—and even by spreading them directly upon the ground, which is nature's method. Manure can also be manufactured by a chemical process, without assistance from animals. Yet perhaps a few horses, cows, and hens, should be kept, and might be turned to excellent account.

If it be farther objected that nature provides for the growth of grass, especially in untillable marshes, so that cattle can be kept without transgressing on the sustenance of man, the reply is, that a limited supply of cows may possibly be beneficial; yet butter may be made from the grass or hay direct, just as good as from the cow, and four or five hundred per cent. more in quantity from the same amount of provender;* which completely refutes the objection. Another far more plausible argument for flesh, is that drawn from the necessity of

* This is new to us.—J. B.

carbon; which, however, we shall waive till we come to treat of animal heat. It is now submitted, whether man's physical or moral perfection requires a flesh diet; whether, in fact, he is not far better—more elevated and happy without than with it. If his nature had been adapted to it, the evidences of the consequent requisition would have been clear and palpable; whereas we find no one law of his being which requires it, but many by which it is interdicted. Facts, principles, everything bear against its use, but nothing appears in its favour.

The cravings of perverted appetite aside, say, intellectual reader, does the constitution of man require that he eat flesh? If not we eat it at our peril. We violate law, and must suffer its righteous penalties.

One counter consideration, however, drawn from man's tendency to progression, yet remains. The opening remarks of volume two develop this progressive tendency, from propensity towards moral sentiment. In the earlier stages of humanity, propensity is indispensable to clear and subdue the earth; nor is the argument of economy particularly forcible till the earth has become crowded throughout. Man may not yet be sufficiently advanced to render it imperiously necessary for him to abstain wholly from meat, but as such abstinence fulfils his nature, his progress would be greatly accelerated thereby.

Since, then, man should not eat flesh, on what shall he subsist? We answer, ON FRUITS AND FARINACEOUS FOOD MAINLY, interspersed with vegetables, nuts, eggs, and perhaps the products of the dairy. The unbolted or undressed flour of wheat, rye, oats, barley, corn, buckwheat, etc., made into bread and puddings in various forms, and seasoned with fruits and sweets, should constitute the main bulk of his diet; and to it should be added potatoes, beans, peas, beets, carrots, turnips, parsnips, nuts, eggs, and a limited supply of milk, cream, butter, and cheese, though the utility of the last may hereafter come up for discussion. The warrant for this dietetic system is, first, its far greater PALATEABLENESS than flesh. That it is relished better is evident. We always reserve the best part of our meals for the dessert—and that dessert consists of fruit, pies, puddings, and cakes, or of oranges, nuts, and raisins, or of apples, peaches, pine apples, berries, and the like; but rarely in meat—never, except in mince pies, from five-sixths, to nine-tenths of which are composed of flour, apples, sugar, cider, and spices. We paraphrase good living by 'roast beef and plum pudding.' But why place the plum-pudding last? Because it is best, and therefore brought on after the roast beef; yet it is composed of flour and fruit, sweetened. Similar remarks apply to all other kinds of puddings. In extra good dinners, almonds and raisins are brought on last, because best of all. How much better these fruit and flour desserts relish than meats and gravies, even after the appetite is glutted with the latter? But eat as much of the dessert first as now of meat, and then bring on your beef and pork, and they would scarcely be touched. We all know how much keener the appetite is at the beginning of meals than at the close, and yet a sated appetite likes the flour and fruit preparations much better than the meat dishes. Hence, as that *tastes* best which is best, fruit and flour constitute the natural diet of man.

Vary the experiment. Set berries* and milk, and also meat, before any children you please, and after telling them to make their meal wholly of the one they like best, and they will all prefer the milk and berries. And this is true of most adults. Many readers can testify that suppers composed of milk, bread, and berries, relish better than any other meal. In the absence of berries, apples, peaches, pears, and other kinds of fruit, cooked and raw, in their place relish about as well. Peel, cut, and sweeten peaches, and tell children they can eat them with bread and butter, or that they can have meat and butter with their bread, but that if they choose the meat they must not have

* I do not know exactly what kind of berries he means.—J. B.

the peaches, and not one in a hundred will prefer the meat. Nor would one in a million prefer all meat to all vegetables and fruit. So of dried peaches or apples, stewed with raisins, and sweetened. Many kinds of pears are still better. Give adults the same choice, and in spite of their perversion of appetite, consequent on eating so much meat, most will prefer the bread and fruit. Or set apple dumplings and good sauce upon the table with meat, it being understood that boarders can have their choice, but must partake of only one dish, and most will relish the fruit and flour preparations better than the meat. Or make a stew pie of flour and apples, or cherries, or berries, or peaches, green or dried, or pears, or raisins, or any other kind of fruit, well sweetened, and most will prefer it to all other eatables. And all would eat a much greater proportion of these various preparations of fruit and flour than they now do, were it not that they are considered too CHOICE and SCARCE to constitute a full meal. And thus of nuts and raisins. But for the impression that these desserts are not substantial enough for labouring men—an idea entirely erroneous—and that they are the most expensive—another idea as erroneous—people would eschew meat, and live on preparations of bread and fruit almost altogether.

The same result is obtained by another variation of the experiment. Contrast the relish with which most people eat short-cake and butter, or buckwheat cakes and molasses or honey, with meat and gravy. It will still further illustrate our doctrine, that preparations of flour and fruit RELISH better, especially with children, than meat.

The various kinds of cake eaten still further prove our doctrine. We calculate on supper as the most dainty meal of the three, and cake is to it what desserts are to dinner, namely, the very climax of all. This is doubly true of the WEDDING cake. Weddings are among the most important events of life, and nuptial suppers are important items of weddings; and hence no expense or pains are spared to render them the very achme of luxurious eating. And in what does this achme consist? In roast beef? In any preparation of flesh? No; but in wedding CAKES.* If meat were generally esteemed to TASTE the best, the married pair would send out cuts of meat, instead of cake, which is never done. These tests of what the public relish best are infallible, though so common as to have escaped general observation. What supper can relish better than bread, butter, and honey, except it be short-cake, or buckwheat cakes in place of bread? How insignificant meat in comparison!

Finally, after we have eaten our buckwheat and molasses breakfast, our fruit and flour or meat dinner and dessert, and our short-cake-and-butter supper, and finished off with preserves and cake, we stroll out in the evening with some loved one, and wishing to heighten our friendship by partaking together the very daintiest morsel known to the palate, we step into a confectionary—the sole object of which being to gratify the palate, it of course proffers the most dainty of luxuries—and call for what? Meat in any form? No, but ICE CREAMS, etc.; or, if in their season, STRAWBERRIES AND CREAM, or other berries in their respective seasons, because they furnish the highest gustatory enjoyment known to man—not to a few, but to all. Who loves roast beef better than rich Vergaluce pears, golden apricots, Moris white peaches, and other delicious fruits? If meat tasted best to the many, it would be the dainty dish; but ice-creams, berries-and-cream, jellies, preserves, cakes, custards, macaronis, floating-islands, blanc-mange, candies in various forms, oranges, lemonade, and the like—all preparations of flour, sugar, eggs, nuts, and fruit—make up what all regard as the real DAINTRIES.

Our proof is thus conclusive, that farinaceous preparations are more palatable than flesh; yet, as many will believe nothing not found in

* The Americans have many customs which we have not.—J. B.

the Bible, and most regard as paramount authority, it also sustained our doctrine: 'Butter and honey shall he eat,' because these were the daintiest luxuries that could be named. *Manna* is called angels' food. Flesh was withheld in the desert except once, and then its use was accompanied with death. 'What is sweeter than honey?' says Samson. Many kindred allusions show that farinaceous food was esteemed far more delicious than meat in Scripture times, and that grapes held a similar rank. Honey is frequently mentioned in Scripture as the most delicious species of eatables, and the truth of this the state of the moderns attest.

A chapter in the author's dietetic experience. Not that he sets up his own taste as a standard for others, but that others may be induced to make like experiments. With the first appearance of strawberries annually, he picks or buys, mashes, sweetens, and adds water or milk, and breaks in brown bread. This dish constitutes his only diet for breakfast and supper, and often for dinner, when he eats three meals a day. When strawberries disappear, raspberries—he prefers the black, which he cultivates—supply their place, till they give way to currants, whortleberries, and blackberries. Give me this diet, and you are quite welcome to all the flesh-pots of modern cookery. I envy not a prince his dainties, but fancy that my living is far more delicious than his.

These gone, pears and peaches take their place. I sit down to breakfast and supper consisting of peaches or pears, sometimes cut, mashed, watered, and sweetened, with bread, but oftener to bread and peaches or pears alone. Let the bread and fruit be first-rate, and I have no desire to taste meat, be it of the choicest varieties. I often vary the dish by adding cream or milk in small quantities, just sufficient to moisten the whole. This diet serves me till November, and I always regret its departure, but intend to prolong it by raising winter pears. I sometimes vary the dish by stewing or boiling the pears in water, and add molasses, eaten with bread. Baked apples and bread, sometimes eaten alone and sometimes cut into milk, furnish another change; and still another consists in a pudding made of potato starch,* milk, and eggs, eaten with cream and sugar, jelly or fruit. Stewed cherries furnish another variety, and so do dried fruits stewed, to which add raisins, and you make a delicious relish. Prunes stewed in water, with bread, constitute another variation. And if flesh-eaters relish their steaks, sirloins, chops, fowls, hams, or even pigeons, woodcock, canvass-back ducks, salmon, or their turtle-soup, better than I do these dishes, I am nevertheless quite contented with my own fare. Understand that I LIVE on these delicious dishes, instead of eating them as relishes merely; thus making entire meals of nothing but desserts; eating them, not after the appetite has been sated and blunted with meats, but with all the keenness of fresh appetite.

Thus much for breakfast and supper. For dinner—which, however, in consequence of often postponing my breakfast till nine or ten o'clock, I frequently omit—I take often the same as for breakfast and supper; or sometimes eat peas, beans, eggs broken into water, and boiled but little, or butter-milk or sour milk sweetened, or the apple or cherry of pot-pies and dumplings eaten with bread, or mealy potatoes, or rice with molasses, milk, or fruit, or custard and bread, or bread and apples, etc., etc. Greens, squashes, melons, onions, beets, turnips, pumpkins, especially pumpkin pies, I relish without meat; but eschew cucumbers, radishes, green Indian corn,† and all fresh-cooked flour victuals, such as short-cakes, the crust of dumplings and pot-pies, etc. I once loved cucumbers and green corn,‡ but found

* It is called arrow-root in England. It would not sell under the name of starch.

† Yet green Indian corn is one of the finest of all dishes.—J. B.

‡ I ate constantly in America, and found no inconvenience from it whatever.—J. B.

they injured me, and discontinued them years ago, and have now lost all relish for them. Similar abstinence will conquer any and all vitiated cravings. Radishes may do well enough when boiled, and cucumbers and corn when ripe, or fried, yet others are quite welcome to the PAINS consequent on eating them while crude and uncooked.*

My winter and spring diet consists mainly of bread and apples, the latter generally uncooked, but sometimes stewed or baked. Sweet apples are preferable, because they contain much more substance than sour. Corn cracked and hulled, commonly called homminy, is another favourite dish, and so are Indian-meal and oat-meal gruels, and also oat-meal, Indian, rye and wheat mush, the flour for the last two unbolted. I eat honey freely in winter. Nor are split-peas or white beans made into soup for dinner one day, and the remainder baked the next, such poor fare as to be allowed to fall into disuse. But of these hereafter. Give me my farinaceous diet for GUSTATORY pleasure merely, as well as health, and you may have the meat. Nor would I give my diet in exchange for that of kings and queens, were it only for its deliciousness.

If objection be raised to this diet on the score of expense, it is claimed that it is certainly CHEAPER than flesh. All kinds of grain are cheap compared with meat, and any one can raise fruit enough for family consumption, on a small piece of ground, or buy it with far less money than the same amount of nourishment costs in the form of meat. Apples and flour are the cheapest kinds of food eaten, and would be much cheaper if less grain were given to cattle, and pastures converted into orchards. But expense is nothing where health is concerned. That diet is cheapest in the end, be its first cost what it may, which best sustains mind and body. But this matter of expense is foreign to our present inquiry, which appertains to the PALATABLENESS of food.

Having shown that that diet *is* best which *tastes* best, and that preparations of bread, sweets, and fruits are more delicious than meats, it follows that bread, sweets, fruits, etc., are best for man, and are his natural diet.

Our gustatory argument in favour of a farinaceous diet derives additional force from the fact, that meat blunts the taste, especially if highly peppered and spiced. Of this Casper Hauser furnished a striking example; and all will confirm it who will try the two, say a year each, or long enough for the taste to become regulated. My own experience accords with this principle; and I submit to all who have changed their diet from a mixed to one exclusively vegetable, whether the mere pleasure of eating has not been doubled in consequence. My full conviction is that mankind, by following the farinaceous system, eating temperately, and adopting the right mode of cookery, might double their pleasures of taste several times over. Appetite palsied can have little relish for anything. Hence, since a flesh diet blunts that keen natural relish on which all table enjoyments depend, besides being less palatable, why curtail those enjoyments by eating meat? Mark how all collateral aspects of our subject favour a farinaceous diet, but bear against flesh.

A BREAD AND FRUIT DIET NOURISHES MORAL SENTIMENT.

We have seen that animal food kindles propensity. As propensity has its natural diet, moral sentiment and intellect have theirs, namely, a FRUIT AND FARINACEOUS DIET. All farinaceous animals are docile and kindly disposed, as the sheep, cow, horse, and the like.

Then look at the organs called into action in PROCURING farinaceous food. While animal food cannot be procured without a violent exercise of destructiveness, etc., nor without also violating the moral sentiments, farinaceous food is procured by the exercise of intellect and

* I seldom ate the corn uncooked.—J. B.

moral sentiment. Thus, Agriculture is a true science, and requires a great amount of knowledge and intellect for its successful prosecution, and is calculated to develop that intellect. Now the very nature of things requires that fruits and grains should feed those faculties required in procuring them. Were it not so, nature would not be true to herself, for one of her ordinances is, that all food should feed those faculties in particular, which are most called into action in its pursuit.

In conclusion, readers, which one of all our arguments is not amply sufficient, in and of itself, to prove that the natural dietetic character of man is farinaceous, and not carnivorous? Scrutinize each separately and then scan them all collectively, with rigid intellectual optics, and then say whether, taken collectively, they do not completely interdict meat, and prove a grain, esculent, and fruit diet to be the *only* one provided and allowed by nature, and of course the one most promotive of human and personal happiness and perfection. Do not those who eat meat violate their natures, and therefore eat it at their peril? Do not those who live on fruits and vegetables fulfil nature's dietetic ordinance? and thus reap their reward? Are they not infinite gainers by eschewing meat, and living luxuriously on grains and fruits?

The only shadow of doubt now remaining as to the fitness of an exclusively farinaceous diet for human sustenance, depends on the answer to this question: Do vegetables contain all the elements which enter into the human system, and are required by the vital process? If so, our argument is complete. And who can answer this question equally with the great Liebig? His 'Animal Chemistry,' one of the most profoundly philosophical works on this subject ever written, thus answers this question:

'Two substances require especial consideration, as the chief ingredients of the blood; one of these separates immediately from the blood, when withdrawn from the circulation. It is well known that in this case blood coagulates, and separates into a yellowish liquid, the SERUM of the blood, and a gelatinous mass, which adheres to a rod or stick in soft, elastic fibres, when coagulating blood is briskly stirred. This is the FIBRINE of the blood, which is identical in all its properties with muscular fibre, when the latter is purified from all foreign matter.

'The second principal ingredient of the blood is contained in the serum, and gives to his liquid all the properties of the white of eggs, with which it is identical. When heated, it coagulates into a white elastic mass, and the coagulating substance is called ALBUMEN.

'Fibrine and albumen, the chief ingredients of blood, contain, in all, seven chemical elements, amongst which nitrogen, phosphorous, and sulphur are found. They contain also the earth of bones. The serum retains in solution sea salt, and other salts of potash and soda, in which the acids are carbonic, phosphoric, and sulphuric acids. The globules of the blood contain fibrine and albumen, along with a red colouring matter, in which iron is a constant element. Besides these, the blood contains certain fatty substances in small quantity, which differ from ordinary fats in several of their properties.

'Chemical analysis has led to the remarkable result, that fibrine and albumen contain the same organic elements, united in the same proportion, so that two analysis, the one of fibrine and the other of albumen, do not differ more than two analysis of fibrine or two of albumen respectively do, in the composition of one hundred parts.

'Both albumen and fibrine, in the process of nutrition, are capable of being converted into muscular fibre, and muscular fibre is capable of being reconverted into blood. These facts have long been established by physiologists, and chemistry has merely proved that these metamorphoses can be accomplished under the influence of a certain force, without the aid of a third substance, or of its elements, and without the addition of any foreign element, or the separation of any element previously present in these substances.

‘The nutritive process is seen in its simplest form in the carnivora. This class of animals lives on the blood and flesh of the graminivora; but this blood and flesh is, in all its properties, identical with their own. Neither chemical nor physiological differences can be discovered.

‘In a chemical sense, therefore, it may be said that a carnivorous animal, in supporting the vital process, consumes itself. That which serves for its nutrition is identical with those parts of its organization which are to be renewed.

‘Chemical researches have shown, that all such parts of vegetables as can afford nutriment to animals, contain certain constituents which are rich in nitrogen; and the most ordinary experience proves that animals require for their support and nutrition less of these parts of plants, in proportion as they abound in the nitrogenized constituents. Animals cannot be fed on matters destitute of these nitrogenized constituents.

‘These important products of vegetation are especially abundant in the seeds of the different kinds of grain, and of peas, beans, and lentils; in the roots and the juices of what are commonly called vegetables. They exist, however, in all plants, without exception, and in every part of plants in larger or smaller quantity.

‘When the newly expressed juices of vegetables are allowed to stand, a separation takes place in a few minutes. A gelatinous precipitate, commonly of a green tinge, is deposited, and this, when acted on by liquids which remove the colouring matter, leaves a grayish white substance, well known to druggists as the deposit from vegetable juices. This is one of the nitrogenized compounds which serves for the nutrition of animals, and has been named **VEGETABLE FIBRINE**. The juice of grapes is especially rich in this constituent, but it is most abundant in the seeds of wheat, and of the cerealia. It may be obtained from wheat flour by a mechanical operation, and in a state of tolerable purity; it is then called **GLUTEN**, but the glutinous property belongs, not to vegetable fibrine, but to a foreign substance, present in small quantity, which is not found in the other cerealia.

‘The second nitrogenized compound remains dissolved in the juice after the separation of the fibrine. It does not separate from the juice at the ordinary temperature, but is instantly coagulated when the liquid containing it is heated to the boiling point.

‘When the clarified juice of nutritious vegetables, such as cauliflower, asparagus, mangel wurzel, or turnips, is made to boil, a coagulum is formed, which it is absolutely impossible to distinguish from the substance which separates as coagulum, when the serum of blood or the white of an egg, diluted with water, are heated to the boiling point. This is **VEGETABLE ALBUMEN**. It is found in the greatest abundance in certain seeds, in nuts, almonds, and others, in which the starch of the gramineæ is replaced by oil.

‘The third nitrogenized constituent of the vegetable food of animals is **VEGETABLE CASEINE**. It is chiefly found in the seeds of peas, beans, lentils, and similar leguminous seeds. Like vegetable albumen, it is soluble in water, but differs from it in this, that its solution is not coagulated by heat. When the solution is heated or evaporated, a skin forms on its surface, and the addition of an acid causes a coagulum, just as in animal milk.

‘These three nitrogenized compounds, vegetable fibrine, albumen, and caseine, are the true nitrogenized constituents of the food of graminivorous animals; all other nitrogenized compounds, occurring in plants, are either rejected by animals, as in the case of the characteristic principle of poisonous and medicinal plants, or else they occur in the food in such very small proportion, that they cannot possibly contribute to the increase of mass in the animal body.

‘How beautifully and admirably simple, with the aid of these discoveries, appears the process of nutrition in animals, the formation of

their organs, in which vitality chiefly resides! Those vegetable principles, which in animals are used to form blood, contain the chief constituents of blood, fibrine and albumen, ready formed, as far as regards their composition. All plants, beside, contain a certain quantity of iron, which re-appears in the colouring matter of the blood. Vegetable fibrine and animal fibrine, vegetable albumen and animal albumen, hardly differ even in form; if these principles be wanting in the food, the nutrition of the animal is arrested; and when they are present, the graminivorous animal obtains in its food the very same principles on the presence of which the nutrition of the carnivora entirely depends.

‘Vegetables produce in their organism the blood of all animals, for the carnivora, in consuming the blood and flesh of the graminivora, consume, strictly speaking, only the vegetable principles which have served for the nutrition of the latter. Vegetable fibrine and albumen take the same form in the stomach of the graminivorous animal, as animal fibrine and albumen do in that of the carnivorous animal.’—*LIEBEG'S Animal Chemistry.*

Liebeg's concluding paragraph answers our question affirmatively, and in the most conclusive manner, by showing that even the carnivora are nourished solely by those chemical elements derived from the vegetable food of their prey! So that even the carnivora live, after all, on vegetable aliments. Rigid scientific analysis, therefore, sustains our position, that animal food is unnecessary to human sustenance. And the fact that many have lived half a century or more without tasting of animal food, and enjoyed all their powers and faculties, bears a kindred testimony; for if animal food furnished a NECESSARY element of diet which could not be obtained anywhere else, all those who wholly abstained from it would soon feel its want, become enfeebled, pine away, and die; whereas many of them become every way improved in mind, and body by such abstinence; and this shows that the human system CAN obtain from vegetables all it requires to perfect all its functions.

BREAD, PASTRY, FRUIT, MILK, SWEETS, BUTTER, AND ESCULENTS.

Having thus found nature's great requirement in a farinaceous diet, we proceed to fill up this outline by examining more in detail the nutritive properties of the different edibles found in the vegetable kingdom. Of these, bread is beyond question the most important—is the veritable ‘STAFF OF LIFE,’ and therefore deserves primary consideration; and the more so, since the materials of which it is made are used in composition with almost all other kinds of food.

Bread is made chiefly of GRAIN, of one kind or another, crushed or ground into flour, which is usually bolted.* Thus far, these grains have constituted the great staple of human diet. From time immemorial, and in all nations, except the most degraded savages, they have been the chief reliance of the human family as food, and will undoubtedly continue to be so as long as the race exists. Other forms of food may be generally introduced, as potatoes have lately been, yet never to take the place of ‘flour victuals,’ but only to *accompany* them. With many kinds of food we do not eat meat, but we eat bread with all kinds, and more bread usually than anything else. We make flour, both fine and coarse, bolted and unbolted, into various forms of food, both with shortening and without, both with and without sweetening. We prepare food with various kinds of flour, single and mixed, as all wheat, all rye, all Indian, all barley, all oatmeal, all rice, or part wheat and part Indian, or ‘rye-and-Indian,’ or ‘wheat-and-rye.’ We also boil each of these kinds of flour into puddings, the main ingredients and dietetic uses of which are the same as bread, or shorten, sweeten, and fry them in fat, making crullers, dough-nuts, and nut-cakes; or shorten and add fruit, as in the manufacture of apple-fritters, and pies of all kinds; or thickened into soups of all kinds, or made into ‘dressings;’ and thus

* We say *dressed*.—J. B.

we work them into nearly all the food we eat. Even meat-eaters live mainly upon them, and so do many species of animals. Undoubtedly after ages will discover and perfect many other kinds of grain now growing wild in our swamps, or mountains, or forests, as a recent age has Indian corn. But cereal grains will always be a staple article of food.

These grains are simply seed, and all seeds contain nourishment, in order to feed the sprout till it can put forth its roots and draw sustenance from the earth. And it is this nutritious principle, stored up for the purpose of nourishing the plant in embryo, which sustains human and animal life. And the probable reason why the flour of grain forms the best species of nourishment for man is, that it is so highly organised and so condensed. It can also be ground fine, and by proper management preserved for years.

Chemically analysed, wheat, the best of the entire cereal family, is said to contain about eight-tenths of nutritious substances; rye, barley, and oats, about the same; rice, nine-tenths, and Indian corn about seven-tenths; while meat is said to constitute only about five and a half tenths.

Bread being thus promotive of life, its proper preparation, so as to render it as nourishing as possible, becomes a matter of the utmost importance.

After the grain is duly cleansed, it is first ground. And here two egregious errors are committed. The weight of the stone, and its rapidity of motion, both crush it so fine, and heat it so hot, as essentially to impair its nutritive properties. Hence flour is often said to be dead; much of its 'life' or nutrition having been destroyed. Indian meal suffers much from being similarly 'killed,' as is evidenced by its far greater sweetness when coarse ground, than when ground extra fine—warrant enough that excessive grinding impairs the nutritive properties.

Grain is ground thus fine that it may be bolted the more finely, so as to become the whiter. But shall looks be allowed to impair the quality? The bran, or at least a good portion of it, left in, greatly improves its nutritive powers—else nature would have allowed us to separate it from the flour without grinding the flour to death. The flour also greatly promotes that intestinal action so essential to digestion. Its absence tends to cause that torpor of the digestive organs and consequent constipation, which paves the way for those stomach complaints to be noticed hereafter. Give fine flour to hens, cattle, horses, or any other animals, and it will soon disorder them, and breed disease. And if man were not stronger constitutioned than any other animal, it would break down and bury all who eat it. Indeed, as it is it is consuming its consumers by hundreds of thousands; not suddenly, but gradually, by impairing digestion, and thus inducing other diseases, to which the death is ascribed. All who eat coarse and unbolted flour bread, will thereby obviate much of their sickness. It keeps the intestinal canal open, and this carries off those causes of disease which fine flour bread, by inducing constipation, retains in the system to engender sickness. Nothing but dire necessity ever induces me to live on fine flour bread. It immediately occasions intestinal sluggishness and disorder in the stomach, and, in consequence, greatly enhances dyspeptic* troubles. I even pen this paragraph after having recovered from the worst dyspeptic attack I have experienced for years, brought on by eating fine flour bread, and a very little meat. Give me my coarse brown bread and good fruit, with opportunities for exercise, and such troubles as in this instance soon disappear.

Brown bread also tastes better than superfine, as all who will make trial can perceive—another conclusive proof of its superiority. Our

* *Dispepsia* is the Greek word for indigestion. Dispeptic troubles mean the pains occasioned by indigestion.—Ed.

New England ancestry ate coarse bread made of rye and Indian meal, and lived longer, besides enjoying far better health, than their fine flour-fed descendants; and the Scotch oat-cake and porridge eaters rarely know how dyspepsia feels till they exchange them for 'killed' flour bread. Dyspeptics also find coarse bread indispensable; and what is thus indispensable to weak stomachs, would of course go far towards keeping strong ones right. Even sailors cannot live on fine flour bread; much less our sedentary classes.

Besides, the nutriment of fine flour bread is too highly condensed. Sugar is highly nutritious; yet, eaten alone, it soon disorders digestion, because there is too much of it in too small a compass. A due amount of bulk is essential to perfect digestion. The bran thus helps to 'fill up,' and besides restraining over-eating, gently irritates the intestinal coating, and provokes action. Still, your fine flour lovers are quite welcome to your insipid and half 'killed' white bread; no earthly motive but absolute starvation would induce me to partake with you more than a few meals at a time.

LEAVENED AND UNLEAVENED BREAD.

To raise the bread is the next process in its preparation. This consists in causing fermentation, by which a gas is generated, which insinuates itself among the doughy mass, and thus raises it, or renders it porous.

This portion of the bread-making process is also greatly overdone. Fermentation is the first stage of decay. It creates the gas by souring the dough; nor is it possible to raise it without *proportionally* souring it, because, from the souring alone, is this raising gas derived, though habit prevents our perceiving the sourness. But let it stand a little too long, and it tastes very sour. Unleavened bread will also keep twice or thrice as long as that which is raised. Of this, ship bread, Boston crackers, and Graham wafers* are examples. This leavening is incipient decomposition, and from the gas evolved during the baking, alcohol in large quantities can be obtained; and alcohol is the child of rottenness, or decomposition. How is yeast obtained? By excessive fermentation; and the world over, the fermenting process is the rotting process. This incipient decomposition is introduced by the yeast into the dough, and of course impairs its virtue. Hence, excessive fermentation is highly injurious.

And herein consists my unqualified opposition to 'bakers' bread.' It is fermented almost to death in order to make the greatest possible loaf out of the least flour. People love to be gulled. If two loaves, both containing the same quantity and quality of flour, but the one puffed up by excessive fermentation, and the other not thus injured, though abundantly light for utility, were proffered for selection, nearly all would prefer the hollow bulk, though they knew it to be inferior to the smaller, though better loaf. This tempts bakers to contrive all sorts of devices to swell their loaves; and, to neutralise the souring, they put in ammonia, and other things which vitiate the bread. I would eat bakers' bread rather than actually starve; but I would eat it sparingly, and only take one or two meals in succession. Nothing but dire necessity could induce me to live habitually upon it.

Bread raised by sour milk and saleratus is less, if at all objectionable, because the gas which raises it is created, not by decomposition, but by the chemical combination of the acid of the sour milk with the alkali of the saleratus, and raised too quickly to allow the dough to sour. I recommend its frequent, if not general substitution for bread raised with yeast. 'Milk emptyings' bread, besides being whiter and sweeter than that made with yeast, is more wholesome. It becomes light before it sours, and is universally used throughout the West.

* Graham wafers are a kind of thin cakes made by Graham, the American physiologist, I suppose.—Ed.

Let bread be made, then, of coarse flour, unbolted; let it be raised with saleratus or milk emptyings, and not unduly bloated up; let it be thoroughly baked, and never eaten warm; for then mastication rolls it up into firm masses which the gastric juice penetrates with difficulty. Let this bread be eaten more abundantly than any other article of diet.

The Eastern nations live almost wholly on rice, and the Scotch live much on oatmeal. The former contains a greater proportion of nourishment than any other article of diet, and the virtue of the latter is attested by the powerful frame and strong constitutions of the Highland Picts. Fortunately, oatmeal is coming into general use amongst us, and I hail and would promote its introduction. As a diet for children, when eaten with milk, it probably has no superior, if any equal.

The dietetic virtue of rye is not generally appreciated. Unbolted rye flour, made into hasty-pudding, is one of the most easily digested things which dyspeptics can eat. It is also exceedingly palatable. Rye bread is nutritious, opening, and, but for its colour, would undoubtedly rival wheat. Try it as a change.

Barley bread was once a staple article of diet. May it again become a general favourite. The distillery should no longer be allowed to consume so wholesome, palatable, and excellent an article of food.

Pastry, eggs, and spices, next come up for consideration. Cakes and pies are rarely eaten as food, but usually as a relish merely. They are generally deemed unwholesome, and justly so, because composed of flour and grease or shortening sweetened—a compound exceedingly difficult of digestion. Flour sweetened is not so bad; but when shortened as well as sweetened, the stomach dissolves it with extreme difficulty. Melted butter is extremely hard of digestion, and hence the unsuitableness of cake for children. Spices still further aggravate the evil.

Bakers' cake* is still more injurious. Great quantities of ammonia—a poison of which hartshorn is made—are put in to render it light; and to all this is added coloured coatings, composed of poisonous ingredients. Domestic cake is bad enough, but bakers' is utterly unfit even for the adult stomach, much more for the juvenile.

If any doubt remain of the unwholesomeness even of domestic cake, the following recipes must effectually remove it:

POUND CAKE.—'A pound each of butter, sugar, and flour, and ten eggs.' As ten eggs weigh a pound, of course half the cake is butter and eggs, and only one-quarter flour, and that completely saturated with sweet, grease, and eggs, baked an hour. Now we know that eggs cook abundantly in five minutes, and become extremely tough and hard in ten; and since hard-cooked eggs are universally conceded to be difficult of digestion, what must they be after being baked an hour, and in fat and flour?

Sponge cake consists of only one-fifth flour, two-fifths eggs, baked to a crisp, and the remainder sugar. Shrewsbury cake contains one-third flour, above one-third butter and eggs, and the remainder brandy, sugar, and nutmeg—a most deleterious compound. Jumbles are composed of about one-third flour, one-quarter sugar, and above one-third of eggs, milk, and butter. Soft cakes contain nearly half melted butter. Butter and eggs make up above half of a cake called wonders; and wonderful unhealthy it must be. Above half of even plain gingerbread consists of cream, butter, molasses, and ginger. Of composition cake only one-fourth is flour, and nearly three-fourths eggs, butter, cream, and brandy; a full quarter being melted cream and butter. In view of the four facts, first, that melted butter, and of course fat and cream are among the most indigestible things eaten; secondly, that about half of most of our cakes are composed of these articles; thirdly, that about one-quarter consists of eggs baked nearly or quite an hour; and

* A sort of sponge cake. I believe.—J. B.

fourthly, that grease mixed with flour is digested with extreme difficulty, it is submitted whether these cakes are not, of necessity, most unwholesome. Add to all this, that nearly a fifth of the frosting of bakers' cakes is composed of oxides of lead, to impart colour; and then say who that eats cake but must impair the stomach, engender disease, and hasten death? Our ancestors ate little of such cake, yet their descendants think they cannot live without it; and a mistaken kindness gives it to children as freely as if it were the staff of life, and aggravates the evil by giving it 'between meals'—of which more anon.

Pies may be rendered wholesome or unwholesome, at the option of the baker. The union, however intimate, of bread and fruit, forms the best diet in the world. Keep out shortening and spices, and you may live wholly on pies. An excellent crust can be made of flour, potatoes, and milk, or water, without shortening. But I recommend such pies and all pies to be eaten, not after a full meal, but as a *part* of it. And if cakes must be eaten, let them be eaten at breakfast instead of supper.

Though we have spoken against eggs in cake, because baked so exceedingly hard, and commingled with melted grease; yet eggs, properly cooked, are undoubtedly wholesome and nutritious, as they certainly are exceedingly palatable. They contain great quantities of carbon, and also gluten, fibrine, and the very compounds required by animal economy. They are especially good for children. Yet very much depends on the mode of cooking them. Fried in grease as 'ham and eggs,' or 'pork and eggs,' they are hard of digestion, as well on account of being generally over-done, as saturated with melted grease. Poached eggs are liable to a similar objection. But soft boiled eggs, eaten with bread or other substantial food, are as useful as they are delicious. We recommend little if any butter or salt with them, because a little practice will render eggs better alone than seasoned. Butter, salt, pepper, everything mixed with them, takes from, or obscures the taste of the eggs; yet it is this taste which makes us relish eggs as eggs.

Spices and seasoning thus come up for consideration. Most seasonings are decidedly injurious. Their very nature is irritating, heating, feverish. Like alcoholic liquors, they stimulate temporarily, only to debilitate ultimately. They impart no inherent, protracted vigour to the system, but only goad, lash up, and then prostrate. Especially do they irritate, disease, and prostrate the stomach; and, this organ diseased, the entire system suffers.

They also blunt the taste and disorder the appetite. They necessarily, and always, benumb the nerves they touch, and of course deaden the power of taste, as well as deteriorate natural relish. They induce to eat too much, because they necessarily stimulate, and because natural relish being blunted, we eat, and keep eating, vainly attempting to make up in the quantity of food that gustatory pleasure lost by this blunting of taste. They also weaken the salivary glands. Mustard, pepper, cloves, ginger, cinnamon, and the like, I never eat; nor would I under penalty of deteriorated relish and dyspeptic consequences.

Finally, let the principle, that whatever takes away from the natural taste of food, thereby impairs the luxury of eating, be always borne in mind and put in practice. The deliciousness is in the food, not the spices—in the bread, not the butter, or gravy, or sauce, or other things eaten with it as relishes. And if we cannot enjoy simple food simply prepared, we cannot enjoy it with all the 'seasoning' (improperly so called) with which it can be cooked or eaten. Whatever is fit for food nature has already seasoned for us better than art can season it. And since condiments both obscure nature's rich flavours, and blunt our powers of perceiving them, to say nothing of their deleterious consequences, practical wisdom dictates that food should be eaten with as

few spices and relishes as possible. Yet modern cookery is all seasoning—a total perversion of nature's dietetic principle.

Confectionary is so closely allied to pastry as to deserve a passing remark. Ice-creams are probably not objectionable. They may be eaten at, or after meals, with comparative impunity, provided they are allowed to melt first. But candies in all their forms are very detrimental, first, because so very rich, second, because coloured with poisonous ingredients, third, because usually eaten between meals or late at night; and especially because they pervert the relish, so that natural food tastes insipid, and rich food is sought to fill the vacuum they create. They are exceedingly liable to sour on the stomach, which they always overload, and thus stupify the brain, breed worms, and incite disease. Children especially should never be indulged in them. They also soon ruin the teeth. This is a sure sign that they first impair the stomach. But of these relations of the two to each other, hereafter. Confectionaries are public curses.

