Fragments of physiology, or, Essays on life, health, hygiene, disease, and cure of disease / by Abraham T. Lowe.

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Received Dec. 20, 1902.

FRAGMENTS

OF

PHYSIOLOGY.

Mr. Wm G. Barlow,
With the respects of
A. T. Lowe

FRAGMENTS

OF

PHYSIOLOGY;

OR,

ESSAYS

ON

LIFE, HEALTH, HYGIENE,

DISEASE, AND CURE OF DISEASE.

BY

ABRAHAM T. LOWE, M.D.

NON EST VIVERE, SED VALERE, VITA.

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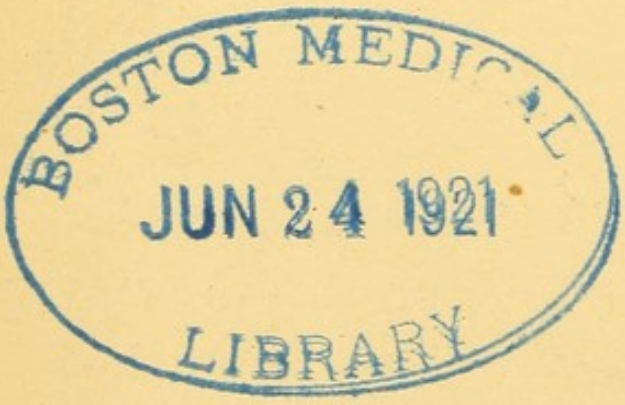

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PREFACE.

THE following Essays are not offered as a system of Physiology, nor even as an epitome of that noble science; but simply, as the title imports, as physiological fragments, principally relating to the more prominent functions of life, as exhibited in health and disease, — the highest and lowest conditions of humanity.

These fragments are some of the recollections of physiological study, undertaken many years ago as a preparation for professional life; and were then deemed worthy of the careful study of the medical student. In later years, the science has been enriched by new developments and illustrations, which render a full understanding of its teachings more worthy of the most careful attention of the practising physician.

The study of the laws and operations of the vital economy of man, when divested of all professional technicalities, must, it would seem, prove interesting to the general reader, as well as to the

medical student. Who would not be glad to learn many of the leading characteristics of human life, — of health, the process of digestion, the ascent of the chyle into the blood, its purification in its progress through the venous system into the arterial circulation, and the manner in which the blood is vitalized, just before it passes to the heart, by the absorption of *oxygen:* to see how, in this laboratory of life, the lungs eject, at every expiration of the breath, all noxious gases; and how, at each succeeding inspiration, they receive and appropriate the vital air?

The marvels of life — even in their most external manifestation — cannot be numbered. They are all wonderful; and, although to some extent inscrutable, they interest and instruct us.

Physiology, or biology, has lately become a study in our higher schools, — in those schools which nearly every considerable town or village now enjoys; and its general usefulness is almost universally conceded. But it is most especially and directly useful to practising physicians, inasmuch as it teaches them — if they will faithfully study its operations — how they may co-operate with the constant efforts of the *inner life* to maintain the health and strength of man; thus enabling them

to perform the highest uses of their material life; or, if man falls into disorder (which is identical with disease), how they can contribute their assistance to this higher vital energy, to recover the health and strength of the person who has declined from the order of life. If the external physician can clearly see what the internal is doing, or attempting to do, to maintain health or recover from disease, he may go forward with entire confidence that he is performing a high service to his fellow-man.

Human life is a continual strife between order and disorder, — between the full measure of human ability, physical and intellectual, and the declining state or condition of manhood; and it is in this continuous conflict between health and sickness that the conservative power of the inner life is ever exercised to maintain man in his full health and strength, or to restore him to his human ability when he may have become a subject of disorder or disease; and the physician, who recognizes and seconds these vital efforts for the recovery of health, renders his highest and best service to those who may have occasion to avail themselves of his professional assistance.