Fruit next deserves consideration. Good fruit is one of the most delicious articles man can eat. Honey and sugar are most delicious at first, but they soon cloy, because their nutrition is so highly concentrated. Not so with good fruit. Let a person moderately hungry, sit down to a plate of honey, or butter, or sugar, and he loses his relish before he has enjoyed one-tenth of the pleasure he may find in eating as many first-rate peaches, pears, apricots, or nectarines, or even apples or berries, as his stomach will bear. And what greater dainty can be served up to man than delicious fruit? For what other luxury will men pay as high a price? Vergaluce pears often command one dollar per dozen. In France they often sell for forty cents a-piece, and fifty cents for a peach have often been paid in Boston—more than treble the cost of ice-cream. Yet there are still better fruits than these.

And what is more, *all* love good fruit. See how fond of fruit all children are. See what enormous quantities of pears, peaches, strawberries, apples, etc., are consumed in our cities.

Now, since that is best which *tastes* best, and since fruit relishes better than anything eaten, fruit must be the most wholesome of food. And so it is. It prevents or removes constipation, and often acts like a charm both upon body and mind. Different constitutions require different kinds, yet ripe fruit, of the right kind, is better even in sickness than medicine; and, eaten with good bread, nothing is more palatable or wholesome as food. It never cloyes the appetite, or clogs the stomach, but keeps the bowels open, head clear, passions cool, and the entire man healthy and happy. Just try the experiment. Sit down to a breakfast of first-rate fruit and Graham bread, and say if it is not the best breakfast you ever ate. And what is more delicious than peaches cut up and sweetened at supper? Or than strawberries and cream with bread? Choice pears are as delicious. Nor are berries with bread and milk such very inferior eating. And when none of these can be obtained, good apples, baked or raw, relish right well.

If it be objected that these choice fruits last but a short time, the answer is, that nature provides us with a perpetual round of them from May to November. Apples keep the whole year, and pears of the very best variety can be kept till the appearance of strawberries the next year. A friend of the author had plums—Coe's golden drop—the first of June, which he had kept perfectly sound all winter, and the frost damson keeps till November; while the amber primordium ripens early in July. Many other kinds ripen through the winter and spring. Pears and plums can be kept the year round as easily as apples; and summer fruit, by bottling, can be kept perfectly fresh a year. And by the use of hot-houses fruit can be picked from the trees in winter or spring?

We can also *preserve* them, or make them into jellies. Yet this process, besides deteriorating their flavour, impairs their digestibility.

Preserves are too rich. Their nutrition is too much concentrated. Yet the juice can be extracted and then dried, so as to preserve its original flavour and dietic utility. Or most kinds of fruit can be dried, and thus kept, though this process dries out much of its goodness as well as sweetness. Yet dried fruit stewed is far better than none.

Stewed apples sweetened, make an excellent relish with bread. The addition of butter does not increase its palatableness, but rather lessens it. Yet apple-sauce should be made every few days, and not made so rich as to keep all winter. Nothing equals simple bread and choice fruit, if people only knew it, both for health and luxury.

In general, good fruit loses much of its flavour and virtue by being cooked. Poor fruit may be improved by being cooked and sweetened; but first-rate fruit and bread ought to be good enough for a prince; and is, in fact, the best pie, and cake, and dessert in the world.

Green fruit, however, is injurious. Nor do we realize how many, especially children, lose their lives directly or indirectly thereby. Adults are most culpable for eating fruit before it is ripe. Nor would children ever eat it, if supplied freely with what is good. Parents should see to it, that their children have good ripe fruit as much as bread.

Most solid fruits, especially peaches, are picked green, so that they may keep the longer. Those who would have good fruit must RAISE it — must pick it from their own trees.

Foreign fruits are good, but home fruits are better. Nature generally adapts the products of every clime to its dietetic requisitions; and has made those fruits to flourish best in every clime which its inhabitants require. Yet imported fruits augment variety, and those which will keep well, may be eaten freely with profit. Of these, oranges, lemons, pine-apples, bananas, and nuts, are examples.

Sweets are as healthy as palatable. They contain starch and carbon in great abundance, and these are two of the principal ingredients required in food. Yet they should be commingled with our food just as nature has mixed them herself with all kinds of edibles. Sugar is extracted from the grain, the beet, and the maple, and even from corn-stalks; and can be made almost out of anything that will serve for food. When eaten, it should be duly diluted, and it will rarely cloy, but greatly enhance the palatableness of almost everything eaten, especially of 'flour victuals.' Sweet apples and fruit are much more nutritious than sour, and greatly facilitate the fattening of stock.

Molasses is good; because, besides yielding a great amount of nourishment, it stimulates the intestinal canal, and thus helps to evacuate obstructions and waste matter. Eaten with Indian meal made into puddings or cakes, it becomes highly aperient, and thus carries off causes of disease. Let children be served with it at least once or twice a week; nor should adults refuse it.

Those slaves, and even cattle, that eat of the cane while extracting its sugar, are said to thrive remarkably well; and I am fully persuaded that if the cane as well as its extract were imported, and extensively used as an article of diet, its usefulness would be very great.

Honey is also most delicious, and, duly mixed with other things, may be eaten with profit, especially in winter. Sweets generally should be eaten more sparingly in warm weather than in cold.

Milk, butter, and cheese are highly nutritious, though not altogether unobjectionable. Milk contains caseine, and caseine contains fibrine and albumen, in a highly soluble state, so that they can be easily carried to every portion of the system. Milk also contains nitrogen, an abundance of which is essential to growth. A milk diet is therefore peculiarly adapted to promote the growth of children and youth. And the fact that nature has ordained it as the natural food of infants, is no mean guarantee of its utility. Its promotion of the growth of young animals generally, still further recommends it.

Butter, made from the oily properties of milk, contains a great amount of carbon. Its nutrition, like that of sugar and honey, is highly concentrated. Butter also soon becomes racid, when exposed to heat, and in this form it is peculiarly obnoxious. It often causes cutaneous eruptions, biles, and the like; and eaten in warm weather, and in those quantities in which it is generally consumed in America, loads the system with corruption, renders many miserable for life, and hurries thousands into untimely graves.

Cream is better than butter, and certainly more palatable, and may be eaten with bread, or bread and fruit, with comparative impunity, especially in cold weather. Other stomachs may manage butter, but mine cannot, except in small quantities; and it proves detrimental to dyspeptics generally. Spread thin upon bread, it may do. Sweetened cream is far more palatable and less objectionable.

Milk also promotes sleep, and hence is the better for supper, especially for the supper of children, and probably for the wakeful. Sour milk and butter milk sweetened, are probably both nutritious and healthy. The author attributes his recovery from a consumptive attack to the use of butter-milk, and relishes sour milk sweetened much. The Germans strain all their sweet milk into sour, and thus curdle it; and some cannot eat milk unless it is previously curdled. Curdled by adding sweet cider, it becomes delicious and wholesome.

Melted butter, as eaten on warm bread, or on hot, short cake is not good. Buckwheat cakes of themselves are harmless, yet swimming in melted butter and molasses, they can be borne only by few. Add milk or cream, with sugar, or molasses, or honey, and they are even more delightful to the palate than with butter, and doubtless as wholesome as they are delicious. When the system is in want of carbon (heat), butter may be eaten with profit, yet cream is better.

Cheese does not suit some stomachs, the author's included, yet may not be peculiarly unwholesome. It often troubles children, and should be administered to them sparingly, if at all. Yet pot-cheese, made of sour milk, is nutritious, and probably harmless.

Peas, beans, potatoes, onions, beets, carrots, turnips, squashes, and vegetables generally, may be eaten freely, with profit. Ripe beans and peas contain a great amount of nutrition, make good blood, and should not be allowed to fall into disuse. Made into soups they relish well. They constituted a standing article of the diet of our ancestors.

Potatoes, a recent but popular article of diet, deserve all the practical estimation in which they are held. Though not very nutritious, yet on this very account they 'fill up,' and thus prevent our taking excessive nutrition in other forms. Baked, they are very fine, and they are palatable however prepared. Yet they should be eaten with bread, or their bulk will be too great for their nutrition. Potatoe-starch pudding is one of the most nutritious and easily digested articles of diet to be found.

Onions are both palatable and wholesome. The French consume them freely. They are especially good in colds. The ourang-outang, when suffering from colds, eats them raw in great quantities, and would eat nothing else. They are aperient, and their syrup, sweetened, relieves oppressed lungs, and restores suppressed perspiration. For incipient infantile colds, it is admirable.

Beets, carrots, and turnips, are good in their places. Every family should feed upon them occasionally. Parsnips are good, though rather difficult of digestion at times.

Cabbages are often digested with some difficulty, and yield but little nourishment.

Greens in the spring are aperient and healthy, yet need not be soaked in vinegar to be rendered palatable.

Squashes and pumpkins are good, either stewed or eaten as sauce, or with bread, or made into plain pies. Yet they should not be spiced to

death, or till their taste is nearly obliterated, and their utility rendered doubtful. To some constitutions, squash is equally serviceable.

Cucumbers and radishes are injurious. They ought never to come upon the table.

Nuts, as generally eaten, are unwholesome, for two reasons. They are often eaten between meals, and when the stomach is already overloaded. Secondly, they contain a great amount of carbon, and thus increase that superabundance of it which is one great cause of disease. Yet eaten with food, or as part of food, they would prove beneficial, as they are eminently nutritious and palatable. The inhabitants of the South of France, Savoy, and a part of Italy, live to a great extent on chestnuts during fall and the early part of winter, making them into bread and puddings in place of flour. Nuts abound in vegetable oil, and of course of carbon, and also of gluten and fibrine—three of the most important elements required for sustaining life. But we shall discuss their value more fully when we come to speak of animal heat.

HOW TO EAT; OR, MASTICATION.

Our food once selected in accordance with the foregoing principles, the next question is, How shall it be eaten? With our *teeth*, of course. Nature forbids our throwing it into the stomach as with a shovel. By rendering the passage to it small, she literally compels us to swallow our food in small parcels. She has also furnished us with a mouth, set all round with two rows of teeth, which fit exactly upon each other, and are every way adapted to crushing our food to atoms. Nor can we, in general, swallow our food without its being more or less chewed.

Still further to induce us to chew well our food, nature has rendered the action pleasurable. She has given food a most delicious flavour. Yet men generally do not know how to enjoy a tithe of the gustatory pleasure which nature has appended to eating. Not one in a thousand know how to eat! All know how to eat *enough*, but few know how to eat *little* enough. All know how to eat *fast* enough, but very few know how to eat *slowly* enough. And strange as it may seem, few know even how to *chew*, simple, easy, and natural as the thing is! Nine hundred and ninety-nine in every thousand eat mostly with their *stomachs* instead of with their *teeth*! This poor slave as often to perform two or three times its proper task, simply to digest the enormous quantities of heterogenous compounds forced upon it, besides being compelled to do what the teeth should previously have done.* Is eating indeed so very grievous a task that it should thus be hurried over? Most men shovel in their food in great masses, mouthful following mouthful, thick and fast, eating as much in five minutes as would take them nearly an hour to eat well. Americans generally treat eating, as they treat impertinent customers—get done with it as soon as they can, without ceremony. Yet few things are of more importance. Besides, how can we expect to enjoy the pleasure nature has associated with eating, unless we take sufficient time in eating? Instead of despatching our meals to get to business, we should despatch our business, and eat at perfect leisure. We should never sit down to the table in a hurry; and we should eat as leisurely as if time and tide were waiting for us. The ox and horse eat as quietly as though eating was their all. Only swine guttle down their food. Will you imitate the swine? Take time to eat *well*, and you will probably live nearly twice as long, and this protraction of life will enable you to do the more business. Eating fast is one of the worst ways of hastening business you can adopt. Let business stand while you eat, and eat with the utmost deliberation. Let nothing hurry you either to or from the table. Make eating a PARAMOUNT business. No one should deposit an ordinary meal in less than half an hour. How foolish to cram it

* This is not so true of English people as of Americans.

down with swinish verocity in five minutes! Yet some men make quick eating their BOAST.

The loss of gustatory enjoyment consequent on fast eating, is one of its smallest and lightest evils. It breaks down the stomach, and thus disorders and diseases the entire system. Few other causes are as prolific of dyspepsia (indigestion) and its dire train of evils, as this. We have not overrated the importance of a due selection of food, yet its proper mastication is as important. How can the gastric juice penetrate the food unless it is mashed fine? Food deposited in lumps defies its solvent power for a long time, meanwhile irritating and weakening its power; whereas, if it were well crushed before it entered the stomach, this juice could penetrate or get hold of it, and digest it before fermentation occurred.

Nor is this all. Food must be thoroughly mixed with SALIVA as a means of being thoroughly crushed. Hence nature has stationed five glands about the mouth, two at the back part of the jaws, two at the sides of the lower jaw, and one under the tongue, which secrete this saliva, and discharge it into the mouth when food is presented. Chewing mingles this saliva with what we eat, and enables us to grind our food perfectly fine.

It appears that saliva, besides facilitating mastication and deglutition*—for without it food would be too dry to be swallowed easily—in part dissolves the food, and prepares it for the action of the gastric juice before it enters the stomach. As cotton must go through several PREPARATORY processes before it can be woven; so food must be both ground fine by mastication and saturated with saliva, till the starch of food, one of its most nutritive elements, is liquefied and prepared for the digestive process. How deeply important, then, that we should thoroughly chew our food, and that we should keep these salivary glands in a healthy, sound, and vigorous state! The stomach has enough to do after thorough mastication and salivation have prepared the food for digestion. Especially is this true of weak stomachs. Nor can the digestive process be complete, or food make good blood, without this work of preparation. The reader will please to note this principle, as we shall find several important directions to dyspeptics on it, when we come to treat of the cure of disordered digestion.

The food is next swallowed, or passed down the œsophagus, a long duct connected with the back part of the mouth, and furnished with longitudinal and transverse fibres, which, contracting from above downwards, impels its contents down into the stomach.

Important as are the right selection and due mastication and salivation of food, its *quantity* is probably equally so. Unwholesome *kinds* will often engender less disease and suffering than excess in the *amount*. Health and disease depend greatly on *how much* we eat. Many, especially dyspeptics, counterbalance the good effects of a plain diet, by over-eating. It is no exaggeration to say, that most people make gluttons of themselves. This is doubly true of Americans. An English Quaker on his return from a transatlantic tour, when asked what he thought of the Yankees, answered, that 'Their men are gluttons, and their women slaves.' Notice the disappearance of dishful after dishful, and even tableful after tableful, at our public and private meals. Watch your own plate, and notice how many times, though it is loaded to begin with, you 'back up your cart' for another load. All this besides the desserts. Though we may not eat as much as the Indians, who are reputed by several travellers to stuff themselves with from six to fifteen pounds of meat per day, when they can get it, yet, on the average, we eat at least from two or three times more than nature requires. Nearly every reader will bear the self-condemning witness, that he often eats so enormously as to feel uncomfortable, stupid,

* Chewing and swallowing.

and sometimes almost sick ; and most who will omit an occasional meal will feel twice as well for a day or two afterwards.

But, to bring our remarks to a point, notice three classes of facts, everywhere observable. Dyspeptics generally eat enormously—nearly twice as much as ordinary persons, while those who enjoy PERFECT health, and have never been sick, eat less than half as much as others, and not a quarter as much as dyspeptics. The bully of the Erie Canal in 1837, and of course the strongest and toughest man of all those powerful navigators of that extended water, ate less than half as much as the average of his passengers. A comb-factory man in Newbury, Mass., who has always enjoyed the very best of health, is surprisingly abstemious in the quantity of his food. Aged persons usually eat very little, and hence their length of life. Men of great talents and virtue usually practise rigid abstinence. Wesley furnished a noted example. See what he did and endured—how little he ate and how often he fasted.

Fleshy persons usually eat moderately, while spare persons, the world over, are generally great eaters. The reason is this : what the former *do* eat, they completely digest, extracting from it all its sustaining virtue, so that they need but little ; whereas gluttons disorder their stomachs, so that the enormous quantities they consume are not converted into nourishment. A little food, well assimilated, yields far more nutrition and life than quantities crudely digested. In fact, gluttony doubly starves its subjects ; first feebling and then disordering digestion, so that it cannot extract the nourishment from food, and secondly, by causing a gnawing, hankering, craving state of the stomach, akin to starvation.

Old Parr, who became a father after he was one hundred and twenty, and retained his health and all his faculties unimpaired till he visited the royal court, aged one hundred and fifty-two, died in about a year, from slightly letting down his extreme abstemiousness.

Louis Carnaro, who, by abandoning those excesses, which broke his constitution, and threatened him with death at thirty-six, baffled disease in its most aggravated form, by confining himself to less than twelve ounces of solid and exclusively vegetable food per day, was over-persuaded to increase his quantity only two ounces, the effects of which he describes as follows : This increase, in eight days, had such an effect upon me, that from being remarkably cheerful and brisk, I began to be peevish and melancholy, and was constantly so strangely disposed, that I neither knew what to say to others, nor what to do with myself. On the twelfth day I was attacked with a violent pain in my side, which held me twenty-two hours, and was followed by a violent fever, which continued thirty-five days, without giving me a moment's respite.' This was his only sickness during sixty-three years of abstemiousness.

Richard Lloyd, 'a strong, straight, upright man, wanting no teeth, having no gray hairs, fleshy and full-cheeked, and the calves of his legs not wasted or shrunk, his hearing, sight, and speech as good as ever,' at one hundred and thirty years of age, being persuaded to substitute a mear and malt liquor diet for one consisting exclusively of bread, butter, cheese, whey, and buttermilk and water, 'soon fell off, and died.'

Dr. Cheyne reduced his weight from four hundred and forty-eight to one hundred and forty pounds, by abstinence, grew corpulent and sick on a more generous diet, and was restored by amstemiousness. His practical and theoretical model was, 'The lightest and least of meat and drink a man can be tolerably easy under, is the shortest and most infallible means to preserve life, health, and serenity.'

Dr. James Johnson, one of the ablest of modern physiologists, who cured himself of an aggravated dyspeptic malady by rigid abstemiousness, and then wore out two armies, in two wars, and thought he

could wear out another, says : 'The quantity should never exceed half a pound in weight at dinner, even when that can be borne without a single unpleasant sensation succeeding. This quantity is quite enough, and generally too much. The invalid will acquire a degree of strength and firmness, not fulness, of muscle, on this quantity, which will, in time, surprise his friends as well as himself.' Some will often derive more nourishment and strength from four ounces of gruel every six hours, than from half a pound of animal food and a pint of wine.

The author's experience fully confirms these testimonies. When so crowded with professional calls that he was obliged to postpone meals or dismiss customers, he occasionally chose to postpone his meals, and soon found that it doubled and trebled his capacity to endure mental labour ; and shortly afterwards adopted the practice of fasting whenever he was pressed with business, and preparatory to lecturing. To eat supper before lecturing,* always greatly mars and enfeebles both matter and manner, so that he always prepares himself for the desk by fasting. To write well on a full stomach is an impossibility. No one who has not frequently practised abstemiousness in quantity as well as quality, can appreciate the far greater flow of thoughts, words, and facts, and the enhanced clearness of mind and intensity of feeling, produced by fasting. It may, indeed, be carried so far as to prostrate, yet even a state of temporary hunger quickens mental action, while a full meal is to the mind as lead tied to the soaring eagle. I find that the less I eat, the more I think. I have, in times past, lost months and years of my precious life by overloading my stomach, and I thus proclaim my errors that others may take warning. But I am determined to commit this sin no more. Shall I fetter the immortal MIND, by indulging appetite? Shall propensity be allowed to blight the godlike powers of the human soul! Gluttony is the great sand-bank of mind. There is no telling how much a little abstinence would enhance the progress of our students, the mental and moral powers and consequent usefulness of writers, and the intellectual acumen of all who require mental strength and activity. Nor do the *feelings* escape the palsying grasp of over-eating. They suffer most, in fact. Over-eating blunts and benumbs all our keener, finer, holier emotions, and curtails enjoyment more universally and effectually than almost any other cause, besides all the untold anguish of body and mind it induces. The extent and magnitude of the evils of intemperance in drinking, though they far exceed even the glowing descriptions of all its opponents combined, fall short of the evils of excessive eating. The former are limited comparatively to few ; the latter are almost universal, and practised from the cradle to the grave. Mothers begin by choking their infants with the breast every time they cry, though this very crossness is generally occasioned by excessive nursing ; and then they aggravate the evil by stuffing, stuffing, stuffing their children with pies, cakes, candies, nuts, apples, and the like, from the time they rise till they retire, the whole year round, so that most children *grow up* gormands. And this soul-and-body destroying habit 'grows with our growth, and strengthens with our strength.'

'I tell you honestly,' says Dr. Abernethy, 'what I think is the cause of the complicated maladies of the human race. It is their gormandizing, and stimulating, and stuffing their digestive organs to excess, thereby producing nervous disorders and irritation.' Another eminent medical writer says : 'It is the opinion of the majority of the most distinguished physicians, that intemperance in diet destroys the bulk of mankind.' 'Most of all the chronic diseases, the infirmities of old age, and the short period of the life of Englishmen, are owing to repletion.'

'And I do firmly believe,' says President Hitchcock, 'that scarcely

* They generally take supper about half-past six in the evening in many parts of America.—J. B.

any sedentary or literary man can exceed from twelve to sixteen ounces of solid food, and from fourteen to twenty-four of liquid per day, and keep within the bounds of temperance.* Soldiers are more vigorous and healthy on scanty than on full rations. Pugilists are fitted for the bloody ring, and horses for the race, by great abstemiousness combined with extreme exertion of muscle, which proves that abstinence facilitates labour. In short, every dietetic fact and principle goes to establish these two conclusions, that almost all eat double the quantity of food necessary for the attainment of the highest state of mental and physical vigour and endurance, and that over-eating is the great cause of modern disease and depravity. One and all, TRY ABSTEMIOUSNESS. Let those who are well try it, that they may retain and enhance their health; and let invalids try it, that they may banish feebleness and maladies, and again enjoy the blessings of health. The literary should try it, that they may augment mental efficiency; and labourers should try it, that they may increase their ease and working capability. Above all, the sedentary should try it, that they may ward off the impending evils of confinement within doors. I would not have any one eat one mouthful too little; but I do wish to see men content themselves with the quantity most promotive of strength, talents, and happiness. How much is best we proceed to show:

A TEST OF THE PROPER QUANTITY OF FOOD.

Appetite is a perfectly certain guide to quantity as well as kind, when it is unperverted. But alas! so perverted is the appetite of most, that it is like a drunken pilot in a storm. It is worse than no guide; for it leads *ASTRAY*. To lose this infallible guide is so important a matter, is most unfortunate. An ill-regulated appetite, by constantly tempting people to over-eat, engenders a great portion of those very maladies and sufferings which mankind experience, and abridges the period of man's existence one half!

This unnatural condition of appetite requires a little explanation. Let it be remembered then, that a most intimate relation exists between the stomach and Alimentiveness. Whatever, therefore, inflames the stomach, excites Alimentiveness, and thus creates cravings akin to hunger. *Excess of food* inflames the stomach, and thus provokes those hankerings after food, which most mistake for real hunger. Yet such cravings are caused, not by hunger, but by *SURFEITING*. This shows why dyspeptics have frequently such enormous appetites. They have inflamed their stomachs, and thus rendered their appetite morbid, and its cravings insatiable. And the more such eat, the more they crave. Eating, so far from satisfying this morbid craving, only enhances it. True, they feel weak, gone, faint, and ravenous—feel as if they shall drop down, unless they can get something to eat soon—yet the more they eat the more they crave, because the more they inflame the stomach, and, of course, its cerebral organ, Alimentiveness. Cannot such see that they eat twice as much as men in general, and four times more than many around them who enjoy uninterrupted health? How can they require so much, when others get along so much better with so little? What could more conclusively prove that both their craving and diseases proceed from their gluttony? And what establishes this point beyond a doubt is, that protracted abstemiousness will diminish these stomachic gnawings. Make trial, ye thus afflicted, and you will be surprised at their decrease. And, in general, those who feel faint in the morning till they eat, ravenous before dinner, and hungry before supper, should attribute these cravings to an *OVER-LOADING* of the stomach instead of an empty one. And they who suffer much from omitting a meal, may depend upon it that they over eat. Fasting gives little inconvenience to healthy stomachs; nor is there a more sure sign

* That this is the case in the United States, I cannot doubt; and I believe it to be the case with millions even in Great Britain.—J. B.

of gluttony than these hankerings, and this faintness when a meal is omitted. Contradictory though it may seem, yet of all such cravings, persevering abstemiousness is a perfect cure, because it allays that irritation of the stomach which causes them, and which full feeding, by re-inflaming appetite, enhances. Only try its virtues, ye thus afflicted. FAST instead of feasting; and keep fasting till you can, like those in health, omit a meal with little inconvenience or prostration. Especially should you omit supper, and drink copiously of cold water an hour before breakfast.

'Whenever,' says Dr. James Johnson, 'our food is followed by inappetite for mental or corporal exertion, we have transgressed the rules of health, and are laying the foundation for disease. Any discomfort of body, any irritability or despondency of mind, succeeding food and drink, at the distance of an hour, a day, or even two or three days, may be regarded, other evident causes being absent, as a presumptive proof that the quantity has been too much, or the quality injurious. If a few hours after dinner, a man feel a sense of distension in the stomach and bowels, or any of the symptoms of indigestion which have been pointed out; if he feel a langour of body, or a cloudiness of the mind; if he have a restless night; if he have experienced a depression of spirits, or irritability of temper next morning, his previous meals have been too much, or improper in kind, and he must reduce and simplify till he come to that quantity and quality of food and drink for dinner, which will produce little or no alteration in his feelings, whether of exhilaration immediately after dinner, or of discomfort some time after this meal. This is the criterion by which the patient may judge for himself.

The fact is, we may accustom ourselves to eat little or much at pleasure, with this difference, that the former habit leaves the muscles and brain unoppressed and active; while the latter stupifies a man. Agents and tourists concur in the declaration, that the Indians will eat from six to fifteen pounds of meat in the twenty-four hours, spending most of their time in eating it when they can get it. 'For a few days,' says Captain Duval, 'after getting into camp, he will eat from eight to ten pounds, and for the first day or two would even exceed that quantity.' 'The Osages,' says Captain Rogers, 'often eat from ten to fifteen pounds of fresh meat in the course of the twenty-four hours, particularly on returning from a fatiguing hunt, when I have no doubt they frequently consume from five to six pounds at a meal.' Mayor Armstrong says, 'They would consume from six to eight pounds a day,'—a quantity under instead of over the true estimate. Mr. Robert Cook says, 'I have seen a prairie Indian eat and destroy, upon his arrival in camp, fifteen pounds of beef in twenty-four hours. I am further of opinion that they will eat daily ten pounds throughout the year.' Of the amount of food eaten by the Esquimaux, John Ross says, 'Their consumption of food is enormous, and often incredible. They eat, perhaps, twenty pounds of flesh and oil daily.' Sir W. E. Percy weighed out to a half-grown Esquimaux boy, eight pounds of sea-horse flesh, one pound twelve ounces of bread, one pint and a quarter of rich gravy soup, a gallon of water, and six wine-glasses of spirits, a 'quantity no way extraordinary.'

Of the Siberian Yakuti, Captain Cochran says the Russian Admiral Saritcheff gave to a Yakut, 'a thick porridge of rice boiled down with three pounds of butter, weighing together twenty-eight pounds, and although the glutton had already breakfasted, yet did he sit down to it with great eagerness, and consume the whole without stirring from the spot.' Captain Cochran adds, that a good calf, weighing two hundred pounds, 'may serve four or five good Yakuti for a single meal. I have seen three of these gluttons consume a reindeer at a single meal.'

Barrow says, 'Ten of our Hottentots ate a middling sized ox, all but the two hind legs, in three days, but they had very little sleep during

the time, and had fasted the two preceding days. With them the word is eat or sleep.' He adds of the Bosjesmans, 'The three who accompanied us to their wagons, had a sheep given them about five in the evening, which they entirely consumed before noon the next day.'

The author's father once knew a glutton who ate two chickens, with the usual accompaniments of bread and sauce, and called for more. The dinner, prepared for eight workmen was next brought on, which he despatched, they not having been called, and when he called for more still, bread and cheese were set on. When the landlord reproved him for cutting the cheese in slices, instead of cutting it towards the centre, he replied, 'that it made no difference, since he calculated to take the whole,' to avoid which the landlord started forward a drove of cattle he was driving, and thus hurried him from his unfinished meal, though he took in his hand a large slice of bread and another of cheese.

Germans, as a nation, are great eaters, while Spaniards and French live comfortably on very little; while the former are no more healthy than the latter. And the world over, great eaters are generally stupid. Of this, the Indians, Hottentots, and Yukuti are examples. Then why follow depraved appetite as our guide as to quantity? Those who crave and consume great quantities of food do so from gluttony, not necessity. Such, so far from freely indulging their appetite, and thus enhancing their voracity, should reduce it by abstinence. Nor need they fear starvation. The Spaniards do not suffer for want of food, but eat all that unperverted nature requires. And all that any one wishes more than this is unnatural—is the want of a depraved appetite, not of nature. Let us seek and follow *nature's* standard, not our own inordinate cravings, and the result will be increased mental and physical capability and enjoyment.

Those convinced of over-eating will now inquire how appetite can be restrained? Doubtless, most readers, conscious of excess, would give almost anything to know how they can manage to govern their cravings? Every now and then they suffer from excess, and firmly resolve to eat less; and succeed for a single meal, but eat the more afterwards. Indeed, few things are more difficult than to govern a morbid appetite, whether for alcoholic liquors, or unhealthy viands, or excessive quantities of food. He that can do this, has the spirit of a martyr in him. To rule a kingdom is play compared with controlling a morbid appetite. Yet even this is not so difficult after we know how. Many try *hard* enough, but do not try *right*. Follow the succeeding direction, and the task will soon become easy.

FIRST. Take upon your plate, in one or two parcels, all the food, except perhaps the dessert, you think best to eat at a meal, even though it may seem to a 'cart-load,' and leave off when that is finished, instead of backing up your cart for another load. By these means alone can you fully realize how much you *do* eat. Or if this is impracticable, notice how much you have previously taken, so as to bear in mind the sum total consumed. But if you take potato after potato, and slice after slice of meat and bread, and the like, relying upon an already inflamed appetite for your guide to quantity, going on till your stomach, stretched by a thousand surfeits, is pained by fulness, be assured you will over-eat. *Weighing* a few meals till you have learned to estimate correctly by this eye, and never exceeding twenty ounces per day of solid food, will soon aid you in curtailing appetite. When pressed with business or writing, I limit myself to a pound of bread per day, exclusive of fruit, and eat nothing besides.

Especially should the meals of children be measured out to them, with the full understanding that they can have no more than the next meal. They will thus grow up to this much desired limitation. Never make them eat things to prevent them from being wasted.

SECONDLY. Eat your food in *small mouthfuls*. When we cram in great mouthfuls, and chew only till we can just swallow, and then

hurry in as much more as the mouth will hold, we eat far greater 'cart loads' in a short time than we suppose. But when we take a small quantity at a time, and chew it till it is fitted for being deposited in the stomach; instead of a *great* pile of food seeming *little*, a *little* will seem a great one, and go a great way both in satisfying appetite, and in nourishing the body, strengthening instead of impairing digestion. See some children eat. They take a small bite, and laugh, play, and talk, perhaps even while chewing it, and then take a little more, and thus spin out their eating a long time. Do you so, and you will find it easier to stop when you have eaten a small meal than, than you do now after eating a large one.

Besides, when you eat fast, and in large mouthfuls, the stomach hardly realizes how much food it has taken, until it is almost crushed under its burden. Follow these simple directions—parcel out your meal at the commencement, and then eat it in small mouthfuls at a time, and chew thoroughly, and the government of appetite will be easy. To govern a craving appetite while you eat fast, is next to impossible.

A THIRD means of reducing the quantity of food consists in EATING SELDOM. This brings up the question, How *often* should we eat? I should say three times a day for most, twice for others, and four times a day for none.

Many with whom the author has conversed, who have exchanged the three-meal system for the two, declare themselves improved both in mind and body thereby. With this my own experience fully accords. A breakfast at eight or nine, and a hearty dinner at three, are far better for me than a third meal.* Your stomachs, like your muscles, must have REST. And three meals a day do not allow them to rest. Still, I would not recommend a sudden change from three meals to two.

But invalids, it is generally supposed, must eat often. I think the reverse. Their debility or disease prevents their consuming much of the energy derived from food, so that they require less, and their exhausted stomachs pre-eminently require rest. 'There is nothing,' says Dr. Cheyne, 'more supremely ridiculous than to see tender, hysterical, and vapourish people, perpetually complaining, yet perpetually cramming; crying out they are ready to sink into the ground and faint away, yet gobbling down the richest and strongest food and highest cordials.' In fact, I know of no more effectual remedy, both for chronic invalids and the sick, than fasting. Why take food when they cannot digest it, especially since its presence only clogs and irritates? As gormandizing is one great breeder of disease, so abstinence is one great remedy. Whether infinitesimal doses of homœopathy are potent or harmless, one thing is certain, that the *dietetic* prescriptions of this medical sect are beneficial. Nor is the temperance regimen associated with the 'water cure' scarcely as efficacious as a restorative agent, than the water application itself. Abstemiousness and water, rightly applied, will restore almost all to health, while frequent eating puts back almost all convalescents, and often induces a relapse, and hurries its victim to the grave. Many convalescents, whom over-eating does not kill outright, are loaded anew with disease, and injured by it for life. Let our readers heed these warnings.

Eating between meals, luncheons, etc., next come up for reprehension. If two meals are sufficient for human sustenance, eating between three must certainly be injurious. The stomach, on receiving its allowance, empties into itself a copious discharge of that gastric juice which dissolves the food; and it does not secrete another supply till all that meal is disposed of and another demanded. Hence when we eat between meal-times, portions of food must often lie in the stomach undigested, to irritate and disease the stomach. Besides, to interfere with the process of digestion by introducing a fresh mass into the mass already partly

* I should prefer three smaller meals, to two large ones.—J. B.

dissolved, distracts, and arrests the healthy action of the stomach, and causes the food first received to lie until incipient fermentation takes place. Not once a month do I eat between meals, unless just before or after, so as, in fact to be a part of my meals, and always when I do, I hear from it in the form of dyspeptic pains. Nuts, cakes, candies, apples, oranges, and the like, should therefore be eaten *with* meals, not *between* them; and those who violate this law, must suffer the direful consequences of disordered digestion.

Children require food oftener than adults perhaps, but if they have apples, nuts, and the like, see that they eat them just before or right after, or along with their meals; and if adults would enjoy dainties, let them keep them until meal time. Nor should luncheons ever be eaten. Do not disturb the digestive process. Many of us, by thus eating unseasonably, have undoubtedly inflicted aggravated pains and lingering maladies upon ourselves, which will burden us as long as we live, and hasten our death.

The best time for eating also deserves attention. We should never take food just after rising, but wait till the stomach is prepared for it by exercise. Some urge inability to exercise till after breakfast, because of consequent faintness. This the very reason why they should exercise. Its cause is, that stomachic inflammation already explained, which can be cured in part by exercise before breakfast, little and light at first, and gradually increasing its duration and amount as it can be borne. Their difficulty is *dyspepsia*, the cure of which remains to be discussed.

Nor should food be eaten within at least three hours before retiring. True, sleep sometimes promotes digestion, yet digestion interferes with sleep, 'nature's great restorer.' A full stomach is very apt to engender bad dreams, and induce restlessness and stirring in sleep, as well as night-mare. Especially should nuts, raisins, candies, fruits, etc., be eschewed at night. Eat little, if any, supper, and that three or more hours before retiring, and you will sleep the more sweetly, and feel the better the next day, because of the far greater good your sleep will do you.

But where three meals are eaten, seven, twelve, and five are perhaps the best hours; where only two are taken, from eight to nine, and from three to four are probably preferable. Business men, who dine at three, should forego forenoon luncheons and suppers, because the former unfit the stomach for dinner, and the latter, especially on the top of a hearty dinner, are doubly injurious.

The digestive process is one of the most remarkable as well as important operations of the human economy. How effectually impaired digestion, in the form of dyspepsia, prostrates both physical and mental energy! A vigorous stomach is indispensable to energy in every other portion of the system. Let us then examine this organ.

It consists of a sack capable of holding from a quart to several gallons, according as it has been more or less distended by excess or deficiency of food and drink. Its upper side is much shorter than its under, thus appearing like a bag held horizontally, and ruffled on its upper edge. It has two openings, the one where the food enters, located on its left superior side, and called the cardiac orifice, from its proximity to the heart, and the other, situated at the right superior side, named the pyloric orifice, through which the food, after having undergone the chymifying process, makes it egress into the duodenum, or second stomach. The latter opening is constructed with a valve, or door, so arranged as to close upon and send back whatever presents itself for egress before it is completely dissolved; and it departs from this rule in extreme cases only, and where things cannot be digested without remaining so long in the stomach as seriously to injure it. Hence, the ejection of food, either way, undigested, is a sure index of a deranged stomach, because a vigorous one would solve whatever is soluble.

It is composed of three membranes—the outer, called the peritonæum, or glossy coat, which lines and lubricates all the internal organs, and allows them to slide upon each other without friction: the middle, composed of muscles laid transversely, and crossing each other in all directions, which contract upon its contents so as to give them the required motion; and the inner, or mucous membrane, which is extremely delicate, and of a pale cream colour when healthy. And this structure pervades the whole intestinal canal. Nerves and blood-vessels permeate all its parts; the blood-vessels imparting vitality, and the nerves connecting it with the whole nervous system, by which mean the various states of the stomach control both the nervous system and mind.

When a healthy stomach receives its food, the mucous membrane, or some glandular structure interwoven with it, empties into it a clear, tasteless liquid, reseembling saliva in appearance, called the GASTRIC JUICE, previously secreted so as to be in readiness. This fluid is a most power solvent, capable of reducing to a milky, homogeneous mass, called chyme, all those heterogeneous substances taken as food. It, as it were, sets free, or extracts, from food the carbon, fibrine, caseine, nitrogen, hydrogen, and other substances, which enter into the composition of food, and are required to support life. It will even dissolve food out of the stomach, though not as quickly as in. Its solvent power, when the stomach is healthy, is most astonishing. Not to dwell on the wonderful gastric powers of some animals, *man's* solvent power is far greater, by nature, than any suppose. Some have swallowed knives, and digested their bone or horn handles. Is it not surprising that the stomach should bear up often for a century almost, under such continued abuse as most men daily heap upon it?

But such abuse ultimately weakens its solvent powers. This allows food to lay so long in the stomach, that its heat induces souring or fermentation, which aids its dissolution, and helps to relieve the stomach of its load. But mark: this fermentation is nothing more or less than incipient decomposition, or, to call it by its true name, the commencement of the *rotting* process. To *ferment* is to *putrefy*. Nor is it possible for food to ferment in the stomach without engendering corruption. Especially is this true of the fermentation of meat. All know how vast the amount of offensive matter eliminated by its decay out of the stomach. Fermentation engenders the same *in* it. Is it then any wonder that dyspepsia, which consists simply in the rotting of food, especially meat, in the human stomach, should cause its victims to feel so wretchedly? Is not here a powerful argument against meat eating, especially when the stomach is not *perfectly* good? Think of it; meat actually putrefying in the centre of the system, to be sent all through it. It is frightful to contemplate! And yet this very process is perpetually going on, in a greater or less degree, within the stomachs of all afflicted by dyspepsia, and this class embraces the mass of Americans, as we shall show when we come to treat of this disease. This chymical fact, that the fermenting process is incipient rotting, together with the fact that the food of the great mass of our nation does thus ferment, develops the prolific cause of most of those chronic, malignant, and all other diseases which bring suffering and premature death on the mass of mankind. Men cannot, therefore, guard too carefully against all injury of this important organ. Its healthy and vigorous condition is indispensable to life and happiness. Its abuse is suffering and death. As starvation, by withholding nutrition, soon destroys life, so imperfect digestion proportionably impairs it. Dyspepsia is partial starvation on the one hand, by withholding the materials of life, and death on the other, by engendering corruption. Hence, whatever dyspeptics do besides, they should first restore the flagging energies of their stomachs. The scholar who is impairing digestion by study is, instead of disciplining his mind, *undisciplining* it in the most effectual manner possible, because stomachic diseases effectually prostrate the brain. Such should stop

studying till they have effected a cure. And all, whoever they are, whose stomachs are strong, should make it their paramount business to keep them so. And those whose stomachs are weak and disordered should endeavour to strengthen and heal them, and should give up or abstain from whatever impairs them. But more on this hereafter.

The gastric juice acts mainly upon the OUTSIDE of the food eaten, thus evolving nourishment GRADUALLY—a provision of great practical utility. Otherwise we should be obliged to eat perpetually, which would be inconvenient, if not impossible.

The motion of the stomach greatly facilitates digestion. That muscular coating of the stomach, already described, by contracting from all points upon the food, as it were *churns* it till it is dissolved. As the muscle of the gizzard of fowls contracts upon their food so powerfully as to grind it by friction against the gravel stones mixed up with it,* so the muscles of the human stomach keep perpetually squeezing and whirling the food over and over, always one way. This motion all may have observed within themselves. In cases of heart-burn, which is caused by the fermenting process, this rolling of the food is particularly observable.

The motion is involuntary, else we should be obliged to attend to it continually, which would be exceedingly inconvenient. Breathing greatly facilitates it. Every inspiration hauls down the stomach, to make room for the ingress of air, and every expiration redoubles this motion by allowing it to return to its place. And as breathing is perpetual, so is this stomachic motion. This physiological principle condemns all lashing down of the stomach, and the use of all girding round it and the lungs as it prevents this motion. Unless this motion had been very important, nature would never have devised so effectual a means of securing it; and those who *arrest* it by tight-lacing do so at their *peril*.

Nature still further facilitates this motion by those ABDOMINAL MUSCLES which pass up and down across the stomach and bowels, so that we cannot well move the body backwards, forwards, sideways, or any way, without using the muscles, and thus kneading the stomach.

This brings up for discussion exercise after meals, and sleeping at noon. Such exercise is generally condemned, and a sleep recommended instead; because two dogs having been fed alike, the one put upon the chase, the other allowed to rest, on being killed two hours and a half after feeding, digestion was scarcely commenced in the former, while in the other it was nearly completed. Violent exercise is undoubtedly injurious, because it robs the stomach of energy, to supply the extra exactions of the muscles; yet this does not condemn moderate exercise. Nor are we told whether the still dog laid down all the time, or ran around leisurely here and there, but only that he was not on the chase; so that these cases fail of proving that we should 'after dinner, sit an hour.' *Moderate exercise promotes instead of retarding digestion, though fatiguing labour is of course injurious.*

'But,' it is objected, 'nature inclines to rest after meals, and what she, unperverted, inclines to, is beneficial.' But I doubt whether apathy after meals is natural. True, when we have overtaken the stomach, this organ withdraws energy from the muscles, brain, and wherever else it can obtain it, to enable it to discharge its burden, just as over-taxed muscles rob both stomach and brain, and as an over-taxed brain robs all the rest of the *system*. Lethargy of mind, or indolence of body, is a certain sign of having over-eaten. The stomachic nerve robs the brain, or muscle, when thus over-loaded. One function is never made to interfere with or obstruct another, else nature would be at war with *herself*. So far from its being a law of things that the

* Those who will bolt their food, like fowls, without chewing, should, like hem, eat gravel stones to do the crushing which fowls were created to do.

stomach should retard the action of brain or muscle, it was created to facilitate both; so that *right* eating will actually exhilarate instead of prostrating all the other functions. I never take sleeps at noon. Children never do, but are generally more lively and playful after meals than before, but never more stupid; and he who cannot take hold of labour with zest and strength, or study with success, after having eaten, has eaten too much. Eat exactly right—enough but not too much, of the right kind and masticate well—and you can labour with augmented ease, and apply your mind with increased clearness and power after eating, and feel like *doing* instead of *loitering*. Food, like sleep, naturally refreshes and invigorates; and unless it does so, it is excessive in quantity or injurious in kind. This physiological law furnishes a sure criterion of the quantity of food required for the most perfect sustenance of body and mind. Yet when we have over-eaten, sleep and rest after meals are probably beneficial.

THE DUODENUM, LIVER, PANCREAS, INTESTINES AND MESENTERY GLANDS,
AND THEIR FUNCTIONS.

CHYLE.

The manufacture of good chyme by the stomach, so far from *completing* the digestive process, only begins it. The mass of chyme remains to be assorted—the nutritious separated from the innutritious portions; for there is a refuse in food, as there is of ashes in combustion. By what means, then, is this separation effected?

After the chyme has been admitted through the pyloric orifice into the duodenum, or second stomach—a long narrow sack, composed, like the stomach proper, of the peritoneal, muscular, and mucous coatings—it there receives two secretions, one called gall, from the liver, and the other, called the pancreatic juice, from the pancreas. The gall is a liquid of a greenish colour, and exceedingly bitter, secreted from the dark and venous blood while returning back to the heart. This bile is composed mainly of carbon, and this is one of the means by which the system relieves itself of surplus carbon. Hence those whose livers are weak, should eat substances less highly carbonized, so that they may have less carbon to secrete. They should also eat less food for the same reason.

Soda is also secreted from the venous blood, and is contained in the bile, and, being required in the vital process, is taken up by the liver, and returned into the circulation, to take part in respiration—a most ingenious contrivance for supplying the system with the soda it requires. The gall thus secreted by the liver, is emptied from all parts of this glandular and porous organ into little ducts, and these continue to empty themselves into larger and still larger ones, till they finally deposit the gall in a little sack called the gall-bladder, from which it is carried by another duct into the duodenum.

With the glandular structure and general mechanism of the liver, most readers are doubtless familiar. If not, they can obtain the required knowledge by observing and dissecting that of animals.

The pancreas, or sweet bread, another long and tapering gland, situated right under the stomach, secretes another fluid somewhat resembling the saliva, which is conveyed by a trough-like duct which traverses it, into which a multitude of smaller ducts empty this fluid, into the duodenum. Of the precise nature of this juice little is known, only that it is indispensable to chyfication, as chyfication is necessary to nutrition.

These two fluids, commingling with the chyme, separate its nutritious from its innutritious portions, somewhat as rennet separates the whey and curd of milk from each other. The nutritious portion is called chyle—a half-liquid grayish substance, closely resembling milk in appearance, laden with fibrine, carbon, nitrogen, oil, and other substances required to support life. In fact, its composition is almost

identical with that of the blood, and requires only contact with the air to impart that red color and oxygen which constitute it blood proper. The importance of these two glandular secretions, shows how absolutely indispensable health of function in each is to human life.

The chyle thus separated in the duodenum from the refuse portions of food, both are urged along together into the intestines, and carried along them by the motion of that muscular or middle coating which surrounds the entire alimentary canal, arranged circularly and transversely, so that its action crowds its contents along irresistibly. This canal is some six or eight times the length of a man, and into it open a vast multitude of little mouths or suckers, called the lacteal vessels.

These lacteals, or chyle-drinkers, passing through the three other coatings, open upon the inner surface of the mucous membrane. These lacteals suck up the chyle as it is thus urged along over them, and, passing backward behind the intestines, and then through innumerable little glands called the mesenteries, empty themselves into larger, and these into still larger ducts, till they form one duct which passes up along inside the back-bone to near the neck, and empties its contents into the right subclavian vein, nearly under the right clavicle, or collar-bone, while the residuum, or waste portions of the food, are driven along through the small intestines, and expelled in the form of excrement. Blood vessels also open into the alimentary canal, and when inflamed, as in dysentery, cholera, etc., discharge blood; and hence the sudden weakening, and often death, they occasion.

Behold this most ingenious system of instrumentalities employed to manufacture food into blood, and load the blood with the elements requisite for sustaining life! Yet even now the digestive process is by no means complete—it is only, as it were, begun. After the materials of life have thus been furnished, they must be WORKED UP, else they will be like the unused timber of a house or ship. How are these materials manufactured into life and happiness?

CHAPTER III.

CIRCULATION, RESPIRATION, PERSPIRATION, AND SLEEP.

THE HEART—ITS STRUCTURE AND OFFICE.

THE chyle, richly freighted with the materials of life, is emptied into the blood. The blood is composed of two principal parts—first, serum, which rises to the top of fresh drawn blood when allowed to coagulate undisturbed, and secondly, albumen and globules, which settle to the bottom and coagulate. The blood also contains fibrine. All these resupply that waste of muscle and nerve consequent on their action. The vivifying office of the blood is too well known to require description. Drained of this messenger of life, how soon muscle, nerve, and organ, faint and die?

But this blood must be *circulated* throughout the system in order to impart its vitality. Every organ, nerve, muscle, shred, and tissue of the entire physiology must be supplied with it perpetually, or die. To secure this circulation, nature has devised a circulatory apparatus of extraordinary power and efficiency, consisting of heart, arteries, capillaries, and veins.

The heart is located at the top, and nearly in the middle, of the chest, or between the shoulders, its smaller end pointing downwards and towards the left side.

It consists, in common with the stomach, of three coatings—a peritoneal, a muscular, and a serous or mucous one. The treble structure belongs to arteries and veins, as well as to the stomach and intestines,

and each coating serves a kindred purpose. In the heart, however, this muscular coating is very large, so as to enable it to put forth an extraordinary contractile force.

It is divided into four chambers—two above, called auricles, which draw in the blood; and two called ventricles, which force it out. Nature has also divided it up and down, into right and left lobes. The right auricle pumps in the blood by suction from the veins, and the right ventricle, forces it out into the pulmonary or lung arteries and capillary structure. The left auricle withdraws the blood from the lungs and empties it into the left ventricle, which forces it into the arteries and throughout the system.

This ever-acting organ contracts, in healthy adults, about seventy times a minute, or a little more than once a second. It contracts slower or faster according to the general and temporary activity of the subject. It at each pulsation forces into the lungs and arteries somewhere from two to three ounces of blood, according to its size and power; so that as the blood weighs from twenty-five to thirty pounds, more or less, in different subjects, all the blood of the body passes through this organ and throughout the system about twenty-nine times an hour, or once in about two minutes. The heart, therefore, sends throughout the system nearly two hundred ounces every minute, or some seven hundred pints an hour, and above *eight tons* every twenty-four hours. Think what tremendous power is required to withdraw from the veins, pump into the lungs, withdraw from the pulmonary veins, and then send round the system this amount of blood! How little do we realize the amount of power this organ puts forth, or the good which it effects!

To inspect still more closely this mighty pumping machine and its mode of action; the two auricles contract upon the blood they contain at the same time, thereby embracing and balancing each other. Their contraction produces a vacuum into which blood is again propelled by the contractile action of the veins, and the pressure of the atmosphere and muscles upon them. The two ventricles also contract together, the right forcing the blood into the lungs, and the left forcing it into the arteries.

We have said that the muscles, or walls of the heart, are thick, large, and strong. The ventricles are much more so than the auricles, because they have more to do. The auricles have only to pump the blood in by suction from the veins and lungs, or rather to empty it out of themselves right into the ventricles, so that it may run in till it again fills them up and causes spontaneous contraction, while the ventricles have to pump it out, the right throughout the lungs, and the left throughout the body. The office of the ventricles being so much more labourious than that of the auricles, they are much the larger, and the left ventricle is by far the largest and strongest of all, because it has to force out the blood with sufficient impetus to drive it not only into all the extremities of the system, but also throughout the inconceivably minute blood-vessels of those extremities.

The heart is a self-acting forcing pump. As the working of the pump creates a vacuum into which the pressure of the atmosphere on the top of the well forces the water, so the contraction of the right auricle of the heart upon the blood it contains, forces out that blood into the right ventricle, and thus creates a vacuum in itself into which the pressure of the atmosphere upon the surface of the body, together with the contractile power of the veins, propel the blood along into these auricles. And just as the water in the pump above the valve is forced up and out, so the right ventricle pumps the blood into the lungs, to be withdrawn again from them by that same principle of suction just described. But for this external pressure of the atmosphere upon the veins, they would burst, strong as they are; and but for this internal pressure, the external would be sufficient to press the walls of the veins so closely together, as effectually to shut them up. If asked, why the

contraction of the heart does not propel the blood both ways—BACKWARDS as well as forwards—the answer is, that it is constructed with valves, which close the instant the blood begins to go backwards, and thus stop its return. It must go FORWARDS or stand still.

Our subject brings us next to consider

THE LUNGS—THEIR STRUCTURE AND FUNCTIONS.

The fibrine, carbon, oxygen, nitrogen, iron, and other substances which the blood derives from food, constitute hardly half its freight. True, life cannot proceed without them; nor can it with them alone. We must eat; but we must also *breathe*. And the elements furnished to the blood by breathing, are even more indispensable to life, than those derived from digestion. We can live longer without food than we can without breathing. Starvation is terrible, and soon fatal, but suffocation is worse, and dispatches its victim a hundred-fold more quickly. Mankind can live but a few minutes—from five to eight—without breath; and those who are the most active die the soonest when deprived of it. The more active the subject, the more rapidly he consumes the energies derived from breath as well as from food, and therefore the more frequent and copious must be his re-supply. The faster we live, the more and oftener we must breathe. As the snake, frog, alligator, and other cold-blooded, sluggish animals, can live a long time without breath, especially while torpid, so the more stupid the human animal, the less breath he requires.

But why dwell upon the importance of respiration? All know how indispensable a constant supply of breath is to life.

But *why* indispensable? What precise *end* does breath subserve? What does it do for the blood and the animal? It thins the blood; but *how*, and *what for*?

We answer, the vital process requires large and constant supplies of OXYGEN. Without it, all the materials of life furnished by digestion would be of no avail. The vital process resembles combustion or burning, of which oxygen is the great agent. As fire goes down with the scarcity of oxygen, and goes out with its disappearance, so the fire of life wanes in proportion as the supply of oxygen is diminished, and death supervenes almost immediately upon its disappearance. It is this imperious demand of the system for oxygen which renders breathing so necessary, and its suspension so soon fatal. Oxygen is obtained from the breath. Air always contains it. Indeed, it is composed of twenty-one parts oxygen and seventy-eight nitrogen, the other hundredth being carbonic acid gas, and going to support vegetation.

The air is introduced into the system by means of the lungs. The lungs are those two spongy lobes in the upper part of the chest, which surround the heart, and, together with the heart, fill up most of the cavity formed by the ribs. They consist of a very thin and light membrane, permeated by two sets of tubes, one set formed by the branching and re-branching almost to infinity, of the trachea, or wind-pipe, called air-cells; the other set formed by the branching and re-branching of the arteries and veins, which convey the blood from the heart to the lungs and back again. A very thin, though tough membrane, separates these air-cells and blood-cells. The air-cells run side by side with the blood-cells. Thus the air, and of course the oxygen of the air, is brought alongside the blood, only a very thin membrane separating them. This membrane, while it prevents the blood from escaping, except when ruptured, does *not* prevent the passage of *oxygen*. Oxygen is more subtle than air, so that it can pass into the blood through this membrane, while the blood cannot pass *out* through it, nor air pass in through it to the body.

The globules of the blood contain *iron*, and this iron attracts and absorbs the oxygen. The oxygen changes the blood from its dark

venous, to a bright red colour. It also thins it, and inspirits it with life and action, so that it rushes cheerily through the system.

That oxygen is thus transferred from the air in the lungs into the blood, is rendered certain by the fact, that when air is inspired, it contains 21 per cent. of oxygen, while expired air contains only 12 per cent.

What *now* takes place? The production of animal heat. To *heat* the body is one of the first and most essential objects to be provided for. A high temperature is indispensable to the vital process. Human life cannot proceed without it. Man soon dies unless kept heated up to about 98 deg. Fahrenheit. This temperature of the healthy human body is always about the same, in summer and in winter; under the tropical sun of the torrid zone, and among 'Greenland's icy mountains'; though in children it is a little higher, about 102 deg. or 103 deg., and in the aged, a little lower than 98 deg. It never varies over five or six degrees above 98 deg., or two or three below it, without arresting life.

Of course the body, thus heated up so much above surrounding bodies, is constantly *GIVING OFF* heat, in harmony with the universal tendency of heat to seek an equilibrium, just as a hot brick or iron between two cold ones naturally gives off its heat to the others, till all three become equal in temperature. The amount of heat given off by the human subject every hour is, therefore, very considerable, as experience proves.

The re-supply must be equally great, else a permanent cooling would take place, and death ensue. And this re-supply must be furnished to all parts of the body. This re-supply takes place in the capillary system of the blood-vessels, by the mutual combustion of the oxygen in the blood derived from the breath, with the carbon in the blood derived from food. Nowhere in nature is heat produced except by some form of combustion; nor need we regard animal heat as an exception. And the more so, since chymistry assures us that these two gases, carbon and oxygen, have a strong affinity for each other—the affinity of oxygen for carbon being even greater than that of oxygen for iron—so that these two gasses, when forced into close contact with each other, in the capillary system of the blood-vessels, *BURN EACH OTHER UP*, the result of course being the generation of heat, so that the system is heated up much as we heat a room. Wood—and all that can be burnt—contains a large proportion of carbon, and hence its formation of charcoal, which is almost all carbon. Add a little fire to start with, and then blow a current of air upon the fire, and the oxygen of the air combining with the carbon of the wood, produces a combustion and evolves heat. The carbon in the blood and the oxygen thus burn each other up. Thus is engendered that immense amount of animal heat within the system which re-supplies that given off by the cooling process just explained, and the body, together with all its parts, internal and external, is kept at that elevated temperature necessary for the maintenance of life.

What next? As the combustion of wood forms smoke and ashes, so that of these two gasses deposits a like substance. The materials employed in this internal combustion, chymically analyzed, are almost identical in their chymical compounds with charcoal, both being composed mainly of carbonic acid.

The blood, immediately on the combustion of its oxygen, assumes a dark, lived hue, resembling in kind the colour of charcoal, though not so dark, because containing less carbon. Combustion can never take place, either out of the system or in, without creating carbonic acid; and that process of combustion just explained, by which the system is heated, forms some ten or twelve ounces of this acid a day. This substance is hostile to life, and exceedingly poisonous, as seen when inhaled in a tight room in which charcoal is consuming. Its superabundance is fatal to life. Hence, unless some means are devised for

removing it from the system, we should die. The system is cleared of this foe by the iron in the blood combining with the carbonic acid, and then giving it out again, on arriving with it at the lungs. Here this carbonic acid, quitting the iron, combines with the nitrogen, and is brought out of its pent-up enclosure in the human frame into the wide world, again to enter into the formation of vegetables and food.

The iron finds a new supply of oxygen in the lungs. It is this series of changes which gives the heat which is so comfortable in itself, and so indispensable to life. By these means the system is guarded against the otherwise fatal consequences of those sudden and extreme changes of the atmosphere from heat to cold—is prevented from freezing on the one hand, and from burning on the other, and always kept at the required temperature.

This shows us what the primary office of respiration or breathing is, the generation of ANIMAL HEAT. It also shows that one of the principal offices of digestion is the subserviency of this same end—the manufacture of heat.

Philosophical reader, you who have to trace out the relation of cause and effect, say whether these combinations, revolutions, and re-combinations are not beautiful in the highest possible degree. And do they not go far towards explaining the INSTRUMENTALITIES by which life takes place?

The amount of heat thus generated is given by Liebig as follows:—

‘According to the experiments of Dezpretz, 1 oz. of carbon evolves, during its combustion, as much heat as would raise the temperature of 105 oz. of water at 32 deg. to 167 deg., that is, 135 degrees; in all, therefore, 105 times 135 deg.=14207 degrees of heat. Consequently, the 13.9 oz. of carbon which are daily converted into carbonic acid in the body of an adult evolve 13.9 by 14207 deg.=97477.3 degrees of heat. This amount of heat is sufficient to raise the temperature of 1 oz. of water by that number of degrees, or from 32 deg. to 197509.3 deg.; or to cause 136.8 lbs. of water at 32 deg. to boil; or to heat 370 lbs. of water to 98.3 deg. (the temperature of the human body); or to convert into vapour 24 lbs. of water at 98.3 deg.’

‘If we now assume that the quantity of water vaporized through the skin and lungs in 24 hours, amounts to 48 oz. (three lbs.) then there will remain, after deducting the necessary amount of heat, 146380.4 degrees of heat, which are dissipated by radiation, by heating the expired air, and in the excrementitious matters.’

‘In this calculation, no account has been taken of the heat evolved by the hydrogen of the food, during its conversion into water by oxydation within the body. But if we consider that the specific heat of the bones, of fat, and of the organs generally, is far less than that of water, and that consequently they require, in order to be heated to 98.3 deg., much less heat than an equal weight of water, no doubt can be entertained, that when all the concomitant circumstances are included in the calculation, the heat evolved in the process of combustion, to which the food is subjected in the body, is amply sufficient to explain the constant temperature of the body, as well as the evaporation from the skin and lungs.’

The combustion of carbon and oxygen is not, however, the only source of animal heat. Food contains hydrogen which is also received into the blood. This hydrogen has also a strong affinity for oxygen, and combining with it, forms water. The author has seen—many readers have, doubtless, witnessed—the formation of water by the burning together, in a certain fixed proportion, of these two gases. A kindred junction takes place in all parts of the system, and this process both enhances the amount of animal heat, and creates the materials for perspiration.

This brings up for consideration the due regulation of animal heat.

As the temperature of the atmosphere is exceedingly changeable,

sometimes 105 deg. Fahrenheit, and again 40 deg. below 0 ; and, as the colder it is, the more rapidly this heat passes off from the body, some means must be contrived for manufacturing, the more heat the colder it is ; and for manufacturing, the less the warmer it is, so as to keep the body just warm enough, and none too warm. This is effected by a self-acting instrumentality as simple as it is efficient, as follows :—The colder it is, the more dense the atmosphere ; that is, the greater the quantity of both oxygen and nitrogen it contains in any given bulk. Hence, supposing a male subject inhales at each respiration about three pints of air, as is generally estimated, he of course inhales a much greater amount of oxygen in cold weather than in warm, and a less quantity in summer when he gives off less heat. So that in the very changes of the atmosphere from warm to cold, provision is made for increasing the combustion of oxygen, and the generation of heat within the system. The perfectly healthy subject, therefore, needs much less artificial or external fire in winter than is generally supposed, because nature has provided an increased supply of fuel in the atmosphere in proportion to the increased demand. But we shall recur to this subject again when we come to treat of clothing.

SUMMER AND WINTER FOOD.

This principle of animal food also shows why we require more food, and more highly carbonized food, in winter than in summer. As a given amount of oxygen, active or sluggish, can burn up only a fixed proportion of carbon, and as this supply of oxygen is much greater the colder the weather, of course the corresponding re-supply of carbon to be derived from food must be proportionally increased. And so it is. Appetite is almost always greater in cold weather than in warm, and craves more highly-carbonized kinds of food. Thus the fat of meat which consists of 79 per cent., or nearly four-fifths carbon, relishes much better in winter than in summer. So do butter, oils, honey, and the like. Hence the Esquimaux can drink down gallons of train-oil, and eat from ten to twenty pounds of meat per day, or fourteen pounds of candles at a meal. The great condensation of the air consequent on extreme cold, allows them to inhale proportionate quantities of oxygen, to burn up which they must have this great supply of carbon. We should, therefore, eat more in cold weather than warm, and eat food richer in carbon. This brings up our unfinished argument about meat in winter.

The advocates of a flesh diet maintain that meat is indispensable in winter, to supply the increased demand for carbon. That we need more carbon, and of course food more highly charged with carbon in winter than summer, is granted. Yet their argument is completely overthrown by the fact that vegetable food contains, in the aggregate, as much carbon as animal. Thus, roasted flesh contains only 52 per cent. of carbon, while eggs contain 53, and bees'-wax 81. This shows why some relish bees'-wax, namely, for its carbon. The albumen of wheat contains 55 per cent of carbon, and that of almonds 57. Indian corn contains a great amount of carbon, so do molasses. In fact, abstract the water from molasses, and the remainder is all carbon ; so that molasses and Indian meal form an excellent winter diet. So do bread and molasses. All vegetable oils are composed of about four-fifths of carbon, and as drop after drop of this oil can be pressed out of a walnut, or butternut, of course these nuts furnish a far greater proportion of carbon than lean meat. Why not, then, seek in nuts and vegetable oils the carbon, to obtain which you say we must eat meat ? That is, why not eat nuts in place of meat ? Chestnuts should be boiled, and other nuts should be well cured, yet they were undoubtedly created to subserve the purposes of food, and should form a part of our regular winter meals. Nor are nuts inferior to butter as a relish with bread. Sugar, and sweets generally, contain

from 40 to 45 per cent of carbon, according to their dryness or wetness. Hence also, as their water is easily taken up by the stomach, they may justly be considered as nearly all carbon. Nearly the whole of honey, after its water has been abstracted, is carbon. Olives, and olive-oil also contain carbon in far greater proportion than meat. We do not, therefore, need to go to the animal kingdom for carbon, when we can obtain it, in forms much more concentrated, from the vegetable. True, we can obtain it from meat, especially fat meat, but we can obtain all we require from vegetables, without any of the evils of meat-eating. Then why seek that carbon in flesh—flesh often diseased—which we can obtain from vegetable diet in greater abundance, and in a healthy state?

The sufficiency of vegetables for winter food is still farther established by the fact that horses, cattle, and even reindeer—all gramini-vora—are kept abundantly warm by their natural diet, though they inhabit regions quite as cold as any of the carnivora. And indeed the carnivora are more abundant, relatively, in the torrid zone, than colder regions—a fact which tears this winter meat-eating argument in tatters. If meat is so conducive to animal heat and life, why are lions, tigers, etc., confined to warm climates? As oats keep the *horse* abundantly warm in winter, why not oatmeal keep *man* warm enough? Ask the Highland Scotch from time immemorial, if their oat-meal cakes and porridge have not kept them warm enough to camp out even in winter, with snow for the pillow and blanket.

But the great difficulty of civilized life, is, not to get carbon enough, but to get *little* enough. This is especially true of the sedentary. They breathe but little, because they exercise little, and because they live mostly in heated rooms, where the air is both rarefied and vitiated. Hence they take in but little oxygen, and therefore require but little carbon to burn it up. Yet such eat, and keep eating, as heartily as out-door labourers, and often more; thus taking in great quantities of carbon while they consume but little. Hence their dyspeptic complaints and other difficulties. No; few, if any, require more carbon than they now obtain, even in winter; whereas ninety-nine in every hundred would be benefitted by lessening the quantity one half, especially in summer. Its super-abundance is the great cause of disease, of which fasting and the use of less highly carbonized food and more oxygen, are the remedies. All who feel better when cold weather sets in, super-abound in carbon, and by taking less of it in food would be cured. But that very cold which brings their relief sharpens up appetite, and they take still more carbon; thus keeping up both its superabundance and their disease; whereas if they would not increase such quantity, meanwhile breathing freely so as to burn up its surplus, they would obtain permanent health. And such, in fact all, to be healthy, *must* diminish the quantity of carbon taken in food in spring, compared with winter. The great cause of the prevalence of diseases in the spring, is to be found in our eating as much carbon then as in winter; whereas we burn out, and therefore require far less. And one of the great instrumentalities of health is to be found in keeping the amount of carbon received from food, in proportion to that of oxygen inspired from breath.

We dismiss this subject of animal heat, for the kindred one of the necessity of fresh air. Oxygen being indispensable to life, and being derived mainly from the air, the necessity for constant and copious re-supplies of fresh and well oxygenated air becomes obvious. And to this the experience of every human being bears testimony. How dull and stupid we all feel after sitting awhile in a hot room, especially if heated by an air-tight stove—an article I would never sit by if I could help it, because, while it rarefies the air so that we can breathe but little oxygen, even if the air were fresh, it prevents its circulation in the room, so that we soon breathe out most that remains. Hence

the accompanying stagnation of the blood, and lethargy of body and mind. But start out into the fresh air, and how differently you feel! How lively your body! How brisk all your feelings! How clear the mind! How happy the whole man! Every human being ought to spend several hours every day, cold or warm, in the open air, coupled with much bodily activity. Four hours of out-door breathing daily, is the least time compatible with health for adults. Eight hours are better. Children require a greater amount both of out-door air and exercise, because they have a higher temperature, and greater vigour in the circulation. The circulation has more to do in them than in adults—it has to *build up* as well as *sustain* the system. Shutting children up in the house, even in cold weather, is consummate folly—it is downright murder. There is no numbering the deaths this extra carefulness has occasioned. Why, cool air is not poisonous. It is healthy—more so than warm; because, for its bulk, it contains more oxygen, that great quickener of the blood, and stimulator of muscular, nervous, and cerebral action. If a heated atmosphere had been best for man, nature would have provided it. But it is not. It relaxes. All the inhabitants of the tropics are indolent, mentally and physically. All northerners, however active here, are rendered indolent in a tropical climate. Hence the requisition of more or less cold to stir up the system. And unless you who are parents wish to make inert blockheads of your children, you should never keep them shut up in a hot room. However cold it is, let them out—for all children delight to go out—and their lungs will soon warm them and keep them warm. And if your dear, darling, delicate, puny child is indeed so weak, that fresh air gives it a cold, you ought to be sent to prison for rendering it thus tender—or rather, you ought not to have any child at all.

This brings up for condemnation—the vitiated atmosphere of school-rooms. Schools are great disease-breeders to both body and mind. Children require action, not confinement. They should learn on foot, not ‘sit on a bench and say A.’ Especially should they have an abundance of fresh air. To confine two or three score children in a school-house sixteen by twenty feet—enough to breathe up all the air it contains in a few minutes—and to burn out the vitality of even this moiety by a roaring fire—and to keep them thus, stuffed with food, but panting for breath and action, *one quarter of their lives*, and most of the remainder not much better, signs, seals, and delivers the death-warrant of many a fond and lovely embryo of humanity. Our children do not get half air enough. This occasions their being puny, sickly, and mortal. No wonder that half of them die in childhood. The wonder is that more do not.

Nor are cities the places to bring up children. They cannot go out of doors for fear of getting lost or run over, nor play within door, because ma, grandma, or aunt is sick. Nor, if they could, can they obtain fresh air in heated nurseries or kitchens. God made the country—man made the city. Cities are useful chiefly to heap up paltry gold. The country, ‘that’s the place for me.’ But, parents, whether you inhabit city or country, see to it, I beseech you, that your children have a full supply of FRESH AIR DAILY AND PERPETUALLY.

Our subject also shows the absolute necessity of ventilation in general, to say nothing of the importance of ventilating churches, lecture-rooms, and places of general concourse. Hear A. Combe on this subject.

‘The fatal effects of breathing highly vitiated air may easily be made the subject of experiment. When a mouse is confined in a large and tight glass-jar full of air, it seems for a short time to experience no inconvenience; but in proportion as the consumption of oxygen and the exhalation of carbonic acid proceed, it begins to show symptoms of uneasiness, and to pant in its breathing, as if struggling for air; and in a

few hours it dies, convulsed exactly as if drowned or strangled. The same results follow the deprivation of air in man and in all animated beings; and in hanging, death results not from dislocation of the neck, as is often supposed, but simply because the interruption of the breathing prevents the necessary changes from taking place in the constitution of the blood.

'The horrible fate of one hundred and forty-six Englishmen who were shut up in the Black Hole of Calcutta, in 1756, is strikingly illustrative of the destructive consequences of an inadequate supply of air. The whole of them were thrust into a confined place, eighteen feet square. There were only two very small windows by which air could be admitted, and as both of these were on the same side, ventilation was utterly impossible. Scarcely was the door shut upon the prisoners, when their sufferings commenced, and in a short time a delirious and mortal struggle ensued to get near the windows. Within four hours, those who survived lay in the silence of apoplectic stupor; and at the end of six hours NINETY-SIX were relieved by death! In the morning, when the doors were open, twenty-three only were found alive, many of whom were subsequently cut off by putrid fever, caused by the dreadful effluvia and corruption of the air.

'But, it may be said, such a catastrophe as the above could happen only among a barbarous and ignorant people. One would think so; and yet such is the ignorance prevailing amongst ourselves that more than one parallel to it can be pointed out even in our own history. Of two instances to which I allude, one has been lately published in the 'Life of Crabbe,' the poet. When ten or twelve years of age, Crabbe was sent to a school in Bungay. Soon after his arrival, he had a very narrow escape. He and several of his school-fellows were punished for playing at soldiers by being put into a large dog-kennel, known by the terrible name of the 'Black Hole;' George was the first that entered, and the place being crammed full with offenders, the atmosphere became pestilentially close. The poor boy in vain shrieked that he was about to be suffocated. At last, in despair, he bit the lad next to him violently in the hand: 'Crabbe is dying! Crabbe is dying!' roared the sufferer; and at length the sentinel opened the door, and allowed the boys to rush out into the air. My father said, 'A minute more, and I must have died.'—*Crabbe's Life, by his Son.*

'The other instance is recorded in Walpole's Letters, and is the more memorable because it was the pure result of brutal ignorance, and not at all of cruelty or design. 'There has been lately,' says Walpole, 'the most shocking scene of murder imaginable; a parcel of DRUNKEN constables took it into their heads to put the laws in execution against disorderly persons, and so took up every person they met, till they had collected five or six and twenty, all of whom they thrust into St. Martin's round house, where they kept them all night with doors and windows closed. The poor creatures, who could not stir or breathe, screamed as long as they had any breath left, begging at least for water. One poor wretch said she was worth eighteen-pence, and would gladly give it for a draught of water, but in vain! So well did they keep them there that in the morning four were found stifled to death; two died soon after, and a dozen more are in a shocking way. In short, it is horrid to think what the poor creatures suffered. Several of them were beggars, who, from having no lodging, were necessarily found on the street, and others honest labouring women. * * *

Our author next gives the case of two persons confined in the cabin of a vessel, who perished from want of air. He might, if he had written a little later, have given the awful case of a steamer that sailed from Londonderry to Liverpool about a year ago. The weather was somewhat stormy, and the captain forced the passengers down into the hold, and fastened down the hatches. The consequence was, that in a few hours from seventy to eighty persons perished.