A. T. L.

CONTENTS.

PHYSIOLOGY treats of the structure, composition, and general economy of the human system; explains the phenomena of vital action; describes the organs, functions, uses, and relations of every elementary continent and form of life, all of which, in their complex and connections, present the human form; and through which, when man is made alive by an influx of life from the SOURCE of life, he becomes a living soul, a spiri ual being, created into the likeness and image of his MAKER, and endowed with rationality and freedom, those priceless gifts vouchsafed to man alone.

Physiology also illustrates the orderly action of life; the consentaneous movement of every living organ and component fibre of the human form, from which united and perfect motions of life result health, strength, and the ability of each individual to become useful to his fellow-man, and which healthy action is constantly prompting him to the exercise of all the social and kind offices of life; it also furnishes men with hygienic rules and precepts, by the strict observance of which they may be enabled to preserve their health, strength, and usefulness, even to the end of their earthly mission.

I.

INTRODUCTORY.

"What a piece of work is a man! How noble in reason! how infinite in faculties! in form and moving how express and admirable! in action, how like an angel! in apprehension, how like a god! the beauty of the world! the paragon of animals." — HAMLET.

I.

INTRODUCTORY.

THERE is, probably, no department of science which presents greater inducements for investigation than that which treats of animal existence; which describes the parts, structure, functions and economy, health and life, of the human system. And there is no simply human science more worthy of our attention, nor any which could be taught in our public schools that would, if it were properly taught, confer a greater benefit on the rising generation, than that which treats of life itself, and the laws of vital operation. Who does not desire to know something of the tenement he inhabits, and which he must continue to occupy at least while he remains in the natural world: its frame-work, covering, the muscular machinery surrounding the more immediate organs of life, and which is the proxi-

mate cause of all physical action and motion, — that half-and-half voluntary and involuntary motion of the chest occasioned by the respiration of atmospheric air; the perpetual dilatation and contraction of that powerful central muscle, the heart, and the continual round and round of the blood? The subject, it would seem, must grow in favor with every intelligent inquirer. From the examination of the mere stamina and support of the system, he would view the connecting ligaments, the moving fibres, the nervous filaments, and circulating fluids; and, if instructed in these matters in a rational, intelligible manner, would gradually rise to the study of the functions, the nature of the respiratory organs, the power of digestion and assimilation, even to the contemplation of those higher forms which are the seat of the senses, — the hearing ear, the seeing eye, and the extremely delicate and accurate senses of touch and taste. And as the mechanism and office of these complicated and beautifully constituted parts are scrutinized, the inquiry must press on the mind as to the nature and essence of the vital energy

which sustains these functions, superinduces these senses, and produces all the phenomena of animal life. All these inquiries were put forth in the earliest period of profane history. Systems of physiology date back as far as the ages of Grecian literature, — nearly twenty-five centuries ; and new theories have successively been presented, even to the present time, all of which attempt to explain the general anatomy of the body and the laws of the vital energies. But when these compilations have been sought for, to solve the questions which are almost constantly rising in the inquisitive mind, they have usually responded in a manner rather to perplex than enlighten, and to suppress rather than increase the ardor of inquiry. For many centuries physiology had but little more than a nominal existence. The authors of the many publications on this subject seldom recognized the office of the most important organs ; and, if they were occasionally noticed in some of their modes of operation, their action was so generally imputed to a wrong source, and their operations described under so many false relations, that

their definitions seem to be of little use. The motion of the blood is evident to the external senses, but the power by which its current was produced was unknown for many centuries; and, even after it was understood by many that it was distributed by one set of vessels and returned by another, by which a perpetual current was established, physiologists were divided in opinion as to the fountain from which it departed, and also as to the immediate force by which it was carried through its channels; and while some doubted whether the blood was distributed and returned in this manner, others confidently affirmed its truth, and some pointed to the liver as the source of circulation.