The writer then proceeds as follows :—

‘I do not mean to say that in the above instances the fatal results were attributable exclusively to vitiation of the air by breathing. Fixed air may have been disengaged also from some other sources ; but the deteriorating influence of respiration, where no ventilation is possible, cannot be doubted. According to Dr. Bostock’s estimate, an average sized man consumes about 45,000 cubic inches of oxygen, and gives out about 40,000 of carbonic acid in twenty-four hours, or 18,750 of oxygen, and 16,666 of carbonic acid in ten hours, which is nearly the time during which the sufferers had remained in the cabin before they were found. As they were two in number, the quantity of oxygen which would have been required for their consumption was equal to 37,500 cubic inches, while the carbonic acid given out would amount to upwards of 32,000 inches—a source of impurity which, added to the constant exhalation of waste matter and animal effluvia from the lungs, was manifestly quite equal to the production of the serious consequences which ensued from it, and which no one, properly acquainted with the conditions essential to healthy respiration, would ever have willingly encountered. Even supposing that the cause of death was some disengagement of gas within the vessel, it is still certain that, had the means of ventilation been adequately provided, this gas would have been so much diluted, and so quickly dispersed, that it would have been comparatively innocuous.

‘The best and most experienced medical officers of the army and navy, and always the most earnest in insisting on thorough ventilation, as a chief preservative of health, and as indispensable for the recovery of the sick. Sir George Ballingall refers to it frequently, and shows the importance attached to it by Sir John Pringle, Dr. Jackson, Sir Gilbert Blane, and others of equally high authority. Sir John Pringle speaks of hospitals being in his day the cause of much sickness, and of frequent deaths, ‘on account of the bad air and other inconveniences attending them ;’ and Dr. Jackson in insisting on ‘height of roof as a property of great importance in a house appropriated to the reception of the sick of armies,’ adds as a reason ‘that the air being contaminated by the breathings of a crowd of people in a confined space, disease is originated, and mortality is multiplied to an extraordinary extent. It was often proved in the history of the late war, that MORE HUMAN LIFE WAS DESTROYED BY ACCUMULATING SICK MEN IN LOW AND ILL VENTILATED APARTMENTS, THAN BY LEAVING THEM EXPOSED, IN SEVERE AND INCLEMENT WEATHER AT THE SIDE OF A HEDGE OR COMMON DIKE.

‘In the same volume (p. 114) the reader will find another example not less painful than instructive, of the evils arising, first, from crowding together a greater number of human beings than the air of the apartment can sustain, and, secondly, from the total neglect of scientific rules in effecting ventilation. In the summer of 1811 a low typhoid fever broke out in the 4th battalion of the Royals, then quartered in Sterling Castle. In many instances, violent inflammation of the lungs supervened, and the result of the two diseases was generally fatal. On investigating the circumstances of this fever, it was found that rooms of twenty-one feet by eighteen were occupied by SIXTY men, and that others of thirty-one feet by twenty-one were occupied by SEVENTY-TWO men ! To prevent suffocation the windows were kept open all night, so that the men were exposed at once to strong currents of cold air, and to ‘the heated and concentrated animal effluvia necessarily existing in such crowded apartments ; thus subjecting them to the combined effects of typhus fever, and of pneumonic inflammation. In the less crowded apartments of the same barrack no instances of fever occurred. The men who were directly in the way of the current of cold air were of course those who suffered from inflammation.

‘Mr. Carmichael justly regards impure air as one of the most powerful causes of scrofula, and accounts for the extreme prevalence of the

disease in the Dublin House of Industry at the time he wrote, (1809), by mentioning that in one ward of moderate height, sixty feet by eighteen, there were *thirty-eight beds*, each containing *three* children, or more than one hundred in all! The matron told Mr. Carmichael, 'There is no enduring the air of this apartment when the doors are first thrown open in the morning; and it is in vain to raise any of the windows, as those children who happen to be inconvenienced by the cold close them as soon as they have an opportunity. The air they breathe in the day is little better: many are confined to the apartments they sleep in, or crowded to the number of several hundreds in the school room.' Can any one read this account, and wonder at the presence of scrofula under such circumstances.

The due ventilation of sleeping apartments is still more important, because we consume quite as great a proportion of air asleep as awake, yet are far more liable to neglect its re-supply. Most of us spend one-third of our lives in little eight by ten feet bed rooms, scarcely seven feet high, and capable of holding only from five to seven hundred feet of air—scarcely enough for an hour's breathing! And then every crevice, even to the key hole, must be stuffed to prevent the ingress of fresh air. Look at our factory operatives—often six persons confined all night in a little room not exceeding ten feet square, and seven high! No wonder their vocation is unhealthy. And then how repulsive the smell of bed-rooms generally in the morning, observable on quitting them a few minutes, and returning. Instead of being thus miserably supplied with fresh air, they should be large, and especially high, and arranged so as to admit free ventilation. A draft directly upon you may be objectionable, yet even this is less so than confined air. Large airy sleeping apartments would add one-fourth to the aggregate duration of human life. The bed-rooms should be the largest rooms in our houses.

Yet the general idea obtains that night-air is unwholesome and often pestilential. Nothing is more unfounded. The Deity render night-air unwholesome, and then compel us to breathe it! This supposition conflicts with the whole economy of nature. If night-air had been really injurious nature would have allowed us to sleep without breathing, for she never compels the least thing injurious. Night air is as wholesome as day air. It may be damper, but that does not hurt it for breathing purposes. It is usually cooler, and, therefore, contains more oxygen, and is, therefore, even better than day-air—at least for sleeping purposes. Why we are so restless in hot summer nights, and why do we sleep so sweetly, and wake up so invigorated, in cold Autumn nights, but because the needed supply of oxygen is so much greater in the latter instance! So far from being injurious, I give it as my deliberate opinion that sleeping with open windows would greatly promote health. I prefer to do so, however stormy or boisterous the weather, and know of several who sleep thus summer and winter, every one of whom is remarkably robust and healthy. Yet if you adopt this practice, adopt it by degrees, so as not to take cold.

Special attention is invited to blue veins, a sign of insufficient breathing. The blood is rendered dark by the carbon it has taken up. And the darker it is, the greater the amount of carbon in it. Now this carbon should pass off through the lungs, and it will do so when we breathe abundantly. But when we do not, a sufficient amount of the nitrogen contained in the air we breathe is not brought alongside of the carbonic acid contained in the blood to carry it all off, so that it is obliged to return into the blood into the system, and, being a rank poison, it poisons and prostrates the vital organs, diminishes life, and engenders disease. Blueness of veins in children or adults is a sure index of the superabundance of this poison and of insufficient breathing. Let such both eat less and breathe more, so as to thin and redden the blood. True, the blood in the veins should be dark, but not dark enough to

show through. And when visible, see to it, as you value life, that this powerful disease-breeder is removed by a more thorough oxydization of the blood.

An entire volume might be written on this subject of ventilation ; but all-important as it is, our proposed limits do not allow it farther prosecution. We say in conclusion, attend to breathing as much as to eating. Make provision for a constant re-supply of fresh as much as for good food. And ye parents, see that your children have it in luxurious abundance night and day.

PERSPIRATION, OR THE STRUCTURE, FUNCTIONS, AND CLEANSING OF THE SKIN.

WATER ESSENTIAL TO LIFE.

Water covers a great part of the earth's surface, and constitutes a large proportion of all that lives. Nor can anything grow without it, nor can any dry thing live. The ancients supposed it the parent of all endowed with life, and experience teaches us that without it plant and animal parch up and die.

Man cannot live without it. Indeed three-fourths of him are composed of water, and so are four-fifths of his blood. Whether this element is required on its own account, or as the great PORTER of the system, we will not now stop to enquire ; but, be its use what it may, it is even as essential to life as solid food.

If asked—'How then could Dr. Alcott live over a year without drinking a drop of liquid, and even without experiencing thirst?' I answer—All we eat contains water. Meat consists of about three-fourths water ; carrots, beets, turnips, potatoes, and cabbages, about nine-tenths ; eggs about seven-tenths ; milk nearly nine-tenths ; and thus of other kinds of food. So that we cannot eat without introducing it into the animal economy.

But man was undoubtedly ordained to drink as well as eat. To this end he has a drinking organ—Bibativeness, or Aquativeness—located anteriorly to Alimentiveness, adapting him both to the existence of water and this constitutional demand for drink. Water is also manufactured throughout every portion of the system. Whether we drink water or not, whether it abounds in the system or is deficient, we are obliged to receive hydrogen in the system with our food, and oxygen through our lungs, so that these two gasses are forced into close proximity in the capillary blood-vessels, and whenever thus brought together, they unite in the proportion to form water till one or the other is consumed. So that with all this demand for water, man could probably exist without taking any water except in his food.

The water thus taken into the system and manufactured within it does not remain there. It is perpetually given off through the lungs, the skin, and every avenue of escape throughout the body. The amount given off by a healthy adult daily, is estimated at about forty ounces, though it varies in different individuals, and in the same individual at different times, according as he drinks, exercises himself, and the like, much or little.

The lungs exhale large quantities of water, as seen in breathing upon glass, and its freezing on the beard in a cold morning. The moisture expired with the breath in a crowded room also occasions that 'sweating' of the windows so often observed.

But the great outlet for the escape of water, after it has fulfilled its mission of life, is the skin. This thin and exceedingly tough membrane is stretched over the entire body, and also lines all its apertures. It consists of three coatings—the cuticle or epidermis, a horny, insensible over-coat, such as we see often rubbed up by bruises and raised in blisters. This outside skin is thin over the joints, so as not to obstruct their motion, but thick in the palms of the hands and soles of

the feet, even from birth. The second coating, called *rete mucosum*, or mucous network, constitutes the middle coating, and contains that colouring matter which gives the various races their various colours. The *cutis, dermis*, or true skin, is the great instrumentality of sensation, absorption, and exhalation.

This cutis is perfectly full of little pores, thousands being contained in every square inch. It is also filled with two sets of capillary nerves and blood-vessels, the latter being especially numerous here, so as to support the former, and thus create sensation. Indeed it is probably composed mainly by these tissues, and its innumerable pores are probably formed by their interweaving. Through these pores the waste water, and much of the excrementitious matter engendered during the vital process, escapes, causing the perspiration to be sensible or insensible according as it is more or less copious. Sensible perspiration causes sweat to ooze out and stand in drops, or run down in streams, from the body, as when we take violent exercise in hot weather, drink copiously of warm water and the like.

Insensible perspiration is perpetually taking place from all parts of the skin. This may be ascertained by inserting the hand in a glass tumbler turned bottom upwards, or by laying the hand on glass, or even drawing the finger slowly across it.

A contrivance so deeply laid as this of perspiration, cannot but perform some most important end in the animal economy. And so it does. These forty ounces of water do not stream forth perpetually from the system alone, but bring along out with them much of the waste matter engendered by the vital process. The process of life is one of perpetual waste. It is estimated that all the matter in the system, at any given time, becomes useless, because its vitality is 'used up,' is carried off, and its place re-supplied by foreign substances, every seven years. Probably half that time would be nearer the fact. Of course if this matter were allowed to remain where it is created, the system would soon be choked up. To prevent this, it is carried off as fast as it is manufactured.

It is carried off by that same porter which brought it—WATER. As the blood brings a load of oxygen, and, as soon as it is unloaded, takes on the carbonic acid created by the combustion of the oxygen, so after the water in the blood has brought out and deposited its freight of fresh muscle, nerve, etc., it takes on another freight of waste matter, and issues forth out of the system in the form of steam.

More than half of the refuse of all we eat, drink, and take into the system is thus carried off. Though the kidneys, bowels, and lungs do their share in evacuating this waste matter, yet the skin is the great sluice-way—the great scavenger of life, which collects up the leavings and fith out of the highways and byways of the system, and empties them out.

This shows the importance of keeping the pores of the skin open. If these pores be closed, this waste matter both clogs the organs of life on the one hand, and breeds disease in the system on the other. For be it remembered, that most of this waste matter, like carbonic acid, is POISONOUS as well as in the way. It *must pass out*, or extinguish life. A. Combe ably enforces this point as follows:—

'In tracing the connection between suppressed perspiration and the production of individual diseases, we shall find that those organs which possess some similarity of function, sympathise most closely with each other. Thus the skin, the bowels, the lungs, the liver, and the kidneys, sympathise readily, because they have all the common office of throwing waste matter out of the system, each in a way peculiar to its own structure; so that if the exhalation from the skin, for example, be stopped by long exposure to cold, the large quantity of waste matter which it was charged to excrete, and which in itself is hurtful to the system, will most probably be thrown upon one or other of the above-named organs,

whose functions will become consequently excited, and if any of them from constitutional or accidental causes, be already weaker than the rest, as often happens, his health will naturally be the first to suffer. In this way, the bowels of one individual become irritated, and occasion bowel complaint; while in another it is the lungs which become affected, giving rise to cartarrh, or common cold, or perhaps even to inflammation. When, on the other hand, these organs are in a state of vigorous health, a temporary increase of function takes place in them, and relieves the system, without leading to any local disorder; and the skin itself especially resumes its activity, and restores the balance among them.

‘ One of the most obvious illustration of this reciprocity of action is afforded by any convivial company seated in a warm room in a cold evening. The heat of the room, the food and wine, and the excitement of the moment, stimulate the skin, cause an efflux of blood to the surface, and increase in a high degree the flow of the insensible perspiration; which thus, while the heat continues, carries off an undue share of the fluids of the body, and leave the kidneys almost at rest. But the moment the company goes into the cold external air, a sudden reversal of operations take place; the cold chills the surface, stops the organs, which presently become excited—and, under this excitation, the kidneys, for example, will in a few minutes secrete as much of their peculiar food as they did in as many of the preceding hours. The reverse of this again is common in disease obstructing the secretion from the kidneys; for the perspiration from the skin is then altered in quantity and quality, and acquires much of the peculiar smell of the urinary fluid.

‘ When the lungs are weak, and their lining membrane is habitually relaxed, and secretes an unusual amount of mucus from its surface, the mass thrown inwards upon the lungs by cold applied to the skin, increases that secretion to a high degree. Were this secretion to accumulate, it would soon fill up the air-cells of the lungs, and cause suffocation; but to obviate this danger, the Creator has so constituted the lungs, that accumulated mucus or any foreign body coming in contact with them, excites the convulsive effort called coughing, by which a violent and rapid expiration takes place, with a force sufficient to hurry the mucus or other foreign body along with it; just as peas are discharged by boys with much force through short tubes by a sudden effort by blowing. Thus, a check given to perspiration by diminishing the quantity of blood previously circulating on the surface, naturally leads very often to increased expectoration and cough, or, in other words, to common cold.

‘ The lungs excrete, as already noticed, and as we shall afterwards more fully see, a large proportion of waste materials from the system; and the kidneys, the liver, and the bowels, have in so far a similar office. In consequence of this alliance with the skin, these parts are more intimately connected with each other in healthy and diseased action than with other organs. But it is a general law that whenever an organ is usually delicate, it will be affected by any cause of disease more easily than those which are sound: so that if the nervous system, for example, be weaker than other parts, a chill will be more likely to disturb its health than that of the lungs, which are supposed, in this instance, to be constitutionally stronger; or if the muscular and fibrous organisations be unusually susceptible of disturbance, either from previous illness or from natural predisposition, *they* will be the first to suffer, and rheumatism may ensue; and so on. And hence the utility to the physician of an intimate acquaintance with the previous habits and constitutions of his patients, and the advantage of adapting the remedies to the nature of the cause when it can be discovered, as well as to the disease itself. A bowel complaint, for instance, may arise from

over-eating, as well as from a check to perspiration ; but although the thing to be cured is the same, the MEANS of cure ought obviously to be different. In the one instance, an emetic or laxative to carry off the offending cause, and in the other a diaphoretic to open the skin, will be the most rational and efficacious remedies. Facts like these expose well the glaring ignorance and effrontery of the quack, who affirms that his one remedy will cure every form of disease. Were the public not equally ignorant with himself, their credulity would cease to afford to his presumption the rich field in which he now revels.

‘The close sympathy between the skin and the stomach and bowels has often been noticed, and it is now well understood that most of the obstinate eruptions which appear on the face and the rest of the surface, owe their origin to disorders of the digestive organs, and are most successfully cured by treatment directed to the internal disease. Even among the lower animals, the sympathy between the two is so marked as to have arrested attention. Thus, in speaking of the horse, Delabere Blaine says, ‘By a well-known consent of parts between the skin and alimentary canal in general, but between the first passage and the stomach in particular, it follows, in almost every instance, that when one of these becomes affected, the other takes on a sympathetic derangement also, and the condition is then morbid throughout. From close observation and the accumulation of numerous facts, I am disposed to think, that so perfect is this sympathetic consent between these two distant parts or organs, that they change the order of attack as circumstances occur. Thus, when the skin is primarily affected, the stomach becomes secondarily so, and ‘vice versa,’ so that ‘a sudden check to the natural or acquired heat of the body, particularly if aggravated by the evaporation of a perspiring state, as often brings on disease of some internal organ, as if the cause were applied to the organ itself.

‘In noticing this connection between the suppression of perspiration and the appearance of internal disease, I do mean to affirm that the effect is produced by the physical transference of the suppressed exhalation to the internal organ. In many instances, the chief impression seems to be made on the nervous system ; and the manner in which it gives rise to the resulting disease is often extremely obscure. Our knowledge of the animal function is, indeed, still so imperfect, that we daily meet with many occurrences of which no explanation can be given. But it is, nevertheless, of high utility to make known the fact, that a connection does exist between two orders of phenomena, as it calls attention to their more accurate observation, and leads to the adoption of useful practical rules, even when their mode of operation is not understood. Nothing, indeed, can be more delusive than the rash application of mere physical laws to the explanation of the phenomena of living beings. Vitality is a principle superior to, and in continual warfare with, the laws which regulate the actions of inanimate bodies ; and it is only after life has become extinct that these laws regain the mastery, and lead to the rapid decomposition of the animal machine. In studying the functions of the human body, therefore, we must be careful not to hurry to conclusions, before taking time to examine the influence of the vital principle in modifying the expected results.

‘It is in consequence of the sympathy and reciprocity of action existing between the skin and the internal organs, that burns and even scalds of no very great extent prove fatal, by inducing internal, generally intestinal, inflammation. By disordering or disorganizing a large nervous and exhaling surface, an extensive burn causes not only a violent nervous commotion, but a continued partial suspension of an important excretion ; and, when death ensues at some distance of time, it is almost always in consequence of inflammation being excited in the bowels or sympathizing organ. So intimate, indeed, is this connection, that some surgeons of great experience, such as the late Baron

DUPUYTREN, of the Hotel Dieu, while they point to internal inflammation as in such cases the general cause of death, doubt of recovery ever takes place, when more than one-eighth of the surface of the body is severely burnt. And whether this estimate be correct or not, the facts from which it are drawn clearly demonstrate the importance of the relation subsisting between the skin and the other excreting organs.

'In some constitutions, a singular enough sympathy exists between the skin and the bowels. Dr. A. T. THOMSON, in his work on *Materia Medica*, (p. 42,) mentions that he is acquainted with a clergyman who cannot bear the skin to be sponged with vinegar and water, or any diluted acid, without suffering spasm and violent griping of the bowels. The reverse operation of this sympathy is exemplified in the frequent production of nettle-rash and other eruptions on the skin, by shell-fish and other substances taken into the stomach. Dr. Thomson tells us, that the late Dr. Gregory could not eat the smallest portion of the white of an egg, without experiencing an attack of an eruption like nettle-rash. According to the same author, even strawberries have been known to cause fainting, followed by a petechial efflorescence of the skin.

'We have seen that the insensible perspiration removes from the system, without trouble and without consciousness, a large quantity of useless materials and at the same time keeps the skin soft and moist, and thereby fits it for the performance of its functions as the organ of an external sense. In addition to these purposes, the Creator has, in his omniscience and foresight, and with that regard to simplicity of means which betokens a profoundness of thought inconceivable to us, superadded another, scarcely less important, and which is in some degree implied in the former; I mean the proper regulation of the bodily heat. It is well known that, in the polar regions and in the torrid zone, under every variety of circumstances, the human body retains nearly the same temperature, however different may be that of the air by which it is surrounded. This is a property peculiar to life, and, in consequence of it, even vegetables have a power of modifying their own temperature, though in a much more limited degree. Without this power of adaptation, it is obvious that man must have been chained for life to the climate which gave him birth, and even then have suffered constantly from the change of seasons; whereas, by possessing it, he can retain life in a temperature sufficiently cold to freeze mercury, and is able for a time to sustain, unharmed, a heat more than sufficient to boil water, or even to bake meat. Witness the wintering of Captain Parry and his companions in the Polar Regions; and the experiments of Blagden, Sir Joseph Banks, and others, who remained for many minutes in a room heated to 260 deg., or about 50 deg. above the temperature of boiling water. The chief agents in this wonderful adaptation of man to his external situation, are undoubtedly the skin and lungs, in both of which the power is intimately connected with the condition of their respective exhalations. But it is of the skin alone, as an agent in reducing animal heat, that we are at present to speak.

'The sources of animal heat are not yet demonstrably ascertained; but that it is constantly generated and constantly expended has been long known; and if any considerable disproportion occurs between these processes, it is at the immediate risk of health. During repose, or passive exercise, such as riding in a carriage or sailing, the surplus heat is readily carried off by the insensible perspiration from the lungs and skin, and by the contact of the colder air; but when the amount of heat generated is increased, as during excessive exercise, an increased expenditure becomes immediately necessary.'

COLDS AND THEIR CONSEQUENCES.

Colds are caused by SUPPRESSED PERSPIRATION. Cold contracts. Hence a sudden change of the temperature of the skin from heat to cold, causes its pores to contract; and some of them to close. This shows why we perspire so little in colds, especially obdurate colds—and also in fevers. Nor do colds consist in anything else than this closing of these pores. And the injury they inflict arises mainly from their shutting up this waste matter in the system. And the reason why, during colds, the lungs, nose, etc., discharge copiously a thick, yellow phlegm, is, that this corruption, shut in by the closing of these pores, is carried to the lungs, and converted into phlegm, to the kidneys, bowels, and even to the brain, and discharged through the nose and all the other outlets; and hence that increase of all these secretions as mentioned by Combe.

Many of us know by experience, that these colds are exceedingly troublesome—know how dull, feverish, restless, and miserable they render us, and how full of aches and pains they sometimes fill us. Colds are a great cause of tooth-aches. If you have a bad tooth, it rarely troubles you except after you have taken cold, and the way to cure this painful malady is, to cure that cold which is its exciting cause.

Fevers are too mainly the result of colds. Both fever and ague make their attacks in company with colds. Avoid colds and you escape them. And those occasional distempers or epidemics which sweep over city and country, affecting nearly all, prostrating many, and cutting off more or less in the midst of life, are generally only colds, and are thus prevalent because certain states of the atmosphere have conspired to occasion colds, and these colds occasion choleras, influenzas, or other diseases. Avoid these colds, and these plagues will pass you by. But you cannot have a cold without having more or less of fever. Hence the fallacy of that proverb, 'stuff a cold and starve a fever,' for colds cause fevers. Bilious attacks, and the like, will also be found often to follow very severe colds. They generally commence with chills, as colds do. And though the stomach is also disabled, the stomach, would not have been broken down in those attacks but for the cold. It may have been previously foul, and thus generated, by means of imperfect digestion, a great amount of corruption; still, open pores would have contrived to carry it off; whereas, this outlet closed, it accumulates, obstructs, poisons, and at length prostrates the system, perhaps destroys life. I regard colds as the cause of more than half the diseases of our climate—of nearly *all* except those created by impaired digestion. Keep *clear* of colds, and you will generally escape disease. As so much of the waste matter of the vital process escapes through the skin, why should not the closing of this avenue occasion so great a proportion of the diseases prevalent? Many will think I attribute more disease to colds than really belongs to them; but let such look at the universal fact, that they always precede and induce consumption, that great mower of human life. Did you ever know a consumptive patient whose attack did not set in after a terrible cold—a cold generally protracted and aggravated? Colds induce coughs, as just explained by Combe, and that pulmonary irritation, cough, and final consumption of the lungs, which constitutes this mortal enemy to life, consist in nothing more or less than an obstinate cold. I care not how predisposed, hereditarily or otherwise, persons may be to consumption, they will seldom have it till they take a 'heavy cold.' Those predisposed to consumption, should in a special manner guard against contracting colds, and when they take cold, they should break them up as QUICKLY AS POSSIBLE; for their life depends upon the issue.

Children still farther illustrate this principle. They rarely if ever sicken till they get COLD. Of the correctness of this assertion, let ob-

servation be the test. All colds do not make them quite sick, yet they very rarely become sick till they have taken cold. Keep them from taking cold, and I will guarantee them against sickness. Even when their disease appears to be seated in the stomach or other organs, its origin will generally be suppressed perspiration, as shown in the extracts from Combe. Almost all cramps and lung difficulties, are products of colds. So are almost all brain-fevers. So are influenzas, and almost all complaints incident to childhood. Keep the young from taking colds, or break up all colds as soon as contracted, and they will seldom be sick.

Rheumatic affections also prove and illustrate our doctrine. It is submitted to all thus afflicted, be it more or less, whether these pains in their joints, muscles, and bones are not doubled and re-doubled every time they take cold.—The same holds true of the head-ache—often a rheumatic affection of the brain.

An anecdote. While lecturing in East Bradford, Mass., in 1844, a promising youth took a most violent cold which induced a corresponding violent fever, and hurried him into his grave. Another brother, while attending the funeral of this one, also took a terrible cold, which in a few days swept him also into eternity! A sister, exhausted by watching this brother, also took a very severe cold while attending his funeral, and, in consequence, was soon bereft of reason, and then attacked with a scorching fever, of which she died in about a week. All three deaths were distinctly traceable to colds. Three or four other members of this self-afflicted family were also sick simultaneously of colds, the weather at the time of these funerals being particularly unfavourable.

Reader, trace the sickness around you and back up to its cause, and you will be surprised to find colds the author of so many. Recall your own ailings, and see if this principle does not explain the origin of many of them.

But why particularize farther? Do not the experience and the observation of most prove that colds are one of the chief causes of disease?

The prevention of colds, therefore, becomes a very important matter. To consumptive subjects, such prevention is life, as these colds are death. How, then, can they be prevented?

1. BY KEEPING THE SKIN ACTIVE. The system manufactures a great amount of heat. That heat is abundant at the surface, so as to fortify it against those changes of temperature which affect the skin mainly. Hence the great accumulation of blood-vessels at the surface of the body. Probably no part of the body, the head possibly excepted, is so abundantly supplied with blood-vessels as the skin. Hence its warmth. Now vigorous circulation will keep these pores so warm as to resist the closing action of the external cold. In such cases these atmospheric changes do no evil. They close the pores only when the surface circulation has become impaired. Keep that vigorous, and it will ward off all colds, extreme cases of exposure excepted. Whatever tends to promote the activity of the skin, fortifies the system against colds. The two means of promoting such action, are the promotion of circulation in general, and the external application of friction and water.

To say nothing of the ablution of the entire person as a means of cleanliness, or of the surprising quantity of scurf brought off by occasional baths and friction, and the consequent opening of the pores, the habitual practice of bathing will be found effectually to fortify the system against colds. Though constitutionally consumptive, and predisposed to colds, the author has not taken a cold on the average in two years since he adopted the practice of bathing regularly every day or two; and all he has taken, except one, have been contracted after he had suspended these baths for weeks previously, because especially inconvenient. The wealth of Astor would not compensate for a discon-

tinuance of this practice, because colds, with all their evils, would soon follow, and inevitably usher in consumption, and thus end his days. And any reader not accustomed to frequent bathing, would actually find a greater prize in its use, than if he should inherit the fortune of all the Rothschilds; because, by removing diseases and prolonging life, it would promote general enjoyment more than all the wealth of the world! Nothing would tempt me to do without my bath. Its habitual use renders me *cold proof*, and keeps both hereditary and acquired predispositions to disease at bay, as well as doubles and trebles my ability to endure both physical and mental exertion. Even as a luxury it is equalled only by food and sleep. I go to it, not with dread, but with alacrity, on account of the pleasure it gives me. And this pleasure is the greater the colder the weather, because of the greater re-action and subsequent delightful glow. Still, it must be rightly managed, else it results in evil proportionate to its good. The cold bath should never be taken except where there is sufficient energy in the system to produce a delightful reaction and subsequent glow—the sure signs and concomitants of its utility. A. Combe remarks on this point as follows:—

‘The tepid or warm bath seems to me much more suitable than the cold bath, especially in winter, for those who are not robust and full of animal heat. Where the constitution is not sufficiently vigorous to secure reaction after the cold bath, as indicated by a warm glow over the surface, its use inevitably does harm. A vast number of persons are in this condition; while, on the contrary, there are few indeed who do not derive evident advantage from the regular use of the tepid bath, and still fewer who are hurt by it.

‘Where the health is good, and the bodily powers are sufficiently vigorous, cold baths may serve every purpose required from them. But it should never be forgotten that they are too powerful in their agency to be used by EVERY one, especially in cold weather. In proportion as cold bathing is influential in the restoration of health when judiciously used, it is hurtful when resorted to without discrimination; and invalids, therefore, ought never to have recourse to it without the sanction of their professional advisers.

‘Even where cold bathing is likely to be of service, when judiciously employed, much mischief often results from prolonging the immersion too long, or from resorting to it when the vital powers are too languid to admit of the necessary reaction—after fatigue, for example.

‘For those who are robust, daily sponging of the body with cold water, or with salt water, is the best substitute for the cold bath, and may be resorted to with safety and advantage in most states of the system; especially when care is taken to excite in the surface, by subsequent friction with the towel, the healthy glow of reaction. It then becomes an excellent preservative from the effects of changeable weather. When, however, a continued sensation of coldness and chill are perceptible over the body, sponging ought not to be persisted in: dry friction, aided by the tepid bath, is then greatly preferable, and often proves highly serviceable in keeping up the due action of the skin.

‘For habitual use, the tepid or warm bath is certainly the safest and most valuable for invalids, especially during the autumn, winter, and spring. A temperature ranging from 85 deg. to 98 deg., according to the state of the individual, is the most suitable; and the duration of the immersion may vary from fifteen minutes to an hour or more, according to circumstances.

That bathing is a safe and valuable preservative of health in ordinary circumstances, and an active remedy in disease, is most certain. Instead of being dangerous by causing liability to cold, it is, when well managed, so much the reverse, that the author of these pages has used it much and successfully for the express purpose of diminishing such liability, both in himself and in others, in whom the chest is delicate,

In his own instance, in particular, he is conscious of having derived much advantage from its regular employment, especially in the colder months of the year, during which he has uniformly found himself most effectually strengthened against the impression of cold, by repeating the bath at shorter intervals than usual.

‘In many manufactories, where warm water is always obtainable, it would be of very great advantage to have tepid baths erected for the use of the operatives. Not only would these be useful in promoting health and cleanliness, but they would, by their refreshing and soothing influence, diminish the craving for stimulants which leads so many to the gin-shop; and, at the same time, calm the irritability of mind so apt to be induced by excessive labour. Where the trade is dirty, as many trades necessarily are, it is needless to say how conducive to health and comfort a tepid bath would be on quitting it for the day.

‘On the Continent, the vapour and hot-air baths are had recourse to, both as a means of health and in the cure of disease, to a vastly greater extent than they are in this country. Their use is attended by the very best effects, particularly in chronic ailments, and where the water-bath is felt to be oppressive by its weight; and there can be no question that their action is chiefly on the skin, and through its medium on the nervous system. As a means of determining the blood to the surface, promoting cutaneous exhalation, and equalizing the circulation, they are second to no remedy now in use; and consequently, in a variety of affections which the encouragement of these processes is calculated to relieve, they may be applied with every prospect of advantage. The prevailing fear of catching cold, which deters many from using the vapour-bath, even more than from warm bathing, is founded on false analogy between its effects and those of profuse perspiration from exercise or illness. The latter weakens the body, and, by diminishing the power of reaction, renders it susceptible of injury from sudden changes of temperature, but the effect of the vapour-bath properly administered is very different. When not too warm or too long continued, it increases instead of exhausting the strength, and, by exciting the vital action of the skin, gives rise to a power of reaction which enables it to resist cold better than before. This I have heard many patients remark; and the fact is well exemplified in Russia and the north of Europe, where, in the depth of winter, it is not uncommon for the natives to rush out of a vapour-bath and roll themselves in the snow, and be refreshed by doing so; whereas, were they to attempt such a practice after severe perspiration from exercise, they would inevitably suffer. It is the previous stimulus given to the skin by the vapour-bath which is the real safeguard against the coldness of the snow.

‘Common experience affords another illustration of the same principle. If, in a cold winter day, we chance to sit some time in a room imperfectly warmed, and feel in consequence a sensation of chillness over the body, we are much more likely to catch cold on going out, than if we had been sitting in a room comfortably warm. In the latter case, the cutaneous circulation and nervous action go on vigorously; heat is freely generated, and the vital action of the skin is in its full force. The change to a lower temperature, if accompanied with *exercise* to keep up vitality, is then felt to be bracing and stimulating rather than disagreeable. But it is widely different when the surface is already chilled before going out. The vitality of the skin being diminished, reaction cannot follow additional exposure; the circulation leaves the surface and becomes still more internal; and if weakness exist in the throat or chest, cold is the almost certain result. Many suffer from ignorance of this principle.

‘The vapour-bath is thus calculated to be extensively useful, both as a preservative and a remedial agent. Many a cold and many a rheumatic attack arising from checked perspiration or long exposure to the weather, might be nipped in the bud by its timely use. In chronic

affections, not only of the skin itself, but of the internal organs with which the skin most closely sympathises, as the stomach and intestines, the judicious application of the vapour-bath is productive of great relief. Even chronic pulmonary complaints, it is, according to the continental physicians, not only safe, but very serviceable; particularly in those affections of the mucous membrane which resemble consumption in so many of their symptoms. Like all powerful remedies, however, the vapour-bath must be administered with proper regard to the condition and circumstances of the individual; and care must be taken to have the feet sufficiently warm during its use. If, from an irregular distribution of the steam, the feet be left cold, headache and flushing are almost sure to follow.

My own preferences side unequivocally in favour of the *hand* bath as preferable to all others, because it is more easily applied, requires much bodily exertion, which facilitates the required reaction, and can be discontinued the instant a chilly sensation begins to supervene, beyond which no bath should ever be continued a single moment. Salt added to the water facilitates this reaction by exciting the skin, as does also sea-bathing, which, under certain circumstances, is most excellent. But we dismiss this subject till we come to treat of water as a remedial agent.*

The cure of colds by perspiration next comes up for discussion; for if they can be cured soon after having been contracted, the accumulation of waste matter will be trifling, and the cold only slightly injurious. How then can colds be cured?

By opening the pores, the closing of which caused them. This opening can be effected in part by washing and rubbing, but PERSPIRATION forces them open more effectually than probably any other means whatever. Indeed, it is the great antidote of colds. Nor is it material what induces perspiration, so that it is copious, and does not eventuate in another cold. Where the patient is able to exercise sufficiently to burst open these pores, whether he takes this exercise out of doors or in a warm or cold atmosphere, is not material, so that he opens them. In short, get into a dripping SWEAT, and then change your clothes and cool off without contracting more cold, and you will drive it off.

Where colds are taken in their incipient stages, before they have prostrated the system, the best means of breaking them up, is to drink copiously of water, warm or cold, or of warm lemonade, or of currant jelly and warm water, and then work right hard, almost violently, meanwhile pouring down one or another of these drinks by the glass. Do not over-do so as completely to exhaust, but so as to secure profuse perspiration. This, together with the water, which, if taken in quantities, must have some exit, will re-open these closed pores, and destroy the disease. Females who can wash in a warm room, over the steam of hot water, will find this an infallible recipe for colds. Warm herb-teas will fill the place of water, yet are no better in their effects.

Soaking the feet in hot water, and then toasting them on retiring, meanwhile drinking copiously as above directed, and then covering up extra warm, or even the extra drinking and covering alone will answer the same purpose; yet care must be taken to keep the extra clothes on so as not to contract a new cold—the principal evil attendant on this simple and effectual cure. How many of us while young cured our colds thus? But I recommend the daytime. Eat little or no breakfast, but drink copiously of cold water for an hour or two after rising, and provided you can endure it, exercise vigorously, and then return to bed, cover yourselves up warm, and sweat. Sleep, if you can. On rising wash all over in warm saleratus water, or simple warm water, rub dry

* I am for *cold* bathing, either by hand, sponge, or immersion. And all may use it, in my opinion, to advantage, if they will begin by degrees; taking a moment's plunge or so at a time for a while at first.—J. B.

and briskly, and keep yourself in a gentle perspiration all day by exercise. Or eat little breakfast, and begin to drink and exercise about eleven in the forenoon, or even later, and pursue the same course, omitting dinner, and eat only a light supper, or at least a light dinner and a very light supper, and retire early, or as soon as you have done exercise as possible, so as not to renew your cold.

The warm bath, followed by friction and exercise, is also most excellent, and will generally prove efficacious. Yet here, too, care must be taken to guard against renewed colds—not by staying in the house, or muffling up, but by EXERCISE—the very best means of inducing perspiration in the world, because the most natural. The wet sheet is another excellent method, especially for those who are not able to exercise sufficiently to get up the required perspiration; yet of this, and also of the water cure, in their appropriate places. Secure copious perspiration, and you break up the cold, besides unloading the system of its obstructions and poisons. Evacuating the bowels, especially by injections, will facilitate your object, yet the water drunk will be likely to effect this object. Vomiting, especially by drinking warm water, just at the lukewarm, sickening temperature, will render essential service. Hot bricks wrapped in cloths, and laid at the feet, are good.

Glass blowers furnish an excellent illustration of our system of routing colds by inducing perspiration. Obligated to labour excessively hard, and around a furnaceso extremely hot as to keep the material at a white heat, they of course sweat profusely. I have often seen all their clothes wringing wet. Yet the sides of the building are open to the wind, else they would not endure the heat an hour. And they go from their furnaces to their houses while thus perspiring, and hence often take severe colds one day, which, however, they generally sweat out the next, so that these repeated colds make but short stay, and do but little damage, simply because they expel them by inducing copious perspiration. This simple fact furnishes a practical illustration of the true method of curing colds of great practical value. As colds consist in closing of the pores, forcing them open by sweating is a sovereign and universal cure for those disease-breeders.

Sometimes the required perspiration is spontaneous. Children often sweat freely when asleep, awaking only to call for water. This should be considered a most favourable symptom; and the desired water should be freely administered till they wake up, when they should be washed. The washing should be followed by friction and brisk play, so as to keep perspiration up. Yet care should be taken not to contract additional cold.

In fine, to break up colds, START THE SWEAT, by what means it matters little, so that it is copious, protracted, and not followed by more cold.

Perspiration, besides thus unloading the system of disease, also serves to regulate the temperature of the body. The necessity of uniformity of temperature—neither too high nor too low—has already been explained; as also the means by which heat is generated. But heat at times superabounds. When the system is full of carbon, if we exercise vigorously, so as to breathe freely, and thereby introduce great quantities of oxygen into the system, we of course manufacture an undue supply, especially in warm weather, when heat does not pass off readily. Now this extra heat must be evacuated, else it will melt the fat in the system, and relax and prostrate. This important evacuation of the surplus warmth is effected by perspiration, as follows. All bodies absorb heat when passing from a dense medium to one that is more rare. Thus water, in passing into steam, takes up a great amount of heat, which it again gives off in returning back to water, on the well known chemical principle that all bodies give off heat when passing from a rarer medium to a denser. Here, again, water becomes a porter. An excess of heat aids the conversion of water into steam, which then

takes up its surplus heat, carries it out of the system, and gives it off again while condensing back to water.

This explains why it is that men can remain in ovens heated hot enough to cook meat, and long enough to cook it, without destroying life. They *sweat out* the surplus heat, or else their own flesh would also bake.

But sometimes the system does not generate sufficient heat. This scarcity must be made up by some means, or we must die.

The following letter to the author shows some of the consequences of a spare supply of heat.

‘John Clark, a native of Connecticut, born more than a century ago, was peculiarly affected by cold weather. In the cool mornings of nearly every month in the year, his hands would become benumbed and almost entirely useless, his tongue stiffened so that he could scarcely articulate, the muscles of his face contracted and stiffened, and one or both eyes closed in a very peculiar manner. This infirmity was hereditary.—*Phrenological Journal*, 1846, p. 131.

This was undoubtedly owing to defective lungs, and a consequent want of oxygen in the system. Or there might have been some defect in his digestion, by which a due supply of carbon was not extracted from his food. Many others are also troubled with being habitually cold, even in summer. This is the case with the author, though he is becoming less so yearly. Consumptive parents, and all predisposed to this disease, also feel cold or chilly, and have cold hands and feet, and perhaps what is called goose flesh on the skin. How can this be remedied?

First, and primarily, by ascertaining and removing its cause, which will almost always be found in deficiency of breath, occasioned by small lungs, or confinement, or want of sufficient exercise to promote respiration. When this is the cause, the patient may easily perceive it in the fact that all additions to his breathing add to his warmth. And the remedy is plain. He must BREATHE MORE. Nor can he be comfortably warm without it. Two other means are also resorted to to secure the required temperature. One of these is fire.

That fire is in some way essential to human health and comfort, is established by the ample provision for it found in nature. What she supplies she intends man shall use. Besides being indispensable in many of the arts, as in smelting and casting metals, etc., no one will doubt that fire is useful as a means of animal warmth. When the body is perfectly healthy, vigorous exercise will probably supply all the heat required in the coldest of weather. Yet we often require to apply our minds in a sitting posture, as in writing, reading, listening to speakers, when there is not sufficient action to secure this heat, and when, therefore, fire is both comfortable and indispensable. In cases of exhaustion, sickness, infancy, etc., fire is necessary.

Still, men rely far too much on external heat, and far too little on internal. Though we require fire, yet this alone can never keep us sufficiently warm. How hot, think you, must be the atmosphere to keep the body, inside as well as out, at the temperature of 98 degs.? Hot enough to burn the skin to a crisp. Try the experiment on a corpse. Fire is utterly insufficient to keep us duly warm. Our heat must be generated within us. The use of fire is to keep us warm by retarding the escape of internal heat, not by infusing external heat into us. Those who cannot keep themselves warm by the process already described cannot keep themselves warm at all; because in and by the very act of warming a room, you prevent the manufacture of internal heat by rarefying the air, and, when the fire is in the room heated, by burning up some of its oxygen, so that the lungs cannot carry enough to the blood to support the required internal combustion. External heat, therefore, so far from keeping us warm, often prevents our warmth. All this, besides the smoke and noxious gasses necessarily consequent on burning fuel, especially coal.

To put this matter on the reader's own experience. How many times in your lives, in weather so cold that you could not keep yourself warm in-doors, when compelled to rush into the cold, have you so accelerated circulation and perspiration, as in a few minutes to be quite warm enough, though just before chilly by a hot fire? And this natural warmth is much more delightful than artificial heat. Out of doors is the place to get thoroughly warm in cold weather.

You sedentaries know no more about the back-woodsman's table luxuries, than he about your 'city fixings,' and the way he can beat you keeping warm in cold weather, notwithstanding your hard coal and air-tight stoves, can be known only by trying. If I were again young, and my constitution unimpaired, I would remain were there was fire no more than obliged to, and would never rely on it to warm my feet or hands, but only on natural warmth. Nor would I accustom myself to mittens, except on extra occasions.

Nor can those who generally occupy warm apartments well imagine how much more brisk, lively, buoyant, intense, and happy the feelings are, and how much more clear and vigorous all the intellectual operations, while one is kept warm by exercise in a cold day, than by sitting in a hot room; nor how lax and listless, in comparison, are we rendered by artificial heat. Abundance of exercise, respiration, and good food, is the great receipt for keeping comfortable in cold weather.

The evils consequent on staying perpetually within doors in cold weather, and in hot rooms, are exposed too forcibly by our subject to require enlargement. Those who do so can obtain only a small supply of oxygen, first, because the air they breathe is so rarified by heat that a given bulk contains but little; secondly, because the fire has burnt out much of that little; thirdly, because they have breathed what little air there is over and over again, and thus loaded it with carbonic acid gas, and because they exercise so little that they secure but little action in their lungs. Such live slowly, yet are incurring disease.

Fire also creates carbonic acid gas, which is of course inhaled into the lungs. Hence those who occupy heated rooms, instead of carrying off the surplus already in the system, even take in additional supplies, especially if the fire is made of coal, and hence the blue veins and languid feeling of those who keep themselves housed up in winter.

DIFFERENT KINDS OF FUEL, STOVES, ETC.

And here I protest against air-tight stoves in sitting-rooms, because they prevent a renewal of the air by circulation, and thus effectually shut out the oxygen. Still, air-tights are admissable in the kitchen, where fresh air is introduced by a frequent opening and shutting of doors. If you must be by a fire, at least have one with a draft.

Hence none of those close stoves are the things for health. They all paralyze our mental and physical energies while life lasts, and also hastens its termination. Give me the old-fashioned fire-place, or an open Franklin, or else a new kind of stove made wholly of brick, called the Russian stove, which, for warming sitting-rooms, is probably superior to any other in use, as it certainly is much less expensive in construction, and more economical in fuel. I never imagined till I used it, how much heat a little wood gives out. It also makes a remarkably even heat.

FIRE NECESSARY WHEN THE CIRCULATION IS WEAK.

Let not the preceding remarks be construed to mean that we had better remain cold, than warm ourselves by fire. Heat must be had in some way. Even a slight reduction of temperature induces those colds just shown to be so fatal, and also chills the blood, intercepts circulation, and would soon occasion death. Infinitely better have artificial

heat than cold. Yet even in sickness, when the circulation is low, better provoke as much natural heat as possible by friction and clothing, and rely as little on fire as possible. Invalids, of all others, require oxygen, which artificial heat always and necessarily reduces. I pity those who are obliged to resort to fire for warmth. They may live along from hand to mouth as to health, yet can never know the real luxury of a comfortable temperature. Such should by all means practice those directions for enhancing the circulation to be given hereafter.

CLOTHES AND THEIR NECESSITY.

That man is constituted to wear some kind of external covering, cannot for a moment be questioned. Otherwise, he would have been furnished with a heavy coating, like what grows on animals. Man is designed to inhabit the whole earth, the frozen regions of the north and south included; where, without some external protection, against the extreme rigour of winter, he must inevitably freeze to death. Such protection, though it does not generate heat, retards its escape, and thus aids in that indispensable process of heating the body. And by varying the quantity of clothing as the weather changes, we can greatly facilitate that uniformity of temperature so indispensable.

QUANTITY OF CLOTHING.

But though clothing is thus necessary, yet by far too much is now worn. The Indian, even in colder latitudes than ours, contrives to manage even in the coldest weather, with only his blanket thrown loosely around his shoulders. We need clothing, yet should rely upon it only as a partial regulator of heat, not as our principal warming agent. Clothes, by retarding the escape of heat, cause us to require less food and breath. Hence those who cannot get enough to eat, should dress extra warm, while those who can, should dress light. Extra clothing relaxes the skin, and prevents the generation of animal heat, and this leaves the system colder instead of warmer. If I were again young and robust, I should habituate myself to but little clothing, even in winter. I am wearing less and less every winter—thus relying for warmth more on nature and less on art. Yet I would not change too suddenly. Better too much clothing than too little. Keep warm we must; and in leaving off clothing I would augment the internal manufacture of heat by increased exercise and breathing.

As clothing is worn partly to regulate the temperature, its quantity of course requires to be greater in cold weather than warm. Yet I protest against this varying its quantity with every variation of the weather. Nature has rendered this unnecessary by a provision for enhancing the internal heat in the exact ratio of the external cold. This alone shows that we should rely on nature's provision for warmth, instead of on art—should breathe and eat more as the weather becomes colder, instead of dressing so much warmer.

Yet invalids, and those whose circulation is defective, may require such variation. This habit of relying so much on clothes, however, modifies our advice. As most of us now are, they benefit, yet we should diminish its necessity by enhancing the internal heat.

THE CLOTHING OF CHILDREN.

Few errors are greater than the prevailing custom of wrapping babes up in blanket after blanket as a protection against cold. From the first they are literally smothered with clothing. Besides keeping the nursery quite too warm, the young stranger must have on several thicknesses of its own clothes, and then be covered up most of the time under several thicknesses of bed-clothes with only a small breathing-hole left. It is just as you habituate them, with this difference, that shutting in the animal heat thus, relaxes the skin and paves the way for those colds seen to be so injurious. Too much clothing promotes

colds instead of preventing them. I would not have them cold; yet of this there is little danger. That same self-acting regulator of heat already seen to exist in adults, exists also in them. Rely on this, and do not engender disease by extra clothing. They need more clothing than adults, because animal heat is at its minimum at birth, and should not be carried out, yet they are often well-nigh ruined by being overdressed.

After children have become three years old, they generate animal heat very rapidly, if allowed to play, and therefore require but little clothing. Give them the liberty of the yard, and I'll risk their getting cold, unless they have previously been nursed to death. Mothers, be assured that you are by far too tender of your children in this respect—that you almost kill them—and often quite kill them, by extra dressing. And this muffling up boys with comforts round their necks, in addition to neck wrappers, caps pulled down tight round their ears, warm mittens, warm over-clothes, a cart-load of bed-clothes, and the like, is consummate folly. When boys are running out and in, they will keep warm without all this fuss, and doubly so when they are walking. But we shall discuss this whole subject of children's dress in our proposed work on 'Maternity.'

CHANGE OF RAIMENT.

Whether we should increase and diminish our clothing according to the temperature of the weather or not, we should change it often from motives of HEALTH AND CLEANLINESS. Since perspiration brings out a great amount of corrupt and poisonous matter through the skin, most of which is absorbed by the under clothes, of course they should be changed and cleansed frequently. Nor should we sleep in the under garments worn in the day time.

Children's under clothes, in particular, should be changed every day or two, and also every night, because they perspire more copiously even than adults.

THE QUALITY OF CLOTHING, FLANNELS, SILKS.

That, considering the weak state of the skin generally in civic life, flannel under garments for cold weather may be advisable, is admitted; yet, in cases where the circulation is vigorous, its utility is doubtful. My practice is to postpone putting it on later and later every fall, and to discontinue its use earlier and earlier every spring. It confines the corrupt matter transmitted through the skin, too closely around the body. Hence it should be changed and washed often, as well as aired at night. This wearing flannels a week or ten days without washing, is pernicious.

Silk is highly extolled for under garments. I have worn it with comfort, if not with profit. Yet, like flannel, it retains the perspiration and effluvia of the body. My own convictions favour cotton as furnishing the best material for under and summer clothing.

HEAD AND NECK ATTIRE.

That nature designed us to wear something on the head will not be doubted, but has she not already dressed it in a warm and beautiful garment of air, one abundantly sufficient to secure the required warmth, at the same time allowing perspiration to escape freely? This, hats and caps as commonly made, prevent, and are, therefore, objectionable. Be it remembered that whatever oppresses the head, thereby blunts thought and stifles feeling.

The mode of dressing the neck is scarcely less important. A tight neck dress is highly injurious, because it retards the flow of blood to and from the head. This perpetual strangulation I cannot endure. Anything but being choked. At home I wear no stock or neckerchief, and should never do so abroad, if I could always explain my

motives for the omission. Tight neck dresses also cause bronchital affections.

This confinement of the neck also intercepts the escape of the perspiration and effluvia which the heat of the body causes to rise, but which any bandage around the neck hedges in, and retains around the person, and in the clothes, only to vitiate and disease. The Byronic fashion of dressing the neck is preferable to all others.

That a close neck dress is not required on the score of warmth, is evinced by the open mode of dressing the female neck. If woman can keep warm without choking up her neck with tight bandages, surely robust man can.

THE HANDS AND ARMS.

The hands should be kept warm, yet this can be done without mittens—and in general better without than with. Rely on natural heat more, and on artificial less. Put them on late in the fall, and only in extreme cases. Wearing gloves in summer is perfectly ridiculous. To encase your hands in gloves is to hide their beauty. I should feel ashamed to acknowledge, practically, that mine were too homely to be seen.

UNCOVERED ARMS, by allowing the free escape of waste matter, greatly promotes comfort and health. The free access of the air to the skin is pre-eminently beneficial, and the more surface thus exposed, compatible with warmth and decency, the better.

WARM FEET.

Cold or wet feet are prolific of colds and their consequences, while warm feet generally protect the system from disease. That old saw—'Keep the head cool and feet warm,' is full of practical wisdom. In fact, cold feet induce headache by a partial congestion of the brain, nor is there a greater cure for headache than rubbing, washing, or toasting the feet, because it draws off that extra rush of blood to the head which caused it to ache.

To secure due warmth in the feet, WASH AND RUB THEM OFTEN. Few things are more promotive of health than the daily washing of the feet. It will add considerably to the health of every reader who will practise it, as well as increase his serenity of mind. Jefferson attributed his uniform health, even in advanced life, more to this one practice than to any other. Nor does running in the water in the summer do children the damage apprehended. Let every child be brought up to wash the feet, every night on retiring, in cold water. Nothing is more erroneous or foolish than the prevailing idea that cold water applied to the feet is injurious. Nor are wet feet, if WARM, the precursors of the winding sheet, though cold wet feet often breed disease. Keep up the circulation in them, and they may be wet half the time without injury! The great evil is not in *wet* but COLD feet.

The proper dressing of the feet, so as to secure the required warmth, becomes a matter of great importance. Reliance for keeping them warm should not be placed on shoes, stockings, and fires. The principles respecting fires and dress, already applied to the body, apply equally to the feet. Almost exclusive reliance should be placed on vigorous CIRCULATION, as secured by *exercise* and *washing*, not on stockings, boots, and over-shoes. In fact, the latter generally IMPAIR circulation, and thus induce coldness of the feet instead of warmth. In general, the lighter dressed the warmer, provided they have sufficient *exercise*.

Heating the feet with brick, stones, and the like, is also injurious. Warm them by walking, stamping and the like. And in riding, by far the best plan of warming them, is to get out and walk or run.

GOING BAREFOOT in summer is not injurious to children. They love it dearly, and this is nature's warrant for its utility. The soles of their

feet are furnished from birth with a thick epidermis, which going bare-foot renders thicker and tougher. This abundantly protects them from injury. Nor will going barefoot give them cold, but it will prevent sickness by promoting health and circulation in the feet.

SLEEP.

All that lives must sleep. Even the entire vegetable kingdom sleeps in winter, to wake up with renewed vigour on the opening of spring. All animal life, from snail to man, must rest or die. Nature COMPELS it, nor can any human will or effort forego it. Nor can we be better employed than when thus renewing our vital energies.

Deficiency of sleep is scarcely less injurious than deficiency of food. Yet we can over-sleep as well as over-eat, or over-exercise ourselves. Physiologists differ as to the length of time required, and well they may, because different persons require different lengths, according to circumstances. And the same person requires more at one time than another. The time spent in sleep furnishes no criterion of its amount, because some sleep more in an hour, than others in a night. Some may doze away half their time, yet be starved for rest, while others sleep abundantly in four or five hours—all depending on its soundness and previous fatigue.

While the constitution remains unimpaired, the sleep is sound and refreshing, and five or six hours in the twenty-four may perhaps be sufficient; but broken constitutions require eight or even more. Over-eating also requires additional sleep, as does also excessive toil of any kind, of which all are experimental witnesses. All disorders of the stomach and nervous system also require additional time for sleep. Exceedingly active persons—those who, when awake, are wide awake, also require to sleep longer than those who are half asleep when awake. Convalescents also require to sleep more than usual. Each must, therefore, judge for himself, and while all should sleep enough, none should sleep too much. Over-sleeping is as injurious as gluttony. How stupid, palsied, and good for-nothing it renders people. Our own appetite for sleep, as for food, unperverted, furnishes us with an infallible guide. Nature will rouse us to consciousness when our sleep is out. And when thus aroused, all should spring at once from their couch. To hug the pillow, half asleep and half awake, is most pernicious, and, like over-eating, only makes us crave the more, besides too often inducing, or at least facilitating, impure feelings, which too often result in vice. Would that I could only impress, especially on youth, the importance of rising immediately on waking.

SEASON.

That nature clearly indicates night as the best time for sleep, is too apparent to require proof. It may be doubtful how long we should sleep, but what time we *do* sleep, should be in the night, except in cases to be mentioned. Sitting up half the night and sleeping half the next day, reverses the ordinances of nature, and must therefore prove injurious. Extraordinaries excepted, all should rise with the break of day, and especially children, who should retire soon after the hens do. Better sleep in the mornings than too little, yet either retire the earlier, so as to have your sleep out at least before sun-rise, or else take a short nap in the middle of the day. Those whose previously formed habits prevent their going to sleep early, even when they go to bed, should break up such habits. 'Early to bed and early to rise,' is the motto for health. The customs of society may sometimes require morning sleep, by preventing a due degree of night sleep. Thus the author, after lecturing, often finds his nerves so excited, that though he retires, the blood courses through his throbbing brain so as utterly to defy sleep, and he may as well write while this fever lasts, to compensate for which, he is obliged to sleep in the mornings, which, however, he never

does at home. The fact is, that lectures and public meetings should be held by daytime instead of in the evening.

But some cannot obtain sleep enough. This is partially true of the author, especially after lecturing and writing. Any preternatural excitement of the brain and nervous system, prevents a due supply of this commodity. So do mental troubles, over-exertion, and in some cases, disordered stomachs. In all such cases, sleep should be promoted. This can be done by PREVIOUS PREPARATION. As, to enjoy our meals, we must first become hungry, so we should sharpen up our sleeping appetite, and also prepare ourselves, mentally and physically, for this delightful repast and grand restorer of exhausted energy. This can be facilitated by a due degree of action, especially muscular. Overdoing causes wakefulness, yet a due quantity of muscular exercise every day of our lives is eminently promotive of refreshing sleep at night. And those who would enjoy sleep must exercise. Especially those whose wakefulness is caused by nervous or cerebral excitability. Become comfortably tired, and you are prepared for refreshing sleep.

Such should also avoid excitement, and seek quiet in the evening before retiring. In short, reduce that action of the brain which keeps you awake—directions for doing which will be given hereafter.

The wakeful should especially go to bed soon after becoming drowsy, else they become extra wakeful, and remain so perhaps much of the night. This direction is particularly important. Yet going to bed only to lie awake, or before we are prepared for sleep, is also bad. We should try to go to sleep as soon as possible after going to bed.

Amusements, if of a pleasing, soothing kind, also promote sleep. Especially domestic amusements, as playing with children, conversing with friends, and the like. But exhilarating, exciting amusements, intercept sleep. A quiet, happy frame of mind, is especially promotive of sleep, while unpleasant feelings, especially anger, retard it. Hence, to induce children to have a good play or frolic just before going to bed, is an excellent practice.

Religious contemplations and devotional exercises are especially promotive of sleep. They diffuse over the soul a delightful quiet, a heavenly calmness, which invite sleep. A physician once directed a wakeful patient to THINK ON GOD, when he wished to go to sleep but could not, and the patient said that for forty years, whenever wakefulness returned, following this prescription soon lulled him to sleep. Family devotion induces a similar preparation.

Moderate fasting promotes sleep, while a full stomach retards it. The English think differently, and eat on retiring; but if a full stomach facilitated sleep, we should become hungry when we became sleepy, whereas sleep diminishes appetite. In fact, we eat the less when we sleep abundantly, and the more the less we sleep.

Invalids, and the sick in particular, require to sleep much. As a restorative measure, medicines bear no comparison with sleep. Hence, wakening the sick to give drugs is consummate folly. Nor is there a better sign of a favourable turn of disease, than a disposition to sleep, provided it be natural. A state of mere stupidity is a bad sign, but this differs materially from natural sleep.

Invalids and the wakeful should also guard assiduously against being disturbed when once asleep, till fully rested, on pain of subsequent wakefulness. Many weakly mothers have ruined their health and lost their lives by crying children. That they can so train children as to sleep soundly all night, from infancy to maturity, will be fully shown in the author's work on 'Maternity.'

A day nap is also most excellent for invalids, children, and all who do not or cannot obtain sleep enough during the night. A mere doze is to such most refreshing. If you cannot get to sleep the first few times, keep trying till you can, and you will soon form the habit. And even when you do not lose yourself, the rest will be beneficial.

The best posture for promoting sleep is doubtless lying on the back, because it facilitates respiration. Lying wholly on either side often causes the internal organs and even the brain to lag and remain more on that side, which is evidently injurious. Habituate children to sleep on the back, and if on either side, also on both.

A slight elevation of the head may be beneficial.

BEDS AND BEDDING.

Mattresses are preferable to feathers, because, not so hard so as to give pain, nor so soft as to enervate. Nor are straw beds any too hard. Feather beds are decidedly unwholesome, especially in summer. Being animal matter, they are subject to decay, and hence their unpleasant odour, which of course vitiates the air and breeds disease. They are also relaxing and weakening. Sunk into a pile of feathers, perspiration cannot properly escape, sleep is disturbed and does not refresh, and we awake with a headache, feel prostrate, and unfitted for pleasure or business. Not so with mattresses.

The habit of sleeping under a stack of bed clothes is also equally as pernicious as a superabundance of clothes by day. They prevent sleep, and retain about the body all the corrupt effluvia it throws off, and which should be allowed to escape. None should sleep cold, yet all should habituate themselves to as few bed clothes as possible, to keep comfortable. And during the day, these clothes should be thrown upon the backs of chairs and thoroughly aired in a draft till towards evening.

The practice of covering up the head under the bed clothes is most pernicious. Almost as well not breathe at all, as to breathe over and over again the same foetid air.

THE GLANDULAR SYSTEM, AND ABSORBENTS.

As important a portion of the human structure as this deserves a passing notice, yet we shall not dwell on it. Of the general function of some of the larger glands, as the salivary glands, the liver, pancreas, mesentery, etc., mention has already been made. Their respective functions are indispensable to life, as is the action of the kidneys in secreting from the arterial blood that urea manufactured in the process of life.

These glands are formed, somewhat like the lungs, with two sets of capillary vessels, the one for the ramification of blood, and the other for secreting their respective materials.

The various secretions made in these glandular ramifications are emptied into ducts, and these into one another, till all are emptied into one common reservoir, and carried to their place of destination.

Though all parts of the system reciprocate their several conditions with all the others, yet this reciprocity seems to be more intimate between the glandular functions and the cerebral than between any of the others. Every change and phase of mental action produces a corresponding change in the glandular action. Thus, thinking of food 'makes the mouth water,' that is, excites a copious secretion and discharge of the salivary glands; sadness retards, and pleasurable emotions augment the action of the liver; the former accelerating and the latter preventing digestion; grief provokes a copious secretion of the lachrymal glands in the form of tears, and sudden joy sometimes has a similar effect; and thus of the others. But the most conspicuous illustration of this principle will be found mentioned in 'Love and Parentage,' and applies to the secretion employed as the messenger of life.

The great practical lesson taught by this reciprocity, is the importance of keeping the mind in that calm and happy frame which promotes glandular secretion, and thereby health.

The absorbents also deserve notice in this connection. They are

stationed throughout the entire system for the double purpose of taking up foreign matter, such as the matter of biles and other tumours which do not come to a head, and also any deposits of fat which may be found in the system when wanted by it. The fat of the body is only a deposit of its surplus carbon, stored up against a time of want. When imperfect digestion or a deficiency of food renders the supply of carbon unequal to the demand, these absorbents take up this fat and empty it into the chyle-duct, and so into the circulation, and hence the falling away of the sick or starving. When this fat or store of carbon is exhausted by protracted hunger or stomachic disease, these absorbents take up even muscle and cellular tissue, and empty them also into the circulation, and hence the extreme emaciation of the starving, of consumptives, dyspeptics, and the sick generally. This provision against any deficiency of nutrition is inimitably beautiful and useful.

CHAPTER IV.

LOCOMOTION—ITS APPARATUS AND NECESSITY.

THE OSSEOUS SYSTEM.

THE EXPENDITURE OF THE VITALITY.

THUS far we have seen by what instrumentalities vitality is supplied. Yet all this ingenious arrangement for its supply would have been useless, but for some means of effecting its expenditure. This vitality may be considered the raw material of life—the stock-in-trade of the mechanic. It next requires to be WORKED UP, into the various ends of life, or it will avail nothing. For this expenditure nature has made provisions quite as ample as for its supply. This expenditure consists in two things, MOTION and MENTALITY, sensation included. To subserve these two ends, the entire human structure, the inimitably beautiful vital apparatus included, was created. Without motion, man must always have remained in one place, like the oyster, and been incapable of speaking, eating, or doing a single thing; and without mind or sensation he would have been incapable of experiencing one single emotion of pleasure or pain. But behold and admire the number and variety of functions effected through their instrumentality! In fact, they embody the whole of life—all the ends of man's being.

To effect these great ends, organs adapted thereto are necessary. These organs consist of the osseous, muscular, nervous, and cerebral systems, to the discussion of which our subject thus brings us.

THE OSSEOUS SYSTEM—ITS NECESSITY AND STRUCTURE.

As but for the timbers of buildings nothing would support their superstructure, so, but for some kindred frame-work within the body, both to keep the various organs in place, and to form, as it were, timbers or fulcrums for support, and for the attachment of the muscles, motion would be impossible. With such a provision nature has furnished the human body in the form of BONES. With their general appearance all are familiar. They are composed principally of two substances, animal and earthy, the former imparting life, and the latter firmness. In youth the animal predominates, and hence the greater flexibility of young bones. This, however, prevents fractures, aids to break the falls of children, and facilitates growth. But as age advances, the earthly materials of bones predominate over the animal, because the muscles, having become stronger, require augmented stiffness to prevent their bending, and because experience enables us to

guard against falls. As the earthy predominates, the bones become more and more brittle—and hence the great frangibility of the bones of the aged, till, in a certain disease which consumes their animal matter, they break from slight strains; whereas, in another disease which consumes their earthy matter, but leaves their gelatinous substance, they can be bent any way, and even tied up in knots without breaking; yet in this case motion is impossible. These bones are penetrated with blood-vessels and nerves, the former to supply growth and vitality, and the latter to impart sensation. The bones number about two hundred and fifty-two. They are united by joints, and held together by powerful ligaments. At the joints the bones enlarge, though the weight of their ends is not greater than their middle portions. This enlargement, together with an elastic plating between them, serves to deaden the blows of a fall or a jump upon the feet, so that, before it reaches the brain, it is comparatively obviated, and that delicate structure saved from contusion. Throw two hundred pounds down eight feet—a distance we often jump—and see how hard it strikes. Not so with man.

A membrane is stationed at each joint, to secrete an oleaginous substance more slippery than oil, to lubricate these joints, and preserve their wearing out by the powerful and almost perpetual friction occasioned by muscular contraction and the weight of the body, and to facilitate the ease of motion.

Besides those powerful cords which tie the bones together at their joints, so as to resist their tendency, when the muscles contract powerfully upon them, to slip past each other, as in sprains and dislocations, they are fitted into one another in the form of hinges—a ridge in one exactly fitting to a corresponding hollow in the other—and of BALL and SOCKET joints, as in those of the hips and shoulders, where a ball in one, fits exactly into a socket in the other, so as to allow motion in all directions.

These bones are not scattered about at random, but similarly formed bones are always found in similar positions, exactly fitted to subserve their respective ends. Thus arranged, they constitute the human skeleton or frame-work of the body.

This beautiful structure of bones and joints, every way so perfectly adapted to serve as a foundation for the motive apparatus, would be as inert as so many sticks, but for something like ropes and pulleys to put them in motion. These ropes and pulleys are supplied. They are called MUSCLES. They lie beneath the skin, upon and around the bones, and constitute the red meat of animals and man. Every human being is endowed with some five hundred and twenty-seven, of various shapes and sizes, exactly adapted to produce those innumerable and powerful motions of which man is capable. They over-lap, and under-lay, and are interwoven with each other, in all conceivable ways. They are also enclosed in a smooth membrane, which allows them to slide upon each other without friction. Without this, their powerful contraction would soon wear them into shreds. The muscles are composed of innumerable strings or fibres, bound together in one common bundle, the contracting or shortening of which results in motion. Indeed, this contractile power constitutes their sole function, and is effected by an expenditure of vital force. And as one end of these several muscles is attached to one bone and the other to another across the joint, this contraction moves one or the other of these bones, and of course produces motion.

These muscles are largest in the middle—the part which contracts. They taper off into tendons—those strong cords seen in the wrists, back of the hands, insteps, and above the heels. Thus many muscles may be attached to a single bone. The strength of these cords is tested by hanging slaughtered animals up on sticks thrust under these tendons, and also by the tenacity with which they adhere to the bones, as well as by our ability to stand on one foot, and toss the body about by one of these

tendons—that at the heel. Their attachment is formed on ridges in the bones, or on their heads, near joints.

Single motions are generally effected by the contraction of individual muscles. But most of our motions are compounds, effected by many bones, joints, and muscles acting in concert. Thus, the simple lifting of the hand to the head is effected by the combined motions of the wrist, elbow, and shoulder. And in walking—apparently so easy a motion—nearly all the muscles and bones of the body are brought into requisition; so much so, that even the tying of the hands greatly impedes it.

Many of the motions of the body, as climbing, leaping, lifting, &c., require the CONCERTED as well as powerful action of almost every muscle of the body. This concert is probably effected by means of a cerebral organ of motion located in the cerebellum. Indeed, all the internal organs, heart, lungs, liver, &c., undoubtedly have each their cerebral organs and work by them, just as the stomach operates by means of Alimentiveness.

THE POWER OF THE MUSCULAR SYSTEM.

The number, variety, and power of the motions capable of being produced by these muscles are indeed most wonderful. They enable us to climb the lofty tree, and even the smooth pole of liberty—to mount the towering mast, and not only support ourselves in the rigging of the ship, but to put forth great muscular exertion while the ship is tossing and rolling, and that in the midst of the hurricane. Standing upon our feet, we can toss our bodies—weighing from one hundred to two hundred pounds—several feet upwards and forwards, and in all directions, for many hours in succession, as in dancing and the circus. Or we can transport it fifty or sixty miles between sun and sun, and even carry many pounds' weight upon our backs. Or we can labour briskly every day for scores of years. Or we can lift and carry several times our own weight. Or we can accomplish a multiplicity of powerful and protracted bodily exertions, and do a variety and amount of things almost without end.

'The muscular power of the human body is indeed wonderful. A Turkish porter will trot at a rapid pace, carrying a weight of six hundred pounds. Milo, a celebrated athletic from Crotonia, accustomed himself to carry the greatest weights, and by degrees became a monster in strength. It is said that he carried on his shoulder an ox four years old, weighing upwards of one thousand pounds, for above forty yards. He was seven times crowned at the Pythian games, and six at the Olympian. He presented himself the seventh time, but no one had the courage to enter the lists against him. He was one of the disciples of Pythagoras, and to his uncommon strength the learned preceptor and his pupils owed their lives. The pillar which supported the roof of the school suddenly gave way, but Milo supported the whole weight of the building, and gave the philosopher time to escape. In his old age Milo attempted to pull up a tree by its roots, and break it. He partly succeeded, but his strength being gradually exhausted, the tree, when cleft, reunited, and left his hand pinched in the body of it. He was then alone, and, being unable to disengage himself, died in that position.

'Haller mentioned that he saw a man whose finger being caught in a chain at the bottom of a mine, by keeping it forcibly bent, supported by that means the weight of his whole body, one hundred and fifty pounds, until he was drawn up to the surface, a height of six hundred feet.

'Augustus XI., King of Poland, could roll up a silver plate like a sheet of paper, and twist the strongest horse shoe asunder.

'The most prodigious power of muscle is exhibited by fish. The whale moves with a velocity through the dense medium of water, that would carry him, if continued at the same rate, round the world in less than a fortnight; and a sword fish has been known to strike his

weapon quite through the oak plank of a ship.'—*Western Literary Messenger*.

The following, bearing on this point, is taken from a Scotch paper, and is headed, 'The last of the Stuarts.' 'It is, withal, an excellent hereditary fact, and shows that the Stuart family were most remarkable for great physical strength, which harmonizes with the principle that all distinguished men are both from strong-constituted and long-lived families: he being now one hundred and fifteen years old.—'Hundreds of persons can bear testimony to his amazing strength, from which circumstance he got the bye-name of *Jemmy Strength*. Among other feats he could carry a twenty-four pounder cannon, and has been known to lift a cart-load of hay, weighing a ton and a half, upon his back. Many a time has he taken up a jackass, and walked through the toll-bar, carrying it on his shoulders. It will be long before we can look upon his like again, or hear his stories of 1745, and his glowing descriptions of the young Chevalier.'

Jonathan Fowler, of Guildford, Conn., walked out knee deep through the mud, oyster-shells, and filth of a sea shore at low tide, to a shark left by the retiring tide in a pool, captured it while yet alive, weakened of course by having but a scanty supply of water, shouldered it, and brought it alive on his back to the shore, which weighed five hundred pounds!—quite a load, considering that it was not the most portable of articles, nor the best of roads. The feats of the Ravel family, Bedouin Arabs, and circus performers are also in point.