Neither have the later systems of physiology afforded much additional light on this subject. Some advances in this department have been made within the last centuries. Many facts have been established which seem, at least, to constitute a form and continent of the science, and which may, hereafter, assist in the production of a more correct theory; yet most of these facts, when closely scrutinized, appear rather as the deductions of the

skilful anatomist than the expositions of the laws of the human economy. To the operations of the *scalpel* we are principally indebted for our knowledge of the circulation of the blood. And should we consult the more modern systems of physiology, that we might become acquainted with the structure of the eye and the ear, and especially to understand how these organized forms see and hear, we shall find, in the first case, in that of the eye, an account of its coverings, humors, and muscular attachments; an explanation of the inner coat, called the retina, which is but an expansion of the optic nerve, upon which external things are represented, which are received through the aperture of the *iris;* and, in the second place, in the case of the hearing ear, we shall find that the physiology of this organ scarcely transcends the anatomical description of its external and internal parts, — its drum, vestibule, labyrinth, semicircular canals, and the course of the auditory nerve.

In proof of what I have stated of the tardy advances of the science of physiology, I will quote a definition of sympathy, from a medical work by

Dr. Parr, first published within the present century. "Bodies are so constituted that one part seldom suffers alone; and sometimes the most inconsiderable organs, when injured, excite the most violent general affection. The great link of sympathetic connection is the stomach: with this organ the brain, the liver, the organs of deglutition, the joints, and the extreme vessels of the whole system, sympathize. This [the stomach] is the most extensive sphere. There are many inferior sympathies arising from the nervous connections in the brain or its vicinity; but of the more extensive ones the stomach is the centre."

The power of sympathy has for ages engaged the attention of many learned men. Thousands have sought to know more of the nature and essence of this wonderful faculty: how, when, and to what purpose it operates; what are the media or spheres of its transmissions; and what are the elements of its inmost vital energy? But the definition of this power, which has just been given in the language of Dr. Parr, which places its centre, or its sphere, and great link of connec-

tion, in the stomach, and refers only to the brain or its vicinity as the source of inferior sympathies, must fail to afford full satisfaction to the inquiries; and yet, perhaps, the function of which we now speak has never been defined in any professional work published previous to the writings of Dr. Parr, in a more rational and intelligible manner.

An eminent physiologist and histologist of the last century described man as a society in the least form. This definition is favored by many at the present time, not only as just, but as important in a physiological point of view. The constituent material forms of man, in their composition, connection, and mutual adaptation, considered as an integral, by the union of all the organs of life, present the human form; and, when this form has received the breath of life, man becomes thereby a living soul, — a spiritual being. Every organ, every composing filament of man, — in the exercise of its legitimate function, — is alive, and active in the performance of its duty; all concurring and co-operating to promote the great ends of life, — all engaged in doing good to

others. When all these organs and fibres which compose the individual man act in order, in perfect harmony, we have a picture of the man of health, strength, and human ability for usefulness.

What a likeness does this present of a perfect society of men, or of as perfect a condition of society as can justly be predicated of an infirm humanity, — each individual, in the due order of his life, laboring for the good of all, and thus, from and through all, securing his own health and happiness! Herein, as in the case of the individual man who moves in the order in which he was created, we behold a society, all its members moving in joint accord to perform the great uses of life, strong in their united power to do good, and in the performance of these mutual kind offices finding their highest happiness and delight; such concord and peace as we have reason to believe existed among the people of the earliest age.