Nor are these and kindred exhibitions of strength by any means the ultimatum of man's muscular capability. A due degree of TRAINING would enable him to accomplish much more. We are but Liliputians in comparison with what mankind will yet become. Most exalted are my ideas of man's muscular powers. I believe he might vie with the lion himself as to absolute strength, and carry heavier burdens than horses. Indeed, Turkish porters now transport six and eight hundred pounds at a time on their backs, and the Belgian giant could stand up under two TONS. The Chinese have no horses, and carry their teas and silks between two men, hundreds of miles, on their backs! If man can effect all he now does without either muscular discipline or the application of hereditary descent, how much more with? The human race is yet in its nonage in everything, muscular capability included. We little realize the extent to which this capability can be carried IN OUR OWN SELVES, if properly disciplined.

This bring us to consider

THE IMPORTANCE OF EXERCISE.

Our motive apparatus, so perfect, so powerful, was created to be USED. Almost innumerable arrangements in nature *compel* such exercise, Thus man is obliged to exercise his muscles in tilling the soil, in order to procure food. He is obliged to exercise them in changing his position and moving from place to place; in making and working machinery, using tools, building, printing, making that vast variety and quantity of articles of clothing, furniture, ornament, and all the innumerable things used by mankind, and even in reading, writing, eating, walking, talking, looking, breathing, etc.

We have already seen the importance of digestion, circulation, respiration, perspiration, and sleep, all of which exercise promotes. Who has not seen his veins become prominent and hardened during vigorous exercise, on account of the increased passage of blood through them; whereas this swelling appearance of the veins, is never found in the indolent, except in fevers. Who does not know that a smart lift, or a little brisk work, or run, or vigorous exercise of any kind, increases the frequency and power of the pulse, as well as the rapidity and volume of the inspirations? It equally accelerates perspiration. Who has not seen the sweat run down in streams from all parts of the

body during hard labour? And who does not know how much more heartily we eat, and how much more sweetly and soundly we sleep with labour? Nor is there an important function of our nature which muscular exercise does not promote, and inaction impede. By enhancing respiration, it augments the amount of oxygen and carbon consumed, as well as of fibrine, gluten, and caseine consumed, indeed of all the materials derived from food and breath, and also greatly increases the pulsation of all noxious matter from the system in the form of phlegm, perspiration, and respiration. Besides hurrying the circulation by increasing the introduction of oxygen, it still farther increases the flow of blood by urging it along through the veins; for the contraction of the muscles upon the veins, urges their contents forwards towards the heart. Labour also quickens the action of the bowels and of the digestive process generally. These functions, constituting no small portion of life itself, labour enhances, and thus augments life and all its pleasures and powers. In short, muscular action promotes every function and power, mental and physical, of our entire nature, and is indispensable to all. He who does not work can therefore enjoy only a lower degree of life and its pleasures, muscular inaction deteriorating, diseasing, and vitiating the entire man and woman.

Nature still farther recommends muscular action by the

PLEASURES OF EXERCISE AND LABOUR.

Confine yourselves, or even sit or lie, in one position all day, and you will find such inaction to be exceedingly painful. See how animals, on breaking away from close confinement, run and skip, and hop and frisk, as though they did not know how to contain themselves. How many times, after having remained inactive for some time, on going out, have you been filled with an amount of pleasure in action hardly to be described. Nor is it till after our muscles have been drilled long and severely, and even become enfeebled, if not diseased, by inaction, that we can keep still without pain. Idleness is unnatural. Action is natural and pleasurable in its very nature. See how much real pleasure children take in playing and running—so much that they race from morning to night, and cannot be kept still by any means whatever. How much pleasure a smart walk, or ride, or dance affords! Nor do the sedentary realize how much pleasure is to be taken in **MANUAL LABOUR**. Indeed, those who do not work or take vigorous exercise in some way, can experience but little pleasure in life; for they can neither eat, nor sleep, nor breathe, nor think, nor feel with that real **RELISH** so essential to enjoyment. Nor need the labourer envy the rich their ease or their dainties; for he has ‘meat to eat which they know not of,’ luxuries of which they can never partake, till they create a relish for them by labouring. For one, I would as soon forego the pleasure of appetite or rest as of manual labour. I say labour, because, though walking, riding, hunting, bowling, dancing, and other kinds of exercise are better than none, yet none of them compare with **WORK**, as a means of promoting health. No form of play, no other kind of exercise, at all compares with **LABOUR**, especially **AGRICULTURAL** labour, for expanding and strengthening the chest, developing all the organs, and thoroughly exercising every muscle and organ in the body. Better ride, or walk, or dance, or play ball, and the like, than nothing; but better work than either or all of them. To derive all the pleasure from muscular action which it is capable of imparting, we must effect some useful **END**. Exercise for its own sake is comparatively insipid; but when we are achieving some useful end, the utility and pleasures of exercise are doubled. Let me **WORK**. Give me an axe, or saw, or hoe, or scythe, or rake, or shovel, or some kind of tool, and place to use it, and I envy you not the pleasures of either the dance or hunt. Let me plough, and plant, and raise food for my table, and t

out and tend trees that I may enjoy their fruit, and add to the products of the earth, and thereby contribute to the aggregate of human happiness. God has told man PRACTICALLY to till the earth and keep it, and that he must eat his bread by the sweat of his brow. Nor is such toil a curse. It is a *blessing*, and one of the greatest pleasures of earth. Nor is labour *ever* a curse, or other than one of nature's greatest LUXURIES, except when excessive in amount, or ill-timed. Nor can words pourtray the evils consequent on the false notion that labour is a curse. Indeed, if our world had produced all we require spontaneously, without any requisition for human labour, it would hardly have been worth living in.

If these views of the utility of labour require confirmation, they have it in the fact that most great men laboured hard in youth.

What distinguished man in this country or age, or any other, but took a great amount of exercise while young? And most of the world's geniuses were brought up to HARD WORK. Adam Clarke was noted, when at school, for his great physical strength in rolling stones. Shakespeare, while composing his immortal plays, carried brick and mortar to build places for their performance. John Wesley rode and walked a great many thousand miles, and it was this habitual exercise which enabled him to do so much good. Elihu Burritt, probably the greatest scholar of the age, was compelled by necessity to work EIGHT HOURS DAILY at the anvil in order to furnish himself with the means of prosecuting his intellectual labours; and it was this fact of his thus labouring daily, which enabled him thus to take such astonishing strides in the acquisition of knowledge. Clay was a poor boy, and actually worked for a living. Henry Bascom, the great western orator, travelled west on foot, with his axe on his shoulders. The old Roman and Grecian orators took a great amount of exercise in order to prepare themselves for public speaking, and they put in practice one fundamental principal of which we moderns, with all our boasted light and inventions, have lost sight—that of strengthening the voice by gymnastic exercises.* Sir Walter Scott,† after confining himself to his desk for several days, till the energies of brain had become exhausted, would mount his horse, call out his dogs, and follow the chase for days in succession, till he had restored his prostrated energies, and then return to his study. When Byron entered college, fearing that his tendency to corpulency would injure his personal beauty—of which he was very proud—he took extremely severe exercise daily, in order to reduce his system, besides leading an extremely abstemious life. Webster was a backwoodsman, born in a 'log-cabin,' on the borders of the unbroken forest, and inured to hard labour.‡ And often, breaking away from public life, and shouldering his gun, he ranges the forest for days in search of game, besides taking much exercise daily. Franklin was a practical printer and a hard worker. Patrick Henry, that unrivalled star of genius and eloquence, laboured on the farm while young, and was passionately fond of music, dancing, and the chase, the latter of which he often followed for weeks together, camping out in true hunter's style.§ Need we mention the Father of our country, its pride and

* No one can have a good voice without having a good muscular system. To improve the tone of the muscular system, is to augment the power of the voice. An additional reason why public speakers should labour.

† Madden's *Infirmities of men of Genius*.

‡ See his speech at Saratoga Springs, 1844.

§ After his removal to Louisa, he has been known to hunt deer, frequently for several days together, carrying his provisions with him, and at night encamping in the woods. After the hunt was over, he would go from the ground to Louisa court, clad in a coarse cloth coat, stained with all the trophies of the chase, greasy leather breeches, ornamented in the same way, leggings for boots, and a pair of saddle-bags on his arm. Thus accoutered, he would enter

pattern? Washington, when not employed by his country, laboured assiduously upon his farm; and was actually driving his plough when he received the news of his election as President. Harrison, 'the FARMER of North Bend,' led a life of great physical exertion and exposure. Burns, the Scottish bard, actually composed much of his poetry when at work on a farm. President Dwight, the great theologian and scholar, attributed much of his mental vigour to daily labour in his garden. John Quincy Adams, one of the most learned men of the age, says he finds much daily exercise indispensable.

Both while in college, and during my professional visits to our principal colleges since my graduation, I have observed as a uniform fact, that those students who have been brought up without having laboured, never take a high intellectual stand, except in parrot-like scholarship. They always show a want of mental vigour, and of the power of close, hard thinking. After they enter upon the business of life, their case is still worse. For them to rise to eminence is impossible. O, I thank God and my father that I was obliged to WORK hard and constantly on a farm till sixteen years of age, when I began to prepare for college. Leaving home with only four dollars in the world, with my all upon my back, I travelled four hundred miles, WORKED my way to college and through college, and instead of earning my money by teaching school, supported myself by sawing, splitting, and carrying up the wood of my fellow-students, THREE AND FOUR FLIGHTS OF STAIRS, spending every hour in this way, except study hours, and often portions of the night. My fellow-students laughed at me then, but now the scales are turned. I thought it a hard row to hoe, but a rich harvest has it yielded me; and you, reader, owe to this same cause, no small portion of whatever delight or benefit my lectures, writings, and examinations may afford you. Even these very pages are penned after a delightful feast of work. And one of the means by which I am enabled to write as much as I do, is the interspersing of composition with labour. I rise in the morning before the hens leave their resting places, and engage briskly in some sort of labour, usually agricultural, till I have worked up the circulation to a high pitch, and sent the blood rushing round the system—in which manual repast I take more pleasure than even in my subsequent breakfast. I then go to my desk, to put on paper the ideas which this bobily exercise pours in upon my mind. Merely as a means of promoting authorship alone, no motive would induce me to give up MANUAL LABOUR,* nor has probably anything aided my authorship so much as the purchase of a small plot of ground on which to work. Nor has my health ever sustained so much injury from exposure, or excessive professional application, or any other cause, as from that deficiency of labour which some twenty years study and close professional application have partially prevented my taking. Nor has anything done more to restore the health then impaired than a return to work. Do not blame this personal allusion, but profit by the lesson it teaches. Reader, be your occupation what it may, pleasure or business, mental discipline or professional attainments, take this advice—WORK HARD AND DAILY FROM TWO TO SIX HOURS. You will thus accomplish much by study, dispatch more business, and perform and enjoy more in whatever you engage, ten to one, than by perpetual application. As the bow always bent loses its elasticity, so continued application either exhausts or disorders the brain, and impedes mental energy and discipline, which daily labour

the courthouse, to take up the first of his causes that chanced to be called; and if there was any scope for his peculiar talent, throw his adversary into the background, and astonish both court and jury, by the powerful effusions of his natural eloquence.—*Wirt's Life of Patrick Henry.*

* Some have expressed surprise at the amount of mental exertion put forth by the author. Whether it is remarkable or not, its secret is in exercise and fasting.

will wonderfully promote. Ye who aspire after renown, WORK. Ye who would do good, WORK. Ye who would fulfil man's great terrestrial destiny of being HAPAY, LABOUR DAILY. And ye who are too proud or too laizy to work, be content to suffer. Suffering will be good enough for you, because you violate a cardinal law of your being.

In view of these two fundamental laws of our being—the great demand of nature for muscular action, and its subserviency to all the great ends of life, what shall we say of those who are ABOVE WORK? He who thinks himself too good to work, is in reality too BAD. No man or woman can ever be above labour, without being above his nature and his God. That human being is no man, no woman, only some paltry thing, who is too proud to engage in manual labour. 'To till the earth and to keep it,' is an honour, not a disgrace. It is to become 'co-workers with God. And he or she who is too proud to labour, ought, in all consistency, to be too proud to breathe and eat, because labour is quite as much a constitutional function and demand of nature as breathing. Ashamed to be seen at work! As well be ashamed to look or talk! Away with this dogma that labour degrades. It elevates and ennobles. Its influence upon the mind is most beneficial. It begets a resolution and energy of character, which infuses into all our feelings and conduct an indispensable element of success. Labour requires a perpetual grappling with difficulties and overcoming obstacles, which inspire and cultivate a firmness and determination imparted by nothing else. Hence the youth brought up to do no work while young, fails to cope with difficulties. He yields to them through life, and of course accomplishes little. This explains why rich youths make such poor scholars and shiftless ninnies. I had rather my boy should be a street scavenger, and my girls kitchen drudges, than brought up not to labour at all; for no kind or amount of work is as bad as idleness or no labour. Not that I advocate *excess've* toil, but only some sort of work. Play is good for children, but it is not enough. They must learn, by toiling through those opposing obstacles, the removal of which constitutes labour, to grapple with all kinds of difficulties with determined resolution. The greatest curse now impending over our land is this anti-working fashion. Parents seem to vie with each other who shall support their children at the greatest remove from doing anything. And one of the greatest of the evils of that monster evil slavery, is the idea it fosters, that labour is the business of slaves, and is degrading to master and son. That wrong inflicted on the slave, great as it is, is trifling compared with the depravity and suffering which this anti-working tendency does so much to rivet upon the white population.

All anti-workers have their reward. Produce me the man brought up without work, who did not turn out to be both inefficient and vicious. This explains the prevalence of vice among the rich, and at the south. If I had the wealth of Astor my children should work. Not that I would force them to it; for this might make them hate it; but I would persuade them to it, and enamour them of it, so that they should labour from choice.

And those dear, delicate, fashionable, city ladies—generally as homely as hedge fences, simply because they do not work, and of course become sickly, and therefore 'ugly looking'—so extra exquisite that they must never soil their soft hand by doing the least thing about the house—too nice, and delicate, and refined, and genteel, and senseless, to be so vulgar—may possibly take a fashionable promenade once in a while, and an occasional 'airing' in the easiest riding carriage that can be made. So very genteel, they must ride to church, though only two or three streets off! Consummate simpletons; don't you wish you had a patent machine, by which your servants could chew your food and pump breath into you without any effort of your own, so as to place you at a still greater remove from labour! And your extra delicate and helpless children—don't you wish they could lie down and lie there

all their lives, and save the trouble even of eating, by letting pap drop into their open mouth, and run down their throats of itself!

And poor but proud pretenders to gentility, who have scarcely enough to eat, yet would fain make a genteel appearance—starving the kitchen to feed the parlour—if accidentally caught in kitchen habiliments, must blush, and apologize, and lie outright, by pretending that their servant has just left, and they had to prepare dinner. Out upon your proud nothingness! Obligated to work, yet lie to hide it! This anti-working pride is contemptible in the rich, but in you it is intolerable. Beg pardon for obeying the laws of your being, ha? What greater sign of your littleness? Go away, ye toadstool grandees, into merited insignificance and infamy. Come, ye labourers, and inherit the blessings prepared for you. I do not wish such perverters of their natures had no muscles; but a short paralysis of them, so as to make them sensible of their value, would be good enough for them. Indeed, the partial paralysis of their muscles always follows their protracted inaction. Muscles used but little decline, till they become so weak that exertion, otherwise a source of exquisite delight, becomes irksome, and fatigue follows trifling exercise. Such are most heartily to be pitied; yet their punishment is just.

In view of this constitutional demand for labour, what becomes of the idea that labourers are therefore inferior? It is blown to atoms. The honourables of the earth are its labourers. Nothing is mean which nature requires. What she has anointed and crowned, let not man despise. This idea that labour is degrading had its origin in kingly and feudal times and institutions; in the days of lordlings and serfs. Would that it had never been brought to our republican shores. Does it not run in the teeth and face of every principle of republicanism? Our cardinal doctrine of equality is fast erasing it, and elevating labour to that post of honour assigned to it by nature. True REPUBLICANS will never think the less of those who labour; those who do, should emigrate. Our country, our institutions, are not congenial with their practices or doctrines. The old world is enough to be consecrated to aristocracy and caste; this is sacred to equality. Go home to England or India, ye purse-proud labour despisers; here you are aliens. Our institutions conflict with your practices. Go where you can find congeniality, and leave us who love equality, to the peaceable possession of our home. Here you are eye-sores, and stand in the light of those to whom this land, of right, belongs.

Touching the matter of caste as connected with labour, Miss Charlotte E. Beecher justly observes:—

‘Let any woman who esteems herself in the higher classes of society, put the case as her own, and imagine that her son or brother is about to marry a young lady, whose character and education are every way lovely and unexceptionable, but who, it appears, is a seamstress, or a nurse, or a domestic, and how few there are who will not be conscious of the opposing principle of caste. But suppose the young lady to be one who has been earning her livelihood by writing poetry and love stories, and who has lived all her days in utter idleness, and how suddenly the feelings are changed? Now all the comfort and happiness of society depend upon having that work properly performed, which is done by nurses, seamstresses, chambermaids, and cooks; and so long as this kind of work is held to be degrading, and those who perform it allowed to grow up ignorant and vulgar, and then are held down by the prejudices of caste, every woman will use the greatest efforts, and undergo the greatest privations, to escape from the degraded and discreditable position. And this state of society is now, by the natural course of things, bringing a just retribution to the classes who cherish it. Domesticates are forsaking the kitchen, and thronging to the workshop and manufactory, and mainly under the influence of the principles of caste; while the family state suffers keenly from the loss.

Meantime the daughters of wealth have their faculties and their sensibilities developed, while all the household labour, which would equally develop their physical powers, and save them from ill-health, is turned off to hired domestics or a slaving mother. The only remedy for this evil is, securing proper education for all classes, and making productive labour honourable by having all classes engaged in it.

One probable reason that labour is despised is, that it is generally required in such excess as to be extremely burdensome. Such excess is injurious, and should never be required. On the contrary, we should render labour as delightful in fact as nature has rendered it by constitution, thus seconding her evident intention. Nor should labourers be required to strike another blow after they are just comfortably tired. We should work for play, and only when labour is pleasure.

This brings up for consideration the amount of exercise required. From two to six hours of vigorous muscular exercise is the least amount compatible with first-rate health. A lower degree of health may be preserved on less exercise, but as the order of nature is to spend from four to six hours daily in the open air, so the perfection of health requires a great amount of muscular action. My own convictions are, that about four hours brisk labour a day will suffice for exercise; and this amount, well expended by all—rich and poor—would just about supply the human family with the necessaries and comforts of life. How admirable this adaptation of the amount of labour requisite for health, to that required to provide man with the necessaries and comforts of life.

In the light of this required amount of exercise, what shall we say of those merchants, clerks, lawyers, students, and the sedentary classes generally, who confine themselves to their offices, desks, and books, from morning till night, year in and year out, scarcely going out of doors, except to and from their businesses, and then TAKING AN OMNIBUS. If these principles of exercise were put in practice, very few city conveyances would be required or patronized. One would think that our sedentaries, starved almost to death for exercise, would embrace every opportunity to take it, walking at least to and from their business, sawing their own wood, and the like. Yet fashion requires that they hire horses to carry them, and servants to saw them their wood. Such fashions I despise.

How much exercise particular individuals should take depends on circumstances to be determined for each individual by himself, and varies with existing capabilities of endurance, which are easily determined by the feelings at the time. As unperturbed appetite constitutes an infallible guide to the required quantity of food, so muscular appetite, unless rendered abnormal by inaction, will inform us how much exercise we require for the time being, and when we are taking it in excess, or at improper times. Excessive and also fitful or violent exercise, especially for the sedentary, is injurious. Such should exercise deliberately, as well as eat slowly, else exhaustion supervenes before a due degree of exercise is obtained.

Yet some are so situated, that to take sufficient exercise is exceedingly difficult. Though such should change their business, because exercise should be a paramount consideration, yet they may find in dancing a partial substitute. Not that I recommend this amusement as generally conducted, but unequivocally condemn it. But though this dancing but seldom, and then all night in hot and ill-ventilated rooms, and then going out exhausted and exposed to colds, together with most of the associations of the ball room, are most pernicious; yet for our sedentaries to select their company, and meet at each others houses in the afternoon or evening, always avoiding over-exertion, and retiring at nine or ten o'clock, would, if practised often, supply in part that deficiency of muscular action which causes so many to sicken and die, would restore many an invalid now perishing by inches with pure inanition,

and preserve and even re-invigorate the health of many now going in a decline. Dancing MIGHT be, yet rarely is, so conducted as to prove eminently beneficial, without occasioning any evil. Dancing is founded in the nature of man, and can therefore be turned to a most excellent practical account in a great variety of ways. To sedentary young women this form of exercise is particularly recommended. Yet I would have all dance to their own music, vocal and instrumental, or both, and also in company of their parents and elders. Young people should never dance exclusively by themselves. Yet our present purpose being to point out to the sedentary a feasible mode of taking exercise to guard against evils too often associated with it, is digressive.

Besides the sedentary, those labourers who sit or stand much in one posture will find that the change and diversity of manual action secured by dancing, dispel fatigue and promote health, and perhaps even render unhealthy occupations healthy. Seamstresses, goldsmiths, shoemakers, and many artisans of like occupations, who have no substitute, should dance daily as much as eat; and students will find it alike promotive of health and of mental action.

Exercise is doubly requisite for the young. See how briskly and almost incessantly lambs frisk, calves run, colts prance, kittens play, and the young of all animals exert their muscles. Nor do children form an exception to this law. What mother or nurse has not been surprised, if not provoked, by their incessant activity and noise from morning to night, year after year. Nor can this action possibly be prevented. Try your best to keep them still, and you will fail. To prevent their action is as impossible as to prevent their breathing, and as injurious as impossible. This restless activity is interwoven throughout their whole natures, and for the best of reasons. Their growth being rapid, their digestion, respiration, circulation, and perspiration must be proportionally active. Exercise promotes all these functions, and thereby augments growth—is indeed indispensable to it. Swing up an arm or foot so as to prevent its action, and see how it shrinks and becomes enfeebled and diseased. Restoring its action enlarges, restores, and strengthens it. So of the system as a whole. To prevent children from being active, besides being the worst punishment that can be inflicted on them—and I pity from my inmost soul those dear sufferers who are shut up and required to keep still—prevents the development of bone, muscle, nerve, and brain, and thereby weakens every one of their powers, mental and physical, and thus becomes one of the worst evils which can be forced upon them. I rejoice in the gambollings of children, noisy though they be, because augmented health and mentality are the results. I would rather sacrifice my own temporary convenience, than prevent so great a good to them. Nor will my conscience allow me to interdict what their highest good requires. Did Nature implant this perpetual restlessness to be suppressed? We fight against her requirements at our peril. Many a mother has followed her children to their graves because she broke down their constitutions by interdicting their play. You should rather promote than retard this demand of their natures. Nor need they fear, much as they will if allowed, that they will run too much. After they have been unduly kept in for a long time, they may perhaps play beyond their strength at first, but not long. It is hardly possible for them to overdo. Not one in scores of thousands ever does this, but nearly every child in civilized life is more or less enfeebled and diseased by over-confinement and playing too little. Parents should make provision for their children's play as much as for their meals.

'But I cannot possibly stand their perpetual uproar,' cries a nervous mother. Then turn them out of doors. Nor keep them for cold or wet. Wash them all over every morning with cold water, and neither wet nor cold will hurt them, but only benefit them. Their racing will convert both wet and cold into instrumentalities of health. Do not be

too tender of them. Confinement kills scores, where exposure kills one; and even then the exposure would be harmless but for previous confinement. There are weathers not suitable for them to be out, yet then they will want to stay in.

'And what shall we do with them then?' asks another mother. Have a play-room under cover, set apart expressly for them, filled with facilities for play. It need not be warmed; they will keep themselves warm enough by exercise. No house should be without its children's play-room, any more than without a kitchen or bed-room. And such rooms should be large and airy. Whole flocks of children of different ages, should be turned out to roam over hill and dale unrestrained, the elder succouring the younger, or rather, all under the care of teachers, who, from every flower, and mineral, and production of nature met in their rambles, would teach them nature, her operations, and her laws. Whatever you do for children, or whatever you leave undone, do this:—

GIVE THEM THEIR PERPETUAL FILL OF EXERCISE.

In addition to play, children and youth should labour, but not to excess. One of the reasons for this has already been given. It inures them to overcoming obstacles. It also furnishes an exercise of muscle more severe than play, and trains them to habits essential to their health and happiness through life. They should also practice rendering themselves serviceable to others while young. And then there is something in labour which hardens the whole system, brain included, rendering it compact and firm, and capable of enduring what those not inured to work can never sustain. Especially should labour be rendered INVITING to them, never repulsive. If possible, induce them to work from choice, not compulsion. This can be easily effected in a variety of ways. One is by giving boys a parcel of land, and letting them plant, tend, and harvest it on shares. This will also teach them the value of money, by showing them how much labour it requires to earn it. Another way is by giving them tools and a workshop, and encouraging them to make sleds, wagons, kites, boxes, and what play-things they want, as well as tinkering up other things required. By a variety of kindred devices they can be induced to labour from love of it.

Yet I protest against subjecting your children to excessive and perpetual toil. As soon as they enter their teens, some parents say to them, in actions, if not in words, 'I have toiled hard and long for you, and now you must pay me off, principal and interest, by working still harder for me.' Let such remember, that children have much more than paid their own way all along from birth, in the pleasure they have occasioned, and that instead of owing, have actually brought their parents in debt; or rather, that both are indebted to their common parent for the mutual pleasure they have occasioned to each other.

Children are also put to trades too early, and sometimes bound out to severe taskmasters, obliged to work hard early and late for six or seven years, and are sometimes poorly fed and lodged, thus forced to expend in the service of their master, those energies required for the development of their bodies and brains. Many mechanics make it a point of economy—though it is the worst kind of robbery—to get much of their work done by apprentices. The present apprentice system is abominable—utterly anti-republican and unjust, and often wickedly cruel, as many readers know by sad experience. Its object should be to teach the trade, not to enrich the employer. That well learned—and by this time the trouble of teaching and keeping will be amply recompensed by the labour of the apprentice—they should be allowed the full avails of their labour, instead of being compelled to work hard for several years for nothing but their food and clothing, and then thrown empty upon the world at twenty-one, whereas if they had been paid half the nett profits of their labour, they might have had a home of their own, and capital with which to commence business, and more

than all, GOOD CONSTITUTIONS, which are often now well nigh ruined by over-working while growing. Many children and youths, while growing rapidly, are lazy, especially those who mature late, because they require all their vitality for growth, and to give them strong constitutions; nor is it expedient or right to compel such to labour much beyond what they themselves choose, lest they should expend in labour those vital energies required for growth. Nor need you fear that they will be as lazy after they have attained their stature and maturity,—after their reservoir of vitality is full and overflowing; for their very indolence now will contribute to their efficiency then, by increasing their health and strengthening their constitutions, thus giving them the greater surplus for muscular and mental labour. Yet we would have all children work a little every day after they are ten years old.

This principle applies equally to putting youths into stores and offices too young. And the smarter they are, the worse the practice. Slim, spare, flabby, I see their morning sun about to pass into an early cloud, if not set in the darkness of premature death! Without abundant exercise they cannot possibly have strong muscles or vigorous health, and without these they can never do, or enjoy, or become much. Many readers can testify that their apprenticeship broke down their constitutions, and impaired their capabilities and their enjoyments for life.

But worst of all is the practice of compelling young children and youth to work steadily in the factory ten, twelve, or more hours daily, year after year, without vacation, or any time to play or recreate, or even enough to eat and sleep. See how pale, slim, haggard, and jaded out they all look. Give them a six months' play-day, and see how it will improve their health, and looks, and minds. I actually sigh for my country in view of the multitudes of our youth now subjected to this deteriorating practice; I mourn instead of rejoice over our mechanical prosperity. The farm is the place for children. What, if factory labour is light, it is confining, and prevents muscular exercise. Even excessive labour on a farm is less injurious. After the growth is completed, and the constitution every way consolidated, factory labour is less injurious; but I would work desperately myself rather than let my children be confined in the factory.

Thus far our remarks have been applied to boys. Yet to girls such application is quite as important, if not even more so. Girls especially should never be confined either to the chair in sewing, or to the factory room, for reasons given in our work on 'Maternity.' Women may sit and sew or knit after they are thirty, and the more the older they grow; but no girl should learn any female trade requiring her to sit as in sewing, folding books, colouring prints, or to remain in any other fixed posture, or confine herself in the factory till after thirty, on pain of a broken constitution and shortened life. Elderly women may sew, tend machinery, and the like, with comparative impunity. Nor should young growing girls be confined to lugging and tending infants.

If asked at what age children and youths may be put to school without much injury, the following anecdote contains the answer. While riding in a stage with its proprietor, who keeps several hundred horses in constant employ, all of which he buys himself, I asked him what kind of horses he preferred in making his purchases. He answered, 'Balky ones.' 'Why?' I again inquired. 'Because their fractiousness prevented their being used much till fully grown and hardened,' he replied. I again inquired 'At what age horses might be put down to hard work without injury?' 'Not till eight years old; they ought never to be broken earlier, and then they will wear like iron till they are thirty; you can hardly wear them out,' was his answer. He would thus have one quarter of their lives spent simply in growing and maturing, as they will much more make up his lost time by extra endurance afterwards. Only a few days previous I had ridden after an

extra smart horse, twenty-three years old, whose skittishness prevented her being used till about eight.

These facts, palpable to all who will open their eyes upon them, illustrate a universal law, which requires that nearly or quite one-fourth of the life of man should be spent in the formation and development of the physical powers. Youths should work only for play, till, besides having all the vitality requisite for growth, they become full and run over with surplus animal life, so that they almost ache for something to do in order to expend it. When this period arrives, be it earlier or later, just give them a chance to do something for themselves, and they will not be lazy. They will, instead, take hold of the affairs of life 'with an appetite,' and accomplish wonders. Whereas, compelling them to labour too young, is the worst way of all others to make them hate work, and turn idlers as soon as they are out of their time. To put children to hard work at eight or nine, is to wear them out by the time they are thirty or forty; but if you would have them live to be a hundred, give them the reins till they are twenty or upwards, and allow them to be boys and girls, instead of making them young ladies and gentlemen. But we shall touch a kindred point, under *Approbateness*, in Vol. II.

EARLY SCHOOLING.

The injuries consequent on the vitiated air of school-rooms, has already been pointed out. Those consequent on confinement and inaction are scarcely less, and often greater. The demand for vigorous and almost constant exercise in children is *IMPERIOUS*, and its suppression fatal. Apply your finger to their pulse. Mark that rush, rush, rush of blood, simply to supply the hand. This blood is freighted with the materials for growth, and must be much more vigorous in children than adults, because the former grow as well as live. Respiration must also keep pace with circulation, and exercise with both; so that confinement in school-rooms enfeebles the body, and thereby the mind. How perfectly miserable probably every reader has been upon the school-house bench—a sure sign of violated law. But when play-spells and noonings came, did we not run, and jump, and hallo, and breathe deep and fast, and thus send the boiling blood coursing throughout the system, freighted with the materials of life and growth, with new force? Beside, how much faster we learned after than before! The brain is the last portion of the system to form and mature. Hence, if youths should not be put to hard work till twenty, they should not be confined to hard study till even a later period. Many a dull boy has made a smart man. Excessive parental love and vanity too often try every possible method to render their children prodigies while young; yet confining a child in school both prevents the manufacture of vitality, and diverts what little there is from the body to the head, and thus debilitates both. This method of forcing premature development, weakens all a child's powers while alive, and hastens its death as well. But as we shall recur to the evils of precocity hereafter, we dismiss this matter here, simply adding that children should be taught mainly while on foot and in motion, and that the first care of parents should be to build a deep and broad foundation for mental greatness, in powerful constitutions and strong muscles, and *THEN* proceed with the superstructure.

In general, nothing is lost, but everything is gained, by not sending them to school till they are twelve, fifteen, or eighteen years old, and a quarter's play will often save a quarter's sickness. But whether they go to school early or late, much or little, they should not be required to sit above half or three-fourths of an hour at a time, when play-spells should relieve their restlessness, and sharpen up their minds for renewed action. And the longer these play-spells the better. But as our present object is to show the importance of juvenile exercise—not

education, a point elsewhere discussed, we drop it with the remark, that schooling should never curtail play, because muscular motion does children more good than books.

CHAPTER V.

THE BRAIN AND NERVOUS SYSTEM.

Suppose all those beautiful and perfect contrivances already described, of stomach, liver, intestines, heart, lungs, skin, bones, and muscles—the entire man—complete and imperfect order, all would be utterly useless but for some means of MANIFESTING MENTALITY. The mind is the man, and *its* measure *his* measure. This alone renders man both immortal and divine. It is the mind alone which enjoys; and since happiness is the great object of existence, of course our enjoyments are proportionate to the amount and right exercise of our minds. For its sake—to subserve its function—all other organs and functions were created; and hence the one end of life should be to promote its action.

But this mentality must have its ORGAN. Nature's motto is—an organ for every function. As digestion, circulation, motion, hearing, and all the other physical functions are performed by means of organs, shall not this crowning function of all have its organ also? It has; and that organ is the brain—an apparatus every way adapted to execute the mental functions.

Fully to prove that the brain is the organ of the mind, is not our present purpose, but simply to show its adaptation to this end. This will be seen in

THE LOCATION AND STRUCTURE OF THE BRAIN.

The brain occupies the cavity formed by the skull. Being extremely delicate, it is protected by the skull, the spherical form of which is admirably calculated to guard it against injury, break the force of contusions, and prevent fractures. Beneath this skull is a tough, hard membrane, called the *dura mater*, which envelops the brain, and dipping down lengthwise through its middle portion, partially separates it into two halves, called hemispheres. Under this is a thin lubricating film called the *arachnoid*, or spider's-web membrane, and below it again is still another fine-textured vascular membrane, which dips down into all the folds of the brain, and is perfectly full of blood-vessels and nerves, being to the brain, probably, what the skin is to the body.

The brain is exceedingly soft—about the consistency of jelly—and its inner or medullary portion is composed of two sets of nerves, one of which converges from its centre to its surface, and the other from its surface to its centre. These nervous fibres are filled with a semi-fluid called neurine, which probably exercises and transmits sensation and mental action by means of undulations or motions.

THE CEREBELLUM AND ITS FUNCTIONS.

A thick membrane resembling the *dura mater*, called the tentorium, stretched across horizontally, separates the brain into two divisions, the upper and larger of which is called the cerebrum or brain proper, which performs the mental functions, and the lower and smaller of which is called the cerebellum, or little brain, which in all probability serves to carry on the physical functions. Sever the nerve which passes between the brain and stomach, and hunger is destroyed, and digestion nearly suspended. The stomach simply digests, whereas hunger and gustatory pleasure are experienced by an organ of the stomach, located in the cerebellum, called ALIMENTIVENESS. In like manner, the sexual emotion is not experienced in its apparatus, but in the cerebellum, by a cerebral organ called AMATIVENESS. Now since two of the physical

functions are known to be performed by means of cerebral organs acting in conjunction with the physical—that is, since the stomach and sexual apparatus have their cerebral organs in the cerebellum, have not the heart, lungs, muscles, liver, bowels, pancreas, kidneys, and all the other organs of the body, also their cerebral organs in the cerebellum?

This conclusion is fortified by the fact, that all the nerves which connect the brain with the body, proceed from the cerebellum. This establishes the most perfectly reciprocal inter-relation between the body and cerebellum, and the near relationship of the cerebellum and cerebrum renders their states also reciprocal, and thus is proved and explained that perfect reciprocity between all the states of the body and mind already pointed out, and to be hereafter more fully applied.

These facts and deductions warrant the conclusion, that the brain does something besides think and feel—that it generates and sends forth the vital spirit which animates all parts of the body, infuses life and action into them, and sets and keeps the entire human machinery in motion; so that its healthy state is essential to that of the body, and its disease a cause of the disease of the body.

THE NERVOUS SYSTEM.

The nerves are but a continuation or extension of the substance of the brain throughout the system. This is effected by means of the spinal cord, which is enclosed in the spinal column or back-bone. The substance of this cord and of the nerves, closely resembles that of the brain.

This cord gives off nerves at each spinal joint, to the heart, lungs, stomach, liver, viscera, and all the other internal organs.

Nerves also go off from these joints to the hands, feet, muscles, bones, and every portion of the body. Another nervous track is called the great sympathetic nerve, which traverses the cavity of the chest from thorax to abdomen. Thus a double nervous inter-communion of all the organs of the body is maintained both with each other and with their common centre—the brain. These nerves are always found in close proximity with blood-vessels—both arteries and veins—the three always accompany each other throughout the system. And not only is every *principal nerve* thus supplied with blood-vessels, but even every shred of every nerve, and even every fibre of every muscle, is similarly supplied with both blood-vessels and nerves. Wherever there is life, there also will nerves be found, and the more life in any part, the more nerve will there be.

THE FUNCTIONS OF THE NERVES.

These nerves are of three kinds—those of sensation, those of voluntary motion, and those of involuntary motion. The nerves of sensation proceed from the back half of the spinal cord, and those of motion from the anterior half. Soon after they issue through the joints, they unite, are incased in common sheath, and cannot be distinguished from each other. Yet on cutting the nerve, say that which goes to the hand, or issues from the interior half of the spinal cord, all sensation is destroyed, so that the hand may be cut, burnt, anything, without feeling it, while, on cutting that from the posterior half, all power of motion is destroyed. The involuntary nerves go to the heart, lungs, stomach, and other internal organs, so as to carry on their several functions irrespective of the will, while asleep, and when attending to the affairs of life, an arrangement absolutely indisable.

The nerves of voluntary motion are distributed mainly to the muscles, and enable us to govern them at will—to move the hands, feet, and body, in accordance with the determinations of the will; while those of sensation are branched mostly upon the *SURFACE* of the body, stationed as sentinels upon the outer walls, to warn us against the approach of all enemies to life and health—to tell us when we are too warm, or too cold,

or in contact with anything injurious. The opinion has already been expressed, that the skin consists of a network of blood-vessels and nerves—so minutely ramified, that the finest needle cannot be thrust through any part of it without lacerating and paining some of them. The minuteness of this ramification is absolutely inconceivable. Nature is as infinite in her littleness as in her greatness.

Words utterly fail to describe, and the human mind to conceive, the fineness of these capillary formations, as in the structure of the lungs, blood-vessels, pores, and nerves. In this infinite littleness of nervous ramification in the skin, sensation takes place. These nerves ultimately end in an infinitude of little papillæ or feelers, which cover the entire surface of the body, and create that sensation of which we are all conscious.

These nerves are much more abundant at the surface of the body than internally; and hence, in amputations, and all cuttings and bruises, biles, and sores, the greatest pain is nearest the skin—it being comparatively slight after the cut or hurt has fairly passed below the skin. Yet when a bone has become inflamed, it is also exceedingly painful; yet here also the pain is mainly at its surface. Since the inner portions of the body are protected by the outer portions, as great a supply of the nerves of feeling internally as externally, would be a useless expenditure of vitality.

Yet a still greater sentry of nerves is stationed at some points than at other, as about the eyes, hands, and especially ends of the fingers, the utility of which is beyond all computation.

The importance of the sensation thus effected is incalculable. Without it we could never know when we were too cold, or too warm; when our flesh was burning, or freezing, or bruised, or mangled, or experiencing any sort of injury or destruction, unless we chanced to see it. But now, the instant they come in contact with whatever injures them or the system, they occasion pain, and thus cause a spontaneous shrinking from the noxious body, which saves us from farther damage. The suddenness with which this warning and shrinking occur, as when we touch fire, or are cut, or pricked with any sharp instrument, is astonishing. The very instant we touch fire, for example, we jerk away the part affected. The nerves feel pain, telegraph that pain to the brain, muster the will, which gives the muscles a mandate to remove the part affected, and they obey—all in the twinkling of an eye. The importance of this instantaneousness is very great. The injury in cases of burns, punctures, bruises, etc., is extremely sudden, so that, if it were not for this instantaneousness, great havoc would occur before it could be arrested. This arrangement of pain is one of the most useful institutions of our nature.

But this function of pain is by no means the only one experienced by these nerves—indeed, it is not their chief one. Their principal function is to yield a pleasurable sensation when the body is in a natural state. For such pleasurable sensations nature has amply provided. Every arrangement of external nature is adapted to give us pleasure when her laws are observed. Nor do we realize how much pleasure our nervous system yields us. Like breathing, it is so perpetual, as not to be appreciated. This pleasure might be doubled many times over, if we but keep our nerves in a perfectly healthy and highly active state. Take some examples. Your face, before it was washed in the morning, does not feel half that pleasurable glow experienced after it is washed. Why? Because the ablution cleanses and quickens the nerves of the face. Or wash say one limb, hand or arm, or half of the body, or a part of a limb, and not the remainder, and the washed portions will feel as much more comfortable as can well be imagined. The experiment is well worth trying, and powerfully enforces the importance of those ablutions of the whole body already recommended. Nor do those know, who have not tried the experiment, how much more

lively, brisk, buoyant, and happy, bathing renders those who practice it, not at the time merely, but for hours and days afterwards.

So also colds, which impair the sensitiveness of these nerves, either benumb them so that they feel but little, or fever them, and cause a kind of restless, crawling, burning sensation, which make us almost want to 'jump out of our skin.' What we call the *creevels* consist in a crawling, feverish, painful state of the nerves, and can be obviated by restoring them to healthy action. Nor can we conceive how much of our suffering comes directly and indirectly from the disordered and therefore painful condition of these nerves; nor how superlatively happy we could render ourselves by keeping these feelers in a vigorous and perfectly healthy state. But the entire drift of many people's habits tends to deaden and disorder them, and thus to convert the pleasure they were created to confer into pain. We begin to vitiate these nerves in the cradle by extra dressing and a confined and over-heated atmosphere, and go on to weaken and disorder them more and more through life. Every cold we take, they suffer—are the chief sufferers. Have you never felt, while suffering from cold, an indescribable sensation of nervous crawling uneasiness, exceedingly disagreeable, so that you could neither sit, nor stand, nor walk, nor lie still comfortably? You feel as though you would fain spring right away from yourself, or, snake-like, shed your skin—if you could only relieve yourself from, this wretched state of feeling. This state of the nervous system is particularly apparent when we have taken cold, and in the incipient stages of fever, while the chills of ague and fever are on, and generally when we are unwell. What are called nervous, hysterical people, are particularly liable to this feeling, and their condition is indeed pitiable. Yet they should not have brought on this nervous disorder.

But the evils of diseased nerves do not stop here. They extend also to the mind, and render the entire being more and still more wretched the more they are disordered. They not only inflict the *creevels* and the *fidgets* upon the body, but still more upon the mind. That connection of the nerves of the skin with all the nerves of the body, and of the latter with the cerebellum, and through it with the cerebrum, engenders the same condition in the brain which exists in the nerves. It is not possible for the nerves of the skin to be affected, without similarly affecting both brain and mind. If the former are in a feverish, unhappy, or painful state, they diffuse the bad effects of that state throughout all we think, say, do, desire, and feel. Nervous people, or those whose nerves are disordered, are always fretful. They feel wretched both in body and mind; and if they do not worry and find fault with everybody and everything, it is not because they do not feel irritable. Disordered nerves would render an angel cross. However amiable a woman may be by nature, just as surely as her nerves become disordered, just so surely does she become peevish and fretful, if not ill-natured and bad dispositioned. Thus disordered, she would find fault in paradise, if there. But, restore her nerves to their normal, and therefore happy state, and you restore her to her original serenity of mind and sweetness of temper. What worried her before, now gives her pleasure. She laughs now at what she scolded then. Those mental troubles which then preyed upon her mind, have now taken their flight. Indeed, she was troubled in mind only because she was disordered in body. The troubles of such people are imaginary, not real; or if real, they are magnified in the exact ratio of the disease of their nerves. If such have no real cause of trouble, they will make it out of something else. As every touch of the gathering bile gives pain, which, if the part were well, would give pleasure, so with their minds. The irritation of their nerves irritates the brain, and this renders them inordinately irritable about trifles, even in spite of everything calculated to promote a cheerful and happy frame of mind. Trifles excite them more than the cares of kingdoms should do. A great load presses per-

petually upon them. They feel as though some terrible calamity—what, they know not—impended over them, ready to fall upon and crush them. Their excited imaginations magnify molehills till they become mountains. They are rendered wretched from morning till night by a perpetual fever of excitement; tossed backward and forward by currents and counter currents of feeling, which they find it impossible to control. At one time, they are elated beyond measure, and full of ecstasy. Then some trifling thing, too insignificant to affect a healthy brain, casts them into the very depths of despair. The sensibilities are morbidly alive to everything. They retire to their couch, but not to sleep. The boiling blood courses through their veins, while the labouring pulsations of their hearts shake their whole frame. Their thoughts wander to the ends of the earth, but to no purpose. They think and feel upon everything, only to increase their disease, and aggravate their mental sufferings. If Cautiousness be large, they are afraid of their own shadows, and see their path filled with lions and tigers. If Approbativeness predominate, they thirst for fame, but see the cup of praise dashed from their lips by merely imaginary neglects, or reproofs which are so construed as to induce the deepest chagrin and mortification. They seek sleep, but find it not. Hour after hour they turn upon their damask couches, exhausted by mental action, even to prostration, but unable to compose their excited feelings. Their brightest thoughts flit like meteors across their mental horizon, only to vanish in midnight darkness. And if tardy sleep at last enfolds them in his arms, dread dreams disturb their slumbers, and they awake in deep and terrible melancholy. They feel keenly, only to feel most wretchedly. Now and then, a sigh or groan escapes them, and they feel internally, ‘O wretched man that I am!’ They feel burdened with they know not what. Things, otherwise their joy, are now their misery. Their nervous energies are wrought up to the highest pitch of inflamed action; yet they have no strength to endure this excitement. Days and weeks roll on only to augment their miseries, and to increase their exhaustion. Their excited minds thirst for books, but mental application only increases their malady and their miseries. Do what they will, be they in what circumstances they may, their disordered nerves turn all they touch into occasions of wretchedness. The difference between the talents, character, and happiness of the same person when his nerves are healthy and when diseased, is infinite. None can ever understand, but those who know them by experience, the sorrows of persons thus afflicted.

Since healthy nerves render us thus happy, and disordered nerves thus miserable, the inquiry how to keep the nervous system in health, is of the utmost importance. Our answer is, do nothing to derange them, and they will never disorder themselves. The two general directions are, first, keep the skin clean and active by bathing, and secondly, give them *action*. Exercise is as requisite to them as to the muscles, or lungs, or any other portion of the body. Yet who ever thinks of providing exercise for the nerves? One means of securing their action is by promoting cerebral action, of which we treat in Vols. II. and III., and the other means is by exercising them direct.

But the great direction is, not to over-tax them by highly stimulating meats and drinks, such as alcoholic and fermented drinks, or narcotics, as tea, coffee, tobacco, and opium, or mustards, spices, and condiments, generally. No kind of stimulants should ever be administered to children or youth. They are sufficiently excitable and active already. Opium in any of its forms is most detrimental to infants. But of this in our volume on ‘Maternity.’

But mental excitement, anxiety, and trouble, as effectually derange the nervous system, as any other cause, and should therefore be avoided. The fact is, all should arrange their houses, lands, businesses, domestic affairs, and everything around them, little and great, so as to render

themselves as happy a possible, and by all means avoid occasions of sad feelings and vexations. And if trouble *does* overtake them, as the loss of friends, domestic difficulties, failure in business, or anything of the like, they should banish it as far possible from their mind, and try to think on what gives pleasure. Children also should be crossed and provoked, and especially flogged, as little as possible, because the painful excitement thus occasioned, is directly calculated to disorder their nervous system.

Having expounded the principal organs and functions of the human body, and shown how to preserve them in a healthy and vigorous state of action, we are thus brought to consider the general subject of diseases and their remedy, which, next to the preservation of health, becomes an all-absorbing subject of human inquiry.

CHAPTER VI

THE REMEDY OF DISEASES.

ALL the physiological organs thus far described, though their normal function is fraught only with life and happiness, are capable of taking on that abnormal or diseased function which results in pain, and constitutes disease. Diseases assume different forms, according to the organs disordered, the degree of the disorder, and some other circumstances; yet the nature of disease is much less complex than generally supposed.

Though a few of the violations of the physical laws are punished with incurable penalties, yet most cases of disease, poisons not excepted, taken in season, can be cured. In fact, nature seems to have taken the utmost pains to cure most if not all the 'ills that flesh is heir to.'

Medicines abound in the vegetable kingdom; and abounding there, why look any farther for them?

Especially let us not *poison* the system in order to cure it.

The reputation which poisons have got for curing diseases, is due mainly to abstinence from food, to perspiration, and emptying the stomach. The effects of calomel, &c., upon the teeth alone, brands them with unequivocal condemnation; for whatever injures them, first disorders the stomach. The decay of the teeth foretokens incipient dyspepsia. And since they are always impaired by these medicines—and whoever has taken poison is a living witness of this fact—they of course always enfeeble the stomach.

Narrowing down our observation to that popular medicine CALOMEL, It powerfully stimulates the liver, but stimulates it by *poisoning* it. Hence liver affections almost always follow its administration—*always* except when both stomach and liver are extra powerful. Dyspepsia follows its use almost as surely as daylight follows sunrise. Let observation, the more extensive the better, pronounce the verdict. Language can never adequately pourtray its ravages on health and life. On this point hear Professor Chapman, of Philadelphia:—

'GENTLEMEN:—If you could see what I almost daily see in my private practice in this city, persons from the South, in the very last stages of wretched existence, emaciated to a skeleton, with both tables of the skull almost completely perforated in many places, the nose half gone, with rotten jaws, ulcerated throats, breaths more pestiferous, more intolerable, than poisonous upas, limbs racked with the pains of the Inquisition, minds as imbecile as the puling babe's, a grievous burden to themselves and a disgusting spectacle to others, you would exclaim as I have often done, 'O! the lamentable want of science that dietates the abuse of that noxious drug calomel in the Southern States!'

Gentlemen, it is a disgraceful reproach to the profession of medicine ; it is a quackery, horrid, unwarranted, murderous quackery. What merit do gentlemen of the South flatter themselves they possess by being able to salivate a patient ? Cannot the veriest fool in Christendom salivate—give calomel ? But I will ask another question. Who can stop its career at will, after it has taken the reins into its own DESTRUCTIVE AND UNGOVERNABLE HANDS ? He who, for an ordinary cause, resigns the fate of his patient to mercury, is a vile enemy to the sick ; and if he is tolerably popular, will, in one successful season, have paved the way for a good business through life ; for he will have enough to do ever afterwards to stop the mercurial breach in the constitutions of his dilapidated patients. He has thrown himself into fearful proximity to death, and has now to fight him at arms-length as long as the patient maintains a miserable existence.'

Dr. Graham, of Edinburgh, in speaking of mercurial medicines, says :—

'They affect the human constitution in a peculiar manner, taking, so to speak, an iron grasp of all its systems, and penetrating even to the bones, by which they not only change the healthy action of its vessels, and general structure, but greatly impair and destroy its energies ; so that their abuse is rarely overcome. When the tone of the stomach, intestines, or nervous system generally, has been once injured by this mineral, according to my experience, (and I have paid considerable attention to the subject,) it could seldom afterwards be restored. I have seen many persons to whom it has been largely given for the removal of different complaints, who, before they took it, knew not what indigestion and nervous depression meant, only by the description of others ; but they have since become experimentally acquainted with both, for they now constantly complain of weakness and irritability of the digestive organs, of frequent lowness of spirits and impaired strength ; of all of which it appears to me, they will ever be sensible. Instances of this description abound. Many of the victims of this practice are aware of this origin of their permanent indisposition, and many more, who are at present unconscious of it, might here find, upon investigation, a sufficient cause for their sleepless nights and miserable days. We have often had every benevolent feeling called into painful exercise, upon viewing patients already exhausted by protracted illness, groaning under the accumulated miseries of an active course of mercury, and by this for ever deprived of perfect restoration. A barbarous practice, the inconsistency, folly, and injury of which no words can fully describe.'

This is the testimony of ITS FRIEND—of distinguished members of the medical FACULTY—and it is true of the PRINCIPLE on which calomel and *all* mineral poisons act. And the more virulent the poisons, the worse. Those who take them *may* recover, yet it will be in SPITE of both disease and medicine. And their recovery will be slow, and their constitutions will be impaired.

'But,' retorts one, 'I took calomel, arsenic, quinine, and other condensed poisons, and was immediately relieved, and was more robust afterwards than before.' Aye, but how long did you REMAIN SO ? In a few months your stomach became impaired, and various aches, to which you were before a stranger, afflicted you. Still, all are at liberty to swallow all the rank poisons they please ; but I for one, however sick, should rely on other remedies, and particularly on abstinence and perspiration.

Scarcely less detrimental than these poisons, is that custom of draining the life's blood which generally accompanies it. Bleeding does not extract the disease, or at least only in proportion as it withdraws life itself, and repeated bleeding diverts the vital energies from brain and muscle to the EXTRA manufacture of blood.

A summary of these medicinal principles shows that we place far

less reliance on medicines, even vegetable ones, as restorative agents, than on *physiological* prescriptions. Obey the laws of health, and we need not be sick; and, when sick, a return to this obedience is the most direct road to health. Still, the existence of medicines shows, that they should be taken. Yet why take them in their present highly condensed form? Why not take them in that diluted form in which we find them in nature? In short, why not take them along with our FOOD?

A MEDICAL DIET BETTER THAN CONCENTRATED MEDICINES.

That certain kinds of food are eminently medicinal, is a matter of universal experience. Thus, many kinds of food act as powerful cathartics. Then why not follow nature, and always move the bowels by diet instead of by concentrated medicines? But we shall touch this point again. What we wish now, is to establish the PRINCIPLE, that nature has furnished us with all the medicines we require in *food*, and that medicines thus administered, are always efficacious, and never 'leave a sting behind.' We have already shown that what the system requires, it will RELISH; and that what is either repulsive to the taste or painful in its operation, is injurious; the plain inference from this is, that whenever the system requires any particular kind of medicine, appetite will crave those kinds of food which will effect a cure. Every medicinal law of nature centres in this focus. Granted, that mankind have not yet ascertained a tithe of the different kinds of food adapted to remedy given disease, yet the fact that *some* kinds are good for some complaints, favours the conclusion that ALL diseases have their specific cures in particular kinds and commixtures of diet. I can read nature's curative laws in no other light. But more on this point under the cure of dyspepsia.

'But when we are sick, we have no appetite for any kind of food,' objects one. Then fast. Fasting is what your system then demands. Let it not be supposed that we rely *mainly* on medicines, nor even on medicinal food, to cure diseases, but on a general observance of the laws of health, and on medicines, whether in food or out of it, as only secondary aids. Nature is our great physician. Those patients who put themselves under her treatment, may rest assured of an effectual if not very speedy cure.

PROPORTION AMONG THE FUNCTIONS ESSENTIAL TO HEALTH.

What but PROPORTION between those attractive and repulsive forces which cause the motion of the earth, keeps it in its orbit? As the top of the tree increases, so do its roots. This law runs through the vegetable kingdom. It obtains equally in the animal economy. Nature requires and compels to breathe the more the more we exercise. Thus, the more we use our muscles, as in working hard, walking fast, or running, lifting, and the like, the more we must breathe; the increase of respiration being exactly in proportion to that of muscular action. Of this all are witnesses every time they increase or diminish their exercise. Nor will nature allow us to breathe copiously, without proportionate action of body or mind.

This law applies equally, though less obviously, to food. Who does not know that labour and all kinds of exertion, whether mental or physical, promote digestion as well as increase the appetite for food? Hence labourers eat more than sedentaries. And those who will eat more than they work, must suffer. This law cannot be broken with impunity. In fact, the broken constitutions of most of those who go from the farm and the workshop to college, or some sedentary occupation, are caused mainly by violating this law of proportion. They continue to eat as before, yet do not work off that food; and hence the headaches, ennui, debility, nervousness, dyspepsia, and kindred diseases of our literary and sedentary classes. Study does not make men invalids, but

is promotive of health and longevity. People are enfeebled by over-taxing their stomachs, while they starve their muscles for want of action.

Take that city *belle*, rendered delicate, nervous, sickly, miserable, by excessive nervous and cerebral derangement consequent on novel reading, parties, amusements, and all the excitement of fashionable city life. *Medicines* can never cure her, but *work* can. Her malady consists in a preponderance of nerve over muscle, and her remedy consists in restoring the balance between them. She is doomed either to wear out a miserable existence, or else to EXERCISE HER MUSCLES; nor can salvation come from any other source. And one of the great reasons why journeyings, visits to springs, voyages, and the like, often effect such astonishing cures, is that they relieve the nervous system by increasing muscular and vital action. The same exercise taken at home, would cure them quite as speedily and effectually. Nine in every ten of the invalids of our land, are rendered feeble by this one cause, and can be cured by labour. How many thousands, so weakly and sickly that they begin to despair of life, finally give up their business and move upon a farm, and soon find themselves well. Exercise has often cured those who have been bedridden for many years, as seen in the following.

A physician of some repute in Lowell, Mass., was called thirty miles in great haste, to see a sick woman, whose case had thus far baffled all medical treatment, and was regarded by all her friends as hopeless. All they expected was merely to mitigate a disease of long standing; recovery being considered out of the question. The doctor came, saw that she was very nervous, and had been dosed almost to death, and told her that if she would follow his directions implicitly, he could cure her; for he had one kind of medicine of great power, but which was useful only in cases exactly like hers, in which it was an infallible cure. After telling her how often she must take it, he added, that she must get up and WALK ACROSS THE ROOM the second day, and RIDE OUT the third. 'Oh, that she could never do, for she had not been off her bed for many years, and was so very weak,' etc., etc. 'Oh, but,' said the doctor, 'this medicine will give you so much strength, that you will be able to do so, and it will prevent any injurious consequences arising therefrom. And, besides,' he added, 'the medicine will not operate, unless you stir about considerably. Do just as I tell you, and you will be off your bed in ten days.' She sent an express thirty miles after this medicine, bread pills, rolled in aloes to make them taste like medicine. She took them, and took the EXERCISE as prescribed, and the third day she actually got into a carriage, and in ten days was able to leave her bed, and soon after was able to work, and she yet lives to be a blessing to her family, and to pour upon the doctor a flood of gratitude for performing so wonderful a cure—a cure which none of the doctors had been able to effect, and which nothing but restoring the lost proportion between her nerves and muscles could have effected. Nor do I hesitate to affirm, as my deliberate conviction, that nineteen-twentieths of the invalids, especially females, of our land, are rendered so mainly by *excessive nervous* and *deficient muscular* and *vital action*, and can be cured by banishing care, and exercising in the open air.

I say in the *open air*; because many are rendered invalids, not by want of sufficient exercise, but by insufficient BREATH. Yet females, and those who work hard in-doors perpetually, such as clerks, in packing, unpacking, etc., often lose their health because they do not BREATHE in proportion to their exercise. That is, they inhale rarefied air, and thus do not obtain a supply of oxygen adequate to its consumption. The object of breathing is to obtain this oxygen, and the reason why we breathe the more the more we exercise, is that we consume the more oxygen. But when, though we breathe copiously, we do not obtain a due supply of oxygen, the evil is analagous to a proportionate suspen-

sion of breath. Such should work less, and thus preserve the proportion between the consumption and the supply of oxygen.

Consumptive families and patients furnish another illustration of this principle. Why are they consumptive? Because their brains and nerves predominate over their vital and muscular apparatus, as is evinced by the fact that they are slim, sharp-featured, small-chested, and have small muscles, great sensitiveness, intense feelings, clear heads, and fine feelings. This *DISPROPORTION* of function constitutes their consumptive tendency. Restore the balance and you obviate the tendency. Or thus, their lungs are too small for their brains. Apoplexy, gout, obesity, corpulency, and the like, are caused by the opposite extreme, and can be cured by eating less and working more.

Precocious children and youth furnish another illustration of our doctrine. How frequent the expression, 'That child is too clever to live;' because general observation attests the premature death of most extra clever children. Hear that broken-hearted mother enumerate the virtues of her departed child—tell how fond of books, how quick to learn, how apt in his remarks, how sweet-dispositioned and good, all produced by excessive cerebral action. His death was occasioned by the predominance of mind over body. Its head ate up its body. As the vital energies cannot be expended twice, and as an extremely active brain robs the muscles and vital apparatus, the muscles and vital organs cease to grow, become feeble, are attacked by disease, and die, and of course the brain also dies. And such parents, ignorant of this principle, too often ply such prodigies with books and mental stimulants, and thus aggravate the disproportion and hasten death, whereas they should pursue the *OPPOSITE* course—should use every exertion to restrain cerebral and promote muscular action.

Extra talented and lovely youths are also more mortal than others. The flower of both sexes are more liable to die young, than those more coarsely organized—because of this same predominance of cerebral over muscular and vital power. A large proportion of those who take our first college appointments, die soon after they graduate, because they have studied, studied, studied, night and day, the year through, thus keeping their brains continually upon the stretch, yet using their muscles little more than to go to and from their meals and recitations. Is it any wonder that they pay the forfeit by impaired health, blighted prospects, and premature death? What an omission that their entire range of classical studies should not embrace so important a law as this.

The working classes furnish a converse illustration of this law. They exercise their muscles too much, and their brains too little. They labour, eat, and sleep, and that is about all. To the crowning pleasures of humanity, resulting from the exercise of *MIND*, they are comparative strangers. Their muscles rob their brains, as effectually as the heads of the literati rob their bodies. If they sit down to read, or listen to a speaker, they fall asleep. Their finer sensibilities become blunted by inaction, just as those of the fashionable classes become morbid by over action. Their minds are sluggish, their thinking powers obtuse, their feelings hard to rouse, and all their capabilities of enjoyment partially palsied, because most of their energies are directed to their muscles. Besides this loss of enjoyment, they are much more subject to actual disease than they would be, if they laboured less and studied more.

Slaves furnish still another illustration of the violation of this law. They exercise their muscles still more, relatively, and their brains still less, books and study being prohibited.* Hence no small share of their admitted mental obtuseness. The principle also applies to the working

* Can that institution be 'all right' which represses intellect? Must mind, that ultimate end of human creation, be fettered? The unrestricted exercise of intellect is as inherent a right of human being as breath or sight.

classes of the old world. Labourers generally might live many years longer, and live much more happily, if they worked less and studied more.

Unhealthy trades, as shoemaking, saddlery, drawing, painting, sewing, and the like, are generally rendered so by exercising only a portion of the system, and might be rendered salubrious by calling into vigorous exercise the dormant limbs and muscles an hour or two a day. To seamstresses this advice is particularly applicable and important. Sitting for months together in one posture, arched inwardly, and their shoulders thrown forward, thus doubly impeding respiration, digestion, and all the vital functions, at the same time taking next to no exercise, no wonder that so many of them break down even while learning the business, and sew in misery for life. Let such walk at least four miles a day, or dance an hour before retiring; and also sit up STRAIGHT while they sew, and it will not injure them. They should also restrict their diet.

But the institutions of society are most unfavourable to this required proportion of muscular, vital, and mental action. As things now are, those who work at all, work excessively; and as labour is considered a disgrace, all who can, are straining every nerve to live without it. Society should be so constructed as to require labourers to work only about half the day, and allow them the remainder for mental and moral cultivation, while the literary, sedentary, and fashionable classes should labour several hours every day, if not for wages, at least for health. The fullest measure of personal happiness requires that all should appropriate about eight hours in every twenty-four to the vital apparatus—to sleep and food, or the supply of exhausted animal energy—about four or six hours more to muscular exercise, mostly in the form of manual, productive labour, and about ten or twelve to mental cultivation, moral improvement, &c. 'All work and no play,' cuts off that vast range of pleasure designed and adapted to flow into the soul of man through the channel of MIND; and continued mental application, by concentrating vitality in the brain, withdraws it from the muscles, stomach, and heart, thus impairing respiration, circulation, and all the vital functions, and of course curtailing talent and even life itself, while epicures, gentlemen and ladies of pleasure, and all fashionable idlers, rob both muscle and brain, so that all these classes fail to obtain the great end of life—happiness. Whereas, if all would labour about four or six hours a day, so as to promote all the animal functions and ensure health, they would thus furnish the brain and nervous system with an abundant supply of that animal energy so indispensable to mental power, and thus vastly enhance clearness of thought, retentiveness of memory, intellectual attainments, and moral excellence. Nor can any become great or good without MANUAL LABOUR. Man *must* exercise, if only to keep his brain in working order, it being to the brain what the sharpening of his tools is to the workman. Labourers plead that they have no time to study, but they should *take* time. They were created to ENJOY; and since they can enjoy much more by commingling study with labour, practical wisdom requires that they make mental culture as much a part of their business as work. Business men and professional men, lawyers, ministers, bankers, brokers, merchants, clerks, editors, artists, etc., again say they have no time for exercise; but let such remember, that exercise is the very way to MAKE time, by augmenting mental efficiency, and especially prolonging their lives. The result is, that our business, fashionable, and sedentary classes, have a great preponderance of the mental temperament over the vital and muscular, and hence are delicate, sharp-favoured, homely, excitable, dyspeptic, nervous, melancholy invalids, living but a short and miserable life, while the working classes, though endowed by nature with excellent heads, yet lack that cultivation requisite to the developement of their natural talents and virtues.

Were the sole object of my life to see how long I could live, or even how happily, I would divide each twenty-four hours into three parts, and devote eight hours to sleep, rest and meals; six more to vigorous exercise, or rather hard labour; and the remainder to the exercise of mind, uniting the last two whenever practicable. Or, even were my object to become intellectually great or learned! or were health my object; or all these combined, I would pursue the same course. Burritt, the learned blacksmith, is often referred to as an intellectual prodigy. He certainly is the wonder of the learned world. Besides understanding more than fifty languages, he has accumulated a richer treasure of historical and miscellaneous information, than probably any man living; and yet, in his letter to ex-Governor Everett, he states that his poverty compelled him to labour at the anvil EIGHT HOURS DAILY. This is the one main secret of his greatness. 'Go you and do likewise,' and train up your children, too, in harmony with this principle.

GROWING YOUTH AN EXCEPTION TO THIS LAW.

Since youth requires a great expenditure of vital energy during growth, the vitality should predominate over the mentality. The order of nature requires that the great proportion of their vital energies should be expended in laying a deep and broad foundation for a corresponding superstructure of mental greatness, and every item of vitality required by the body, when expended on the mind, only weakens both. The great fault of modern education is, robbing the body to develop the mind—trying to make learned babies and nursery prodigies at the expense of health. In doing this, parents often make children simpletons for life, or else youthful corpses. As when the miser had learned his horse to live without eating, it died; so just as these children become extra smart, they die. Where are those poetic geniuses, the Misses Davidson? In their graves at fifteen! What folly parental vanity often perpetrates! Better no education than such robbery of the body, ruin of the health, and destruction of life. Better ripen too late than too early. As early fruits soon decay, but late ones keep all winter, and as the poplar tree, and all vegetables which grow fast, die soon, while the slow-growing oak and pine last long, and do much more service, so it is with children. So certain and uniform is this law, that the length of life of all animals can be calculated from the age at which they come to maturity. This law governs all that grows, man included. Accordingly, long-lived persons mature late, and our most talented men were backward boys. Adam Clarke was a very blockhead at school—an eyesore to his teacher, and a byword among his mates. And what was young Patrick Henry? The dullest of the dull. Most distinguished men of all ages were backward boys; and in general, they entered on their career of greatness late in life. Let my children be children till out of their teens, and let them enter too late upon the business of life rather than too early. This eagerness of our youth to begin life early, occasions immense misery. I would not leave the minds of my children an uncultivated waste, yet I would expend only their SURPLUS vitality in either study or labour. I would not sacrifice one iota of health to mental acquirements. The brains of children are soft, and their nerves less sensitive to burns, bruises, colds, and hurts, than those of adults. The nervous system is the last to mature, and the last to yield to the approaches of age and natural death. Hence little pains should be taken to cultivate the intellect, until nature has fully matured the brain and nervous system. Some species of animals, the dog included, are born blind. What consummate folly it would be to cut open their eyes, or to put on glasses, or attempt to make them see by artificial means before their natural time! Let nature have her perfect work. Follow where she leads; but never outrun her. Let your first labour be to give your children STRONG CONSTITUTIONS, and to lay in for them as large a supply of physical energy as possible. You

may cultivate their intellects, but not so much as to withdraw their energies from growth. Let intellectual attainments be what nature has made them, SECONDARY, in point of time. Would you not lose by hurrying your fruit-trees into bloom so early, that the frosts of spring would certainly nip the bud?

EXCESS OF CARBON A PROLIFIC CAUSE OF DISEASE.

If this great law of health—proportion of function—requires confirmation, it is to be found in the number and aggravation of those diseases engendered by an excess of carbon in the system. Why do northerners sicken at the South? Because they continue to eat as freely as before. A given quantity of oxygen can combine with no more than its fixed equivalent of carbon; and since a warmer and therefore more rarefied atmosphere prevents them inhaling as much oxygen as at the North, they of course evacuate less carbon from the system by respiration than they take into it by eating and drinking. A surfeit of carbon is the necessary consequence, and this induces those malignant fevers which prevail in tropical climates. Southern emigrants who eat less and bathe much, escape, because they occasion no such glut of carbon. All who move South, besides eating less, should eat food less highly carbonized, for the same reason that we should eat less, and less highly carbonized food, in the summer than winter.

The summer complaints of children have the same cause—excess of carbon. This is rendered evident by the fact that they prevail most in hot weather, and diminish as the cool season approaches. They then inhale more oxygen, and thus consume more carbon, thus partially restoring the proportion between the two. And if parents would administer less food, and that less carbonated, to children during the summer months, many who now sicken and die would escape. Hence we should give such little if any butter, fat, or sweets, because they all contain a great proportion of already superabundant carbon.

Dyspepsia is caused mainly by carbonic surplus. This is proved by the improvement which dyspeptics generally experience on the approach of cold weather. And all whose health is better in the fall and winter than in spring and summer, may rely upon it that their maladies are occasioned by surplus carbon, or, in other words, by over-eating.

The consumptive process too is partially owing to an excess of carbon over oxygen. As the lungs waste away, they afford a less surface for oxygenating the blood. Of course less carbon is burnt up, the body is cold, and the system decays. Let such be doubly particular to reduce their eating and increase their breathing. Of what use is any more carbon than can be burnt up by respiration? And as their stomachs are more vigorous than their lungs, of course they should eat less than they crave.

These views are still farther sustained by the chemical analysis of the putrid matter of biles, fever-sores, ulcers, diseased lungs, and the like. This matter has been ascertained to contain about fifty-four per cent. of carbon. Indeed, most obstructions, irritations, inflammations, and the like, will be found to consist mainly in this surplus of carbon. Abscesses may fairly be considered as the outlets of that surplus carbon which occasioned them. Hence their beneficial influence. Hence, also, butter, fat, sweets, and other highly carbonated substances, provoke biles and cutaneous eruptions. So do high living and over-eating generally.

These proofs of our doctrine of proportion might be extended illimitably, but it is too obvious to require it. This doctrine unfolds a fundamental condition of health and cause of disease of the utmost importance. And if physicians understood this law, and laboured to restore that lost balance which occasioned the disease, instead of administering powerful drugs, they would save a large proportion of those patients whom they lose. And if mankind in general would preserve or restore

this proportion,—if the sedentary and fashionable world would study and fret less, and take more exercise,—if labourers would rest and read more,—if those who have over-eaten would fast, and those who sit much in-doors, would exercise much in the open air, the great majority of chronic invalids would soon be gladdened by returning health; and death—that most dreadful penalty of violated law—would be postponed a score or two of years; the power of every faculty of body and mind would be incalculably enhanced, and their pains supplanted by pleasures. Proportion between the eating and breathing, and proportion between these two and muscular action, and between all three and the exercise of mind and feeling, will ensure a high order of intellectual capability, moral excellence, and a long and happy life. And the application of this law to the mental faculties will constitute much of the framework of the next volume.

MEANS OF SECURING THIS BALANCE.

Exhaustion, temporary or permanent, physical or mental, consists in a deficient supply of vitality as compared with its expenditure. This is another violation of the law of proportion, and occasions a great amount of disease. Vitality resists disease in proportion to its abundance. As an active skin neutralises the effect of exposure to colds which overcome a feeble skin, so strong constitutions withstand exposures which would break down weak ones. Take an example. While full of vitality and animal vigour, say in the morning, wet feet, malaria, noxious gases, contagion of various kinds, extreme cold, are resisted with impunity, whereas when fatigued, deprived of sleep, or hungry, comparatively trifling exposures overcome the system, and cause sickness. Keep a full supply of vitality, and it will both resist and eject disease. This is confirmed by the fact, that we rarely sicken suddenly, but are ailing more or less for days or weeks before a serious attack of disease. Debility, or a diminution of the supply of vitality, leaves the system too feeble to resist renewed exposures. Even in apoplectic and other sudden attacks, disease has been previously undermining the system perhaps for years. Most forms of disease, taken in season, can be thrown off at once, and protracted illness averted. Extreme and protracted exhaustion generally precedes and induces consumption, many of its victims having first worn themselves completely out just before being thrown down. But for such exhaustion they would have escaped. Many a one has been prostrated by disease after having watched day and night around the sick bed, not, as generally supposed, because the disease was contagious, but because their exhaustion left the gates of life open to the ingress of the enemy. That excessive labour invites disease, is a matter of general experience and observation. How many, after seasons of unusually protracted and arduous labour, first become debilitated and then sick. American females in particular contract many of their diseases in consequence of protracted exhaustion, occasioned by undue confinement within doors, late hours, restless children, and consequent deprivation of sleep, perpetual kitchen drudgery, unintermitting toil, and kindred causes; and many chronic invalids can be cured simply by rest and recreation, whose case medicines can never reach. They have expended animal energy faster than supplied it, become debilitated, and thus exposed to disease, and can be restored only by restoring the equilibrium of the system.