Another important definition is, that man has no life in and of himself, but is merely a form receptive of the divine influx. The brain, therefore, is not the life, as it has sometimes been defined; but

the highest, inmost recipient of life, from the only Source of life. The brain, with its extensions, is in the human form. Its nerves pervade every organ, every fibre, every minutest portion of fibre, so that the smallest needle's point cannot be introduced beneath the skin without wounding this inmost continent of vitality; and if it were possible to divest the body of every other substance, leaving the brain and its appendages uninjured and undisturbed in place, the manly form would still be preserved, scarcely injured in its general outlines, although marred in its beauty, as it would lack the eloquent eye, the expressive lip, and the perfect dress of the soft, polished skin, — that most graceful garment of humanity, especially beautiful in its bloom of health upon the cheek, and its flush upon the countenance; disclosing, through its translucence, the sympathies and affections of the inner life. Thus, every part of the system is instantly alive, and is made man by the reception of the divine influence into this all-pervading form of life; and every organ, every smallest thread even, has life as of itself, — life exactly

adapted to its function, — life constantly prompting its ultimate organization to the performance of its legitimate and social use.

Another important principle — which, so far as I can learn, has hitherto remained unwritten in physiological works, but which is recognized by many at the present day — is found in the fact that each organ of the human body, in the discharge of its proper office, acts solely for the good of every other part. Thus the brain sends forth its entire influence: not a diverging fibre of the nerves can be seen within its walls. The heart propels from its ventricle every globule of influent blood, and receives its own support from the common stock, through a small recurrent vessel. The arteries derive no support from the blood in its passage through their channels. They first distribute their contents to sustain other parts, while they are supported by small reflecting branches which are spread on their coats. Thus, in a healthy and orderly state of society, from the least to the largest form, each member performs uses for the good of others.

And the offices which subsist between the various parts of the body, when some of its members fail in the performance of duty, correspond to the acts of kindness which are reciprocated by individuals composing the larger forms of society, when some of their members fail in the performance of their function, and thus disturb, or at least for a time interrupt, the harmony which results from the exact performance of individual duty. If the channel of the principal blood-vessel of a limb be closed or obliterated, the parts below are but temporarily impaired in their condition; for the small collateral vessels, even as though conscious of the call for the performance of enlarged duties, at once begin to increase their calibre, and soon transmit to the extremity of the member its full supply of blood. Whenever a limb is removed, the connection between the veins and arteries at the point of separation is nearly destroyed. The vessels communicating with the arteries in the new extremity are insufficient to receive and return all the blood which is necessary to sustain the part; but the neighboring veins, as if emulous of acts

of kindness, send forth small branches which inosculate with the arteries, and thus form in the part a new sanguiferous system. In some cases of long-neglected dislocation of a limb, the exhalant vessels assume a new function, and form a new joint! An interesting proof of this fact was exhibited some years since to the medical students of Harvard University. The shoulder joint had been luxated, and remained unreduced to the end of life. Subsequent examination proved that the neighboring organs, by the assumption of new duties, had formed a new joint. Obliquely, from the edge of the cavity from which the head of the member had been forced, a slender, osseous body was formed, and extended in a direction to meet the extremity of the displaced bone. At the end of this column or neck, a cup-like expansion was formed, fitted to the shape, and receiving the ball, of the shoulder; and thus a new articulation was formed, greatly facilitating the action of the limb. The motion of the new joint must have been considerably impaired, because its position was a constrained one; or, in other words, this member

of society was out of place, and could not, therefore, render a perfect service: still, by the kind assistance of neighboring members, the disability was rendered as slight as possible, inasmuch as the projection of new bone, the length of the column, the size and shape of the receiving cup, the position and form of all its parts, were exactly proportioned and adapted to afford the greatest attainable remedy for the displacement of the limb.

In some instances one organ, in addition to the exercise of its own office, will also assume for a time the functions of another whose use is temporarily suspended. When the passages of some of the largest glands are obstructed by disease, the skin, and even the vessels of the eye, besides their usual secretions, will transmit a fluid wholly dissimilar to that which is usually perspired through the skin, and to the lachrymal secretion which lubricates and facilitates the motion of the eye. And, when the pores of the skin become constringed and obstructed by a sudden exposure to a cold atmosphere, the mucous membrane of the lungs and air passages, which, like the skin, is an exhal-

ant surface, emits a new fluid to compensate for the interruption in the office of the skin; and, as this new secretion consists of humors which can be of no further use to the system, it excites a muscular effort, denominated a "cough," by which it is detached from the surface of the membrane and removed from the system. This double action of the membranes of the chest constitutes what is commonly called a *cold*, which complaint is often removed or relieved by a restoration of the offices of the skin.