This exhaustion, so fatal to health, so prolific of disease, is not generally occasioned by too great an *expenditure*, so much as by an insufficient *supply* of vitality. Invalids might expend much more than they do with impunity, provided they would promote its re-supply by obeying the laws of health. Like a poor farmer, they take all *out* of the land, but put nothing *in*; and this is what reduces and disables them. If they would keep up a full supply of vitality, they might greatly increase their labours, and yet not injure themselves.

This proportion, when lost, can be generally restored. Every function can either be promoted or retarded. Indeed, nature's universal tendency is to secure the restoration of the necessary balance of the system. As over-taxed organs rob the others to obtain vitality with which to discharge their load, so strong organs succour weak ones. Besides this, the same restorative principle which has provided remedial agents in general, has also provided means for the removal of this cause of disease.

One means is by diet. Another is by exercise. By a law of things, the normal or natural action of any organ augments its power. Of this we are all witnesses. The hands of sailors become large and powerful, because used energetically and vigorously in clinging to the rigging and handling ropes. And as a similar increase of power and bulk is the result in all labours. The arms of the blacksmith, the feet of expert dancers and pedestrians, the chests of habitual rowers, the muscles of labourers, compared with those of the sedentary and fashionable classes, all give evidence of the truth of this principle. Let any man, having large and powerful muscles, confine himself to writing or reading for years, and his muscles will decline in size and strength. But if he again returns to a laborious occupation, they will increase again.

The reason of this increase by exercise is apparent. Action causes a proportionate flow of blood to any part exercised, and this blood is freighted with the materials for the supply of strength and bulk. And since this re-supply is commensurate with the exhaustion, the parts exercised most, grow fastest.

But the increased power of *function* is far greater than the increase of size. Let a new hand go into the blacksmith's shop, it is true the muscles of his arms grow rapidly, yet they improve in efficiency far more; and thus of all exercised parts.

To apply this law to the lungs. A man of only ordinary vocal strength becomes a chimney-sweep or street pedlar in our cities, so that he is obliged to hallo perpetually; and he soon acquires a strength of lungs and power of voice which resound above the clatter of carriages, and all the din and roar of the most thronged streets. Take oyster pedlars as examples. And this tremendous bellowing they put forth hour after hour, day after day, and month after month, the whole year round. Behold the astonishing increase of vocal power consequent on exercise.

The gastronomic powers of gluttons furnish another illustration of this law of increase by exercise. Men can divert nearly all the energies of their system to their stomachs. But the truth of our doctrines is too apparent to require enlargement. Weak organs *can* be strengthened, by proper action, to an astonishing degree. The question is—*How* can such action be promoted?

All who are benefitted by exercise,—all who feel better after taking it,—all who sleep more sweetly, or experience an increase of appetite, or additional clearness of mind, or greater agreeableness of disposition, require *more*. Indeed, all whose business confines them much within doors, and all who feel a craving for motion, require additional exercise. To determine whether we need exercise, is just as easy as to determine whether we require food, and by a similar sign, namely, an *appetite* for it.

To show *how* to exercise would be superfluous. All that is required is a few cautions. Sedentaries, convinced of their need of exercise, often take it in excess, or unseasonably, or too violently. That same appetite which demands exercise, will, if closely watched, admonish us the instant we go beyond due bounds, when we should desist at once. A kind of trembling, hurried, excited, and yet weakened state of the muscles, so that instead of playing easily and voluntarily, they must be forced, indicates excess, which always injures. Stop exercise the instant such trembling commences.

Exercise should be taken when the system is prepared to sustain it. It is often beneficial after severe mental application. Before meals, especially before breakfast, is generally a good season. Just before retiring is a good time, when it has not been taken during the day, especially to those who resort to in-door exercise. 'Better late than never.'

Its kind should also be such as to develop all the muscles. That same law of balance just illustrated, requires that every muscle in the body should be exercised every day of our lives.

Yet some work too hard, so that their muscles rob their brains, and thus become stupid in mind, averse to study, drowsy over books, and blunted in their finer sensibilities. Such should work less—should perhaps restrain their craving for action, just as those who over-eat should restrain appetite.

Having enforced the necessity of muscular action in general, and also the necessity of proportion of function, and by consequence the double importance of exercise to those whose muscles have become enfeebled by inaction, we come next to the promotion of digestion.

The opinion has already been expressed, that colds and indigestion were the great causes of the diseases of our climate; and also that most diseases consist in disproportion of function. This is true both of colds and dyspepsia. Though dyspepsia itself rarely terminates life, it is the parent of many diseases that do. It fills the system with morbid matter, unfit to take part in the vital process, and thus irritates and fevers both body and brain. How indigestion breeds corruption and disease has already been explained. The amount of corruption it produces is almost incredible. Take a single illustration. The breath of dyspeptics is always fetid, because of the corruption thrown off through the lungs. Suppose yourself compelled to inhale all the odour or obnoxious matter in the breath of many a dyspeptic, it would soon sicken, if not destroy you. Yet you would inspire no more than they expire. How vast an amount of corruption and animal poison some breathe out every hour of their lives! But no more than their disordered stomachs manufacture. And all is not expelled. All the evacuations put together cannot unload it as fast as it is engendered, and hence it gathers on the lungs and brain in the form of phlegm, oppresses the lungs, irritates them, and engenders consumption, fevers, and all sorts of complaints. Dyspeptics expectorate most while suffering from indigestion, because the salivary glands are closely related to the stomach, and hence the mucus consequent on indigestion. Hence all bad-tasting phlegm should always be spit out, never swallowed; while sweet-tasted spittle should be swallowed.

But it is on the nervous system and brain that dyspepsia exerts its most deleterious influences. The corruption and rank poison it engenders cannot but lash up both nerves and brain to abnormal and therefore painful action. Dyspeptics always feel irresolute, gloomy, and wretched, in proportion as their disease is aggravated, however favourable for enjoyment all their external circumstances. I should disdain the fortune of an Astor if indigestion accompanied its reception. However wealthy or respected, or beloved, or otherwise capacitated for enjoyment, dyspeptics are poor, miserable creatures,—poor, because they cannot enjoy, however richly they may possess the bounties of nature; and miserable, because this disease turns even their facilities for happiness into occasions of pain. They would go mourning even in paradise. Brother dyspeptics, I pity you from my inmost soul. Twenty tedious years have I experienced its prostrating tortures, but I am gradually exchanging its sour grapes for the sweet fruits of restored digestion. Listen while I tell you how to extricate yourselves from its vassalage.

Whether your complaints are caused by indigestion, may be known by certain signs. It generally emaciates. Those who are perpetually growing more and more thin favoured, and especially sinking in at the

abdomen and cheeks, may know that this disease is approaching ; as may also all who feel a gnawing, sunken, fainting, 'gone' sensation at the stomach, or are unable to postpone their meals without inconvenience, or who feel a ravenous appetite and still continue to crave after they have eaten freely ; or who feel prostrated, inefficient, misanthropic, or unusually irritable and fretful ; or who belch up wind frequently—it being a gas formed on the stomach by the souring of their food. Dyspeptics are perpetually cramming, yet virtually starving, because their stomachs do not extract from food its nutrition, and, paradoxical as it may seem, the more they eat the more they starve.

Besides, being hollow-cheeked, and lank in the abdomen, they are generally costive. This is occasioned by the sluggishness of the stomach and bowels ; and the removal of this single symptom or effect of this disease, will generally obviate the disease itself.

CONSTIPATION.

Its evils are quite as great as generally represented. It closes one important outlet for the waste matter of the system, which health requires to be kept open. And that not by medicines ; for they excite only temporarily, and leave the bowels weaker than they found them, so that increased doses are required to re-open them. Never resort to any kind of medicine, not even rhubarb for a cure, but rely wholly on diet and motion. Many kinds of food are highly aperient, Fruit always has this effect ; and thus opened, the bowels do not relax into increased lethargy. Coarse, undressed bread also is aperient. Many are obliged to eat it sparingly, because it is *too* opening. The bran stimulates the coats of the alimentary canal, besides increasing the fæcial bulk. Dyspeptics should always eat freely of it in conjunction with fruit. They may thus cure the most obdurate cases. Buttermilk is another powerful cathartic, and, used with bran bread, will be found efficacious. Rye and Indian-meal bread is quite as opening, and bread *all* rye is excellent. It is the more aperient, the more bran is left in. A pudding made by stirring undressed rye flour into boiling water, and eat with molasses, sugar, milk, or fruit-sauce, will be found most excellent. So will Indian-corn and oatmeal pudding, eaten with molasses or fruit-sauce. Rhubarb sauce and Rhubarb pies, if their crusts are made just right, are still more opening. So is cider *fresh from the press*, before it has fermented. In fact, the dietetic kingdom is full of aperient agents, endowed with quite as much power as cathartic medicines—agents which leave the bowels in a more healthy and active state ; whereas every dose of medicine ultimately weakens and binds. Whenever cathartics are needed, let them be taken in the shape of *food*.

INTESTINAL MOTION, whether effected by kneading the bowels, or by bodily exercise, helps to remove indigestion and constipation. A few years ago an infallible cure for dyspepsia was proffered on two conditions—strict secrecy and a high fee. It consisted simply in kneading the bowels, and otherwise giving motion to them. For dyspeptics, exercise, and especially those kinds which call the abdominal muscles into play, will be found a cure. Fomentations applied to the bowels are excellent. So are cloths wrung out of water as hot as can be borne, and laid on them, and changed every half hour. Water injections, cold and warm, are still better—in fact, are infallible cures, if continued. Putting the thumbs across the hips, and extending the fingers forward and kneading the abdomen, is also useful, as are all forms of rubbing, kneading, and friction. Copious draughts of cold water on an empty stomach will help this complaint.

REGULARITY IN THE EVACUATIONS is scarcely less important than this whole subject of diet. Every individual, and particularly the costive, should see to it that the bowels move every day, and this can easily be secured by attending to this function at stated periods each day, as on

rising, or after breakfast, or dinner, or supper; the earlier the better. A little attention to the formation of regularity in this matter, will effectually cure constipation, and do much towards restoring digestion. Mothers should lead children to form this habit in childhood, and all should practice it till it becomes second nature. Neglecting to attend to this call of nature, and to a kindred evacuation, occasions more disease and suffering than people imagine.

Dyspepsia is generally accompanied by acidity of the stomach, caused by that souring of the food in it already explained. This acidity can be removed. One means is by taking those kinds of food and chemical agents which will neutralize it. Alkalies will sometimes do this, yet they are better taken in saleratus bread, which is far better for dyspeptics than yeast-bread. Oyster-shells, baked and powdered, are also highly recommended, and may be useful. That they often neutralize the acids of the stomach is evinced by the wind they bring up. But do they not leave a deleterious compound in its place? Still they often do at least temporary good.

Some acids decompose other acids, and hence some stomachic acidities may be cured by taking the right kind of acids. The acids found in fruits are the best for this purpose. Hence lemons often improve the tone of the stomach; and when they do so, they should be eaten. Hence, also, lemonade is often a highly beneficial drink for dyspeptics, and should be drunk freely, when it produces a comfortable feeling in the stomach. There are doubtless effectual antidotes in nature, and especially in food, exactly adapted to remove any species of stomachic disorder, by neutralizing or carrying off the noxious compound. In fact, I fully believe that science will yet discover particular kinds of food which will effectually counteract all disordered states of the whole body. To illustrate. The rank poison, corrosive sublimate, if I mistake not, can be at once neutralized by eating soap freely, or swallowing any alkali in large quantities. The poisonous virus infused into the system by the bites of mad dogs, and poisonous snakes, can be effectually neutralized by taking certain chemical agents recently discovered, of which vinegar is one. Now I fully believe that mankind will yet discover some such antidote for every sort of morbid matter, obstruction, and disease incident to the body. Excess of carbon has already been shown to be one prolific cause of disease; and all diseases thus caused are easily obviated by taking little carbon into the system in the form of food, meanwhile introducing much oxygen in the form of breath to burn it out. Thus, suppose you have a bile or abscess, or fever sore; as the corrupt matter consists mainly of carbon, of course, by eating little, and eating those kinds of food which abound in fibrine, tissue, etc., yet contain little carbon, you reduce the supply of carbon, and if, meanwhile, you breathe copiously, so as to burn it up fast, you, of course, soon evacuate this surplus carbon, heal the abscesses, and restore the healthy action of the system. Undoubtedly this principle might be applied effectually to the cure of consumption, as it has been to the gravel. And I fully believe this principle of neutralization will soon be applied so as immediately and effectually to cure all sorts of disease, and prolong life to twice its present period. I earnestly commend this point to the scientific researches of chemists, and to the practical experiments of all.

Stomachic inflammation also accompanies indigestion, and causes those pains incident to dyspepsia. This can be easily reduced, and along with it those cravings of the appetite already shown to accompany dyspepsia.

You ask *how*? This brings up for consideration the drink of dyspeptics—its kind, time, and quantity.

Cold water is undoubtedly man's natural beverage. On this point we need not enlarge. Besides promoting health, its medicinal properties are great. It is one of those powerful neutralizers of the corrupt

matter in the stomach, the virtues of which have just been shown. Have dyspeptics not often noticed copious eructations of gas soon after having drunk freely? The mineral substances of the water combined with and neutralized some of the obnoxious matter in the stomach, and hence the gas. Probably nothing equals water for reducing inflammation. Dip a burn into cold water and keep it there half an hour, and its inflammation and consequent smarting will subside. Immerse a cut, or bruise, or sprain, or fracture, or rheumatic joint, or any other form of inflammation into water, and both inflammation and pain will be diminished. For the virtues of water as an antidote of inflammation in all its forms, see the water cure. This fact admitted, its application to the cure of stomachic irritation follows. No medicine, no diet, no treatment equals its judicious application, externally and internally, to the stomach of dyspeptics. Its external application in the form of wet cloths laid on the stomach and covered with several thicknesses of flannel to keep in the heat, is most beneficial. Injections two or three times a day are even more so. But the DRINKING of cold water is the medicine for dyspeptics after all—drinking not by stint, but by copious draughts.

Dyspeptics should not drink much till three or four hours after their meals—or, rather, till within an hour or two of the next meal, when they should drink freely till within half an hour of meal-time.

Copious drinking before breakfast, of water fresh from the well or spring, accompanied by as vigorous exercise as the patient can bear, will be found especially servicable. Drink freely again an hour before dinner, and an hour before supper, if you take any supper—or rather, be contented to drink instead of eating supper—and again on retiring. If lemonade agrees with you, drink of that occasionally in place of water. Drink thus, and one month will greatly improve the tone of your stomach.

Add to this all the exercise you can well endure, relaxation from business, a light diet, thorough mastication, and slow eating, and you will, in a year—probably in a far less time—be well. Eat in the main those kinds of food which agree best with you, yet abstain from animal food, and live much on coarse unbolted flour bread and fruit.

Especially must dyspeptics EAT LITTLE. Without this, there is no salvation for them. Full feeding will effectually counteract all remedial prescriptions—will even re-induce dyspepsia after it is cured, and of course aggravate it and prevent its cure. Make up your minds to STARVE IT OUT, or else to suffer all its miseries, and soon end your days. Abstinence is the great panacea. All else only aids, but does not reach its root.

Another cure more effectual than any other, except fasting, requires to be distinctly brought forward. This is, *breathing* MORE. Nothing equals breath as a cure-all. Fresh air in large and perpetual doses is by far the most effectual specific for dyspeptics and consumptives that exists. The reason has already been given. In short, let dyspeptics follow the prescriptions of this work, as to the selection, mastication, quantity, and digestion of food, and those touching circulation, respiration, perspiration, sleep, exercise, etc., in addition to the other prescriptions given, and they will soon be cured.

PALPITATION OF THE HEART, AND LIVER COMPLAINTS.

Liver complaints and complaints of the heart are the twin sisters of dyspepsia, so that the prescriptions just given will cure them. The two specific directions for curing diseased liver, palpitation of the heart, etc., are, first, an abstemious, cooling diet, and abundance of fresh air. The blood is too thick and turgid, and hence lodges about the heart. The oxygen of breath thins it, so that it flows the more freely. All thus afflicted, have noticed that just as they inspire air, its beat is quickened and strengthened, but slackens as they expire—proof conclusive

that more copious breathing will remove the difficulty. Such will also generally find their veins too blue, owing to a surplus of carbonic acid. Respiration alone can remove this from the system, and thus still farther thin the blood. Iron filings may aid.

Such will also always be found to have cold hands and feet, to be chilly, and to have frequent head-aches—all because their heart is too feeble to propel the blood throughout the system. Whatever, therefore, promotes circulation, will relieve the heart by leaving less blood collected in its veins, and remove the head-ache by withdrawing that surplus blood which occasions the congestion and consequent pain. Friction and the bath will do much to effect this. The foot-bath will also be serviceable.

CONSUMPTION—ITS CAUSES AND CURE.

Disorder of the stomach induces symptoms often supposed to indicate consumption. Thus a foul stomach loads the system with disease, which settles on the weakest organ, and this may happen to be the lungs. Hence their oppression is often only sympathetic.

The lungs also evacuate much noxious matter from the system. Thus alcohol, being inimical to life, is taken up and ejected by the lungs, and hence we smell it in the breath of those who drink. They also eject other noxious matters. When, therefore, the stomach is foul, so that food decays in it, and thus engenders a vast amount of corruption, and when the pores of the skin are partially closed, so as to prevent its escape through this channel, it returns with the blood to the lungs, and there gathers on them in the form of mucous or phlegm, irritates, occasions cough, soreness, and all the signs of consumption. Yet *dyspepsia* is the *primary* disease, though it often *ends* in consumption. Such may have consumptive symptoms many years, yet recover. They should follow the directions just prescribed for dyspeptics.

This principle applies equally to diseases of the head, nerves, muscles, and other parts of the body, which sometimes occasion consumptive symptoms, and ultimately cause the disease itself. The cure consists in that of the primary disease.

But even when consumption has fastened on the lungs and formed abscesses, it is by no means always incurable—any more than the disease of any of the other organs. The great cause of failure is erroneous modes of TREATMENT, not the obstinacy of the disease. Tubercles form in other parts of the system as often as in the lungs—indeed they are the general product or issue of all chronic diseases. They form in the liver, muscles, glands, stomach, heart, and even brain, and can be cured in all. Then why not in the lungs; They are the exudations of corrupt matter, generated in the lungs or elsewhere, and can be cured by arresting the progress of this corruption, and giving nature a chance to repair the breach. This is rarely attempted. Stop the generation of additional corruption, and the system will soon relieve itself of what exists. Frequent and copious SWEATING, by re-opening the pores and carrying off this corrupt matter, will be found the most efficacious means. Consumptive night sweats are nature's attempts at this, but the corruption generally accumulates faster than it is unloaded, and hence the disease progresses.

One of the principal generators of this corrupt matter is surplus carbon. As the patient's lungs are small, and their lining membrane partially clotted by phlegm, so as to obstruct the ingress of oxygen and the exit of carbonic acid, little carbon is burnt in the system, and a surplus is the consequence. Such persons should eat very little—almost starve—because they can burn up but little carbon.

But the *prevention* of consumption is more important than its cure, and is more easy. The disease can always be kept at a distance, however predisposed the patient.

The small lungs and hearts of those predisposed to this disease render

their circulation imperfect. To promote this should be the first end sought. Whatever, therefore, tends to retard the flow of blood, especially at the surface, such as sedentary pursuits, confinement within doors, particularly in heated rooms, habitual sewing, a cramped and forward posture, severe mental application, impure skin, sudden atmospheric changes, colds, and the like, should be carefully avoided. A light diet, fresh air, out-of-door pursuits, abundant sleep, vigorous exercise, warm climate, and free circulation, tend to prevent the disease. Keep the SKIN clean and active, and you are safe.

TIGHT LACING is most pernicious to those thus predisposed, because it cramps the lungs, prevents their inflation, inflames them, shuts out oxygen, the deficiency of which is the great cause of this disease, checks the action of the whole vital apparatus, prevents the supply of vitality, occasions adhesions, and in other ways induces this disease. No language can tell the number of premature deaths of both mothers and their offspring occasioned by this accursed practice. To girt up the vital organs is to commit virtual suicide.

Hot drinks, especially tea and coffee, are also injurious, because they increase the liability to take colds, and fever the nervous system, already too excitable. Drink warm drinks only when you wish to induce perspiration.

Exercise in the open air is also especially beneficial. Yet be very careful not to OVERDO—the great fault of consumptives, because their nerves are too active for their strength. Alternate REST and EXERCISE, with abundance of FRESH AIR are your best remedial agents. Doctor none, but INVIGORATE YOUR GENERAL HEALTH.

Added to general friction, let the chest be rubbed often, with the hand of a robust and healthy friend. Especially let mothers and nurses rub narrow-chested children much.

The full and frequent INFLATION OF THE LUNGS is especially advantageous. In this alone consist the virtues of Rammage's tube. Yet such inflation can be effected better without than with a tube. Sit or stand straight, throw the arms back, and chest forward, and then draw in slowly as full a breath as possible, and hold it for some time, perhaps meanwhile gently striking the chest, so as to force the air down into the extremities of all the air-cells of the lungs, as well as enlarge the lungs. Reading aloud, speaking, singing, vocal training, and gymnastics—all right EXERCISE of the lungs—will strengthen them, and thus keep this disease at bay; yet care should be taken not to exercise them to EXHAUSTION. Cuvier cured a consumptive predisposition by lecturing, and so has the author. When he first began to lecture, his lungs were feeble and irritable, having twice laid him up for months; but they began to improve at once, and they can now endure almost incessant talking during the day, and two or three hours of public speaking every evening in the year.

Sea voyages are much recommended, and also southern climates. Both, by promoting SURFACE circulation and perspiration, are eminently beneficial.

We conclude by giving directions for the regimen of

THE CHILDREN OF CONSUMPTIVE PARENTS.

Quinsy, sore throat, croup, inflammation on the lungs, and liability to colds, all spring from a consumptive predisposition, and can be cured by whatever prevents it. Besides the applying to such children the preventives already prescribed for consumptive adults, let them not be sent to school too early, but allowed to run wild. Sitting in school is especially pernicious, partly because of the vitiated air of school-rooms, and because their small lungs make them naturally bend forward, and also warp inwardly, so as to retard all the vital functions. Folding the arms upon the chest is especially detrimental, because it impedes respiration. Fold them behind, if at all, so as to throw out the lungs. As

the heads of all such children are too active for their bodies, you should neglect their mental culture, and make every effort to develop and fortify their physiology. They should do little else than EXERCISE, EAT, SLEEP, and GROW TILL TWENTY, and even then not hurry to marry, or engage in business till fully matured. They require all their energies for growth. To divert their energies from the physiology to the mentality, is to increase that very cerebral ascendancy in which their consumptive tendency consists. They border on PRECOCITY, and require to be kept *from* study, instead of sent to school. Furnish boys with tools, instead of books, and encourage them in all kinds of athletic exercises, such as making and flying kites, sliding down hill, skating, swimming, riding, working, climbing, racing, shooting with bow and arrow—and above all talking loud and hallooing much, so as to expand their lungs. The more noisy the better for their health, and the more averse to study the less liable to consumption. But let them live mainly on bread, milk, and fruit, and let them retire and rise early. Meat will injure them, because it still further stimulates them—the reverse of what they require—whereas milk soothes and quiets them. Let no fears be entertained that they will be dull scholars or ignorant men. Their brains are too active already, so that *without* schooling they will eclipse others. Nor put them early into law offices or stores, but LET THEM GROW FIRST. Especially, if they must go to college, do not let them begin to prepare till twenty. Rather let them work on the farm till fully matured. Nor ever put girls thus predisposed to any sedentary, confining, or sewing occupation, or to work in factories. Rather let them work in kitchens—anything that will improve health and prolong life. Perhaps few things invite consumption more than sitting and sewing steadily in warm rooms.

Especially important is it that such bathe. A consumptive patient was cured by being taken on winter mornings to Amboy bay, and immersed in a hole cut through the ice. The colder the weather the more important the cold bath to such children, followed with brisk friction. Follow these directions, and they will escape consumption and live to a good old age.

THE CURE OF DISORDERED NERVES.

The *mental* signs of nervous disease, or of a diseased state of feeling, have already been pointed out.

This disease is more frequently sympathetic than primary. Dyspepsia is always accompanied by nervousness. So are heart affections, scrofula, gout, fevers, colds, and nearly all forms of disease. In fact, as the nerves run through every organ and portion of the body, they sympathize perfectly with the state of the body. Hence, whether nervous disorders are primary or sympathetic, the effectual means of curing them is to restore the tone and vigour of the system as a whole, by obeying the laws of dietetics, circulation, respiration, sleep, bathing, friction, exercise, and the like. The promotion of general health is the great means of restoring disordered nerves. Let nervous patients then strictly fulfil the conditions of health, if they would effect a cure. To a few items, however, special attention should be directed.

1. The importance of bathing, friction, and the healthy action of the skin is to such doubly enhanced, directions for which need not be repeated.

2. Those nervous subjects who are also dyspeptic need not expect to restore their nerves, till they restore their stomachs. The corruption engendered by impaired digestion, is so great, as to keep even healthy nerves in a perpetual fever. This irritating cause must be removed before health can be restored.

3. Nervous people are particularly troubled with restlessness. Though perpetually worn out for want of rest, they can compose themselves to sleep only with difficulty, sleep lightly, are restless, disturbed by

dreams, are easily wakened, and find great difficulty in getting to sleep again. Hence such should sleep all they can. No cure for nervousness at all equals sleep; nor are eight and even nine hours a day too much for such. They sleep slowly when asleep, yet exhaust themselves rapidly while awake, and hence should devote the more time to this all-important function. Let such observe with especial assiduity the directions for promoting sleep already prescribed. To such, light suppers, or no suppers, and as much exercise as can be well borne, will be found especially important. Yet such hate to move till obliged to do so, and then they are perpetually liable to overdo—not to do too much absolutely, but to do too fast, so as to induce that trembling already pointed out as a sign of overdoing. If they would only exercise moderately, they might do a great deal more; but their nervousness renders them always in a great hurry; hence they exercise too violently. Such should work moderately till just comfortably tired, then rest awhile, perhaps lay down, and if possible, take a nap, then return to work, and thus often alternate between action and rest. Day naps to the nervous will be found especially serviceable.

4. To the influence of grief, and all kinds of sadness, melancholy, and despondency, special attention is invited. See how many tolerably healthy mothers have become nervous immediately on the death of a dearly beloved friend or child, have declined rapidly, and soon after followed their lost one to a premature grave. Those at all predisposed to nervous disorder, who may lose friends, should banish grief, not indulge it. Shall their death hasten yours? If your grief could benefit them, you might indulge it; but since it injures you in the most effectual manner possible, without doing any good to them, practical wisdom dictates its banishment. Cultivate cheerfulness and even mirth.

5. Severe mental application is especially deleterious to nervous invalids. Their disorder consists mainly in predominant cerebral and nervous action, and their cure consists in restoring the requisite balance by reducing it. Those, then, whose occupation requires much mental application, must give up their business or their happiness, if not lives. And why prosecute business at the sacrifice of life? Do you not pursue your avocation simply as a means of *enjoyment*? Then why not give it up when it conflicts with this only end of life? Besides, by suspending it till restored, how much more you will be enabled to do in the long run? So that merely for the sake of accomplishing the very business you would do, you should postpone it temporarily.

What folly to sacrifice a lifetime of business to a few months, or even years! Why kill the goose that lays the golden egg? Cure your nerves first, and do your business afterwards.

A light, simple diet is quite as indispensable to the nervous as to the dyspeptic. Few things oppress the nerves more than over-eating, and few things relieve them more than abstemiousness.

6. A *cooling* diet is even more important. All condiments, all stimulants, act mainly upon the nerves, and re-excite, and still farther disease them. Hence all alcoholic drinks, wines, beer, cider, ale, or other fermented liquors, are fire to them, and should be wholly avoided. Tobacco is another powerful nervous irritant, and is fatal to nervous quiet. In common with opium, it exhilarates temporarily only ultimately to fever and disorder. No higher proof of this is required than the feelings consequent on missing the usual indulgence. The more wretched you feel when deprived of your pipe, quid, or cigar, the more has it already impaired your nerves. Of which, however, more fully in a proposed work on this subject.

7. Tea and coffee have a similar effect. The stronger teas are rank poison, and black teas are also poisonous, though less so. Coffee is still worse. Its strong narcotic properties powerfully enhance nervous irritability, and will both create and aggravate nervous disorder. Susceptible as my nerves are, nothing would tempt me to fever them

by tea, coffee, tobacco, or alcohol, and all who do so sin against their own peace. Yet we will not follow up this subject here, but refer the reader to a forthcoming work by the author on their use. Meanwhile all are abjured to refrain from them.

8. An infusion of valerian is also good. Put a tea-spoonful into a pint of water, and take half a wine glass at night.

PREVENTIVES OF INSANITY.

Of all the diseases incident to human nature, those which affect the *mind* are the most grievous and insupportable. Well may the heart of every philanthropist beat with its fullest and strongest pulsations of sympathy, in view of the anguish experienced by the raging, bewildered maniac; and well may government attempt the amelioration of those thus afflicted, by erecting asylums for their comfort and cure. What practice is so barbarous, so absolutely horrible, as that of confining the maniac, perhaps in a dungeon, in chains, or the strait jacket, treating him as if he were criminal, and perhaps scourging him besides. He is *sick*, not *criminal*. To punish one who is dying of fever, or consumption, would be horrible; to chastise a maniac is as bad.

The following prescriptions, faithfully adhered to, while they will greatly mitigate this disease after it is once seated, will, in most cases, if not in all, prevent its developing itself.

The *cause* of insanity, or rather insanity itself, consists in the excessive **EXCITABILITY** and **OVER-ACTION** of the **BRAIN AND NERVOUS SYSTEM**. Its prevention, therefore, can be effected only by *reducing* this over-action.

Special attention is invited to one condition which always accompanies derangement, and which is a product of that very cerebral condition which causes madness, and that is, superior natural abilities, accompanied with feelings the most intense and susceptible. And these are caused by that same exalted action of the brain by which derangement is caused. Consequently, families and individuals predisposed to derangement are always eminently talented, and possessed of the best of feelings. It is the very flower of the community who are thus affected. In fact, this affliction is only the excess of what causes talent and sensibility. Do superior talents depend upon the powerful action of the brain? So does insanity, only the cerebral action is still greater in insanity. As but a narrow line separates the sublime from the ridiculous, so but a step divides the highest order of talents from madness. A simpleton cannot be crazy. It requires a clever man to become deranged. Whoever is subject to insanity, is 'nobody's fool.'

Hence to prevent hereditary tendencies to insanity from developing themselves, it is necessary to prevent this constitutional excitability of the brain from progressing beyond the point of healthy action. And to do this, it is requisite to divert the action from the brain to some other part; to remove exciting causes of cerebral action, and to keep the brain as quiescent as possible.

To illustrate. Your child is hereditarily predisposed to insanity. You will see this predisposition in his ecstasy of feeling when pleased, and in the overwhelming depth of his anguish when crossed; in the power and intensity of his desires; in his haste and eagerness about everything, and in his being precociously clever and acute. And here is the error. Parents generally try to *increase* this action, by plying them with study, keeping them confined at school, and seeing how very clever they can make them. But the preventive of this tendency consists in pursuing directly the opposite course. This highly wrought cerebral action requires to be diminished. Study is directly calculated to increase it; so is confinement; but physical exercise is calculated to divert it from the brain to the muscles. Hence no child or youth, either of whose parents is subject to derangement, should be sent to school. Nor should they, for the same reason, be vexed or plagued, or

excited any way, but should be allowed to run and play while children, to recreate and amuse themselves, and be happy during the period of youth, and they should not be allowed to enter upon the cares and business of life till fully matured, and even then they should check that boiling energy which courses through their veins.

Of all occupations, farming is the most suitable for them, as the labour it requires diverts the energies from the brain, and works off that excitement, the excess of which constitutes this malady. With nothing to do, this energy accumulates, and gathers upon the most susceptible part, the brain, and ends in derangement; but let the valves of labour be open for its escape, and health and sanity are preserved.

Above all, let them sleep much. Put them in bed early, and keep them from being excited in the evening. Young people thus predisposed, should never attend balls or parties, or any exciting scenes in the evening, nor read novels. They should never play at cards, or at any other exciting games of chance, nor take alcoholic stimulants of any kind or degree, not even wine, or cider, or beer. And they should scrupulously avoid tea and coffee, because all these tend to augment and develope that excessive cerebral action from which they are mainly in danger. Alcoholic drinks often induce derangement, even where there is no hereditary predisposition to it; much more will they develope a *latent* susceptibility already existing.

As those thus predisposed cannot be too temperate, so they are in no danger of being too abstemious. The simplest diet is the best. Milk is beneficial. Bread-stuffs will be found far preferable to meats. Indeed meat should be wholly avoided, because it is a powerful stimulant. It heats and fevers the blood, oppresses the brain, and increases the tendency to be avoided. Bread, milk, Indian meal and rye puddings, vegetables, rice, fruit, and the like, should constitute the principal diet of those thus predisposed. Of course from spices, mustards, peppers, pickles, vinegar, and condiments, they should wholly abstain. Only those things should be taken which open the system, and keep it cool. Fruit may be eaten in almost any quantity with advantage, and so may jellies.

Analogous to a cooling diet in its sedative influence, is cold water, both washing and bathing. Cold water is certainly cooling, and as already explained, is pre-eminently calculated to carry off the superabundant heat of the system, and obviate that feverish tendency which constitutes the predisposition to be avoided. Nothing will be found more beneficial to the insane than cold water applied externally, especially to the head, and taken internally in copious and frequent draughts.

But above all things, let all thus predisposed, avoid those subject on which their relatives and ancestors were deranged. Thus, one of the topics of derangement appertaining to the family of a young man who hung himself in the summer of 1842, on account of his having been disappointed in a love matter, was the social affections. He should have known this, and therefore have nipped his affections in the bud, unless he was sure of their being reciprocated, and consummated by marriage. In short, he should never have allowed his affections to become engaged, till he was sure of marriage—a direction suitable for most young people, but doubly so for those thus predisposed, because love is always a very exciting thing. Still, unless such are able to govern their love, they should locate their affections, though they should not be in haste to marry. A partner having a cool, soothing, temperament, should be chosen.

These and all other preventives and cures of insanity, apply equally to the prevention and cure of nervous diseases generally. To cure nervous and cerebral disorder, RESTORE THE GENERAL HEALTH.

THE WATER CURE.

That the author sets a high value upon the water cure as a remedial

agent, this entire work bears abundant evidence. Its power and efficacy probably exceed all other medicinal means now known. Of the wonderful healing virtues of water, its oxygen—of which it contains a large proportion—is probably the chief instrumentality—the various organs imbibing from it this great promoter of universal life. Scarcely less powerful for good is its efficiency and unequalled capability for removing obstructions—for taking up and carrying out of the system those noxious matters which obstruct the functions of life, breed disease, and hasten death. For reducing inflammations, and consequent pain, it has no equal. It is also an efficient promoter of normal action—of universal life. For reviving debilitated, withered organs, for rebuilding broken constitutions, for cleansing the stomach, bracing the system, and infusing new life throughout all its borders, water excels all other agents combined. It is destined to supplant medicines and the lancet. No family, no individual should be without a knowledge of the best modes of applying it in all sorts and stages of debility and disorder.

Other diseases, such as gout, scrofula, and the like, it is not necessary to notice, because the great prevention, the great cure, is A STRICT OBSERVANCE OF THE LAWS OF HEALTH.

CONCLUSION.

Finally, let old and young, one and all, take every possible pains to PRESERVE AND IMPROVE HEALTH. Behold the infinite perfection of our bodies! Behold the variety and power of their functions! Consider their capabilities of enjoyment! O who can contemplate this highest piece of divine mechanism without wonder and gratitude. And was SUCH a structure made to be abused? Shall we undo all that God has done to secure the invaluable blessings of health and happiness? Shall we impair, vitiate, or break down functions thus inimitably perfect, and thus laden with all the enjoyments of life? Shall we nurture our land and our trees, and neglect our own bodies? Shall we not love and keep a present thus divine, as well on account of its own intrinsic worth as its Bountiful Giver? Shall we love earthly donors for their gifts, and not worship the Author of that life which is so infinitely above all other bestowments? Let others do as they list, but let my great concern be to guard this heavenly gift. This, my sacred duty, my paramount obligation to God and my own soul, let me study to fulfil. O thou Bestower of all good, give me intellect to know, and the inflexible determination to practice, THE LAWS OF HEALTH AND LIFE.