Besides these alternations of office, it is also provided, as between the members of a larger and well-balanced society, that no one organ or individual of the body can be made to act, so long as its exercise may endanger its neighbor. The muscles of deglutition cannot be exerted until the valve above the orifice of the windpipe is drawn downward by another set of muscles, so as to prevent the admission of any thing into the chest which might disturb the operation of its organs. Thus we cannot swallow and breathe at the same time. And, if any matter be suddenly introduced

into the back part of the mouth, it may reach the windpipe before its orifice is fully closed by the action of its valve; but the small quantity which may occasionally be admitted in this manner is instantly resisted in its descent by another set of muscular fibres, and is soon ejected by a spasmodic cough, or removed by the absorbent vessels, if it be either a liquid or soluble solid. Certain muscular fibres, which are seldom used in the early stages of life, acquire in after time an habitual action, from their frequent efforts to defend a more delicate organ; and their action becomes more frequent and involuntary in proportion to the greater exposure of this organ. The new-born infant does not often wink. The finger may be carried close to the eye without exciting the action of the lid. Where no violence is apprehended, no means of defence are practised. But children soon learn to close the eye-lid, as a measure of defence to the eye; and this motion, at first occasional and nearly or quite voluntary, becomes frequent and nearly involuntary. But the frequency of the motion of the eye-lids depends much

on the settled employment of the person. The watch-repairer and the compositor seldom wink, while the stone-cutter and the smith close the eye at every strong blow of their hammer; for the integuments, alive to the performance of duty and watchful in the exercise of their use, *will* instantly interpose their defence when their more valuable member is threatened with violence.

When the action of one of the faculties is suspended, those which remain — active in their effort to supply the defect, and to preserve, as far as possible, the integrity of the human form and of human ability — gradually acquire new sensibilities analogous to those which formerly appertained to another organ, but which have been interrupted. Thus, a blind man will acquire a knowledge of many things which others can attain only by the power of vision. Mr. Metcalf, a distinguished English engineer, was blind. He would select the most favorable routes for roads and canals by calculating, with great exactness, the degrees of ascent and descent as he walked over the course. Dr. Sanderson, late Professor of Mathematics in

the University of Cambridge, England, lost his sight during his infancy. He was recommended to the professorship by Sir Isaac Newton. He could multiply, divide, extract the square and cube root, and solve the most abstruse propositions in trigonometry and algebra with the greatest accuracy. There are some blind men who are excellent mechanics, and so exact is their sense of touch that they can readily select from the warehouse of another person all the articles of furniture which are unfaithfully made or of faulty proportions.

By a new method of instruction, the deaf and dumb are taught to read and write, and also to converse, by letters and words presented to each other by a varied position of the fingers; and so rapidly are these motions interchanged, and so readily are they apprehended, that the fingers of the mute will frequently communicate nearly as much in a given period as can be expressed by others by an exercise of the vocal organs. And the deaf are not entirely insensible to the action of sound. They sometimes *feel* a voice behind

them, and turn so readily that many suppose they still hear by the ear. And their sense of touch is sometimes so wonderfully modified that they not only feel the ordinary sounds of the voice, but are even sensible to the harmony of its inflections. The following extract is from a newspaper published in New York, conducted by a deaf and dumb editor: "There is an indescribable effect which music in a close room has on a deaf and dumb man. The air seems to play around in measured vibrations, causing a thrilling sensation throughout the whole system; and the rapid changes (which we suppose proceed from a change in the tune) create a kind of ecstatic confusion of the nerves, which can be realized only where the sense of feeling predominates over that of hearing." The sense of feeling sometimes becomes more exquisitely acute. Julia Brace, at the age of four years, was deprived by sickness of the senses of hearing and seeing. At the age of eighteen she was admitted into the asylum at Hartford, a deaf, dumb, and blind pupil; and, by the methods of instruction peculiar to institutions

of this kind, she was taught such conversational signs of the deaf and dumb as are necessary to convey ideas on common subjects; and, with the exception of matters of an abstract character, she could be made to understand, at least to some extent, any subject which was presented to her in the finger language. At Hartford she was taught many domestic uses. She would select her clothes from the mass belonging to one hundred pupils; never leaving among that great number of articles a garment of her own, nor taking one which belonged to another. These she would wash clean, frequently changing the water, and, when sufficiently dry, iron them smoothly. She performed the entire work of knitting a stocking; and required no assistance in shaping, narrowing, and widening. She would examine the knitting-work of a little girl, discover its defects with great readiness, pull out the needle, unravel the work until she had removed all the imperfections, and, after taking up the stitches, return the work to its owner. She was also taught needle-work, and frequently hemmed fine linen handkerchiefs. In no part of

this work did she require any assistance. Her needle and thread, of the extreme fineness of No. 150, were put into her mouth together, and immediately came forth ready for use! Thus, by its exquisite sense of touch, the tongue *felt* the eye of the smallest needle as readily as some others would find it by the most attentive exercise of vision; and through that smallest aperture the muscles of the mouth directed the thread, nearly, perhaps quite, as quickly as it is usually passed by the steadiest motion of the fingers!

Laura Bridgman, lately a resident of Boston, has but a single sense, — that of touch. Yet this one faculty — striving, as it would seem, to compensate for the privation of others — has assumed new sensibilities and powers, through which the will and understanding are elevated and enlightened. Although connected with the external world by a single link, yet, by virtue of this only medium she understands the nature of her infirmity, and to a great extent her moral and religious duties. She converses with her friends (in the peculiar manner of the mutes), participates in their joys

and sorrows, and performs many worldly uses in the most exact and perfect manner. A short time since Julia Brace and Laura were introduced to each other. The latter clung to the former, put around her neck a chain of her own braiding, and kissed her with the deepest affection. But Julia was much older, and of a less ardent temperament: she coolly put the present which Laura had brought her into her pocket, and sought to retire from the embraces of the child, whose distress then became very evident, and who eagerly asked, in her finger language, "Why does she push me? why does she not love me?"

The following statements, which still further illustrate our subject, have been furnished by a gentleman fully entitled to credit. In one of our Western States there is an institution for the blind, and a plot of ground, connected with the main building, is surrounded by a narrow gravelled walk, solely devoted to the inmates of the asylum. In this enclosure, and upon this gravel walk, the inmates exercise and recreate themselves. The principal of this institution, to show to a

friend that the sense of hearing and feeling in his pupils had added to their usual sensibilities something nearly akin to the power of vision, placed an empty barrel across the path, previous to the usual time of the promenade of his pupils, and with his friend remained near in silence, to watch the approach of the blind pedestrians. Presently the pupils commenced their walk with active, long steps, and with a deportment easy and unconcerned. Not the slightest embarrassment was perceived in their gait until they approached within a single yard of the barrel across their path. At this point they suddenly stopped for an instant, when one in front carefully extended his foot, discovered the obstruction, and instantly removed it, when they all walked forward as before, in perfect assurance!

There is at present a blind man in the city of London who seems to be thoroughly acquainted with all the streets and avenues; and who takes, without accident, his daily walks into the various parts of the town. A person not long since passed an evening at the house of this gentleman,

who found, as he was about to return at a late hour, that the night was not only moonless, but absolutely darkened and blackened by a dense fog. The blind man insisted that he would accompany his friend home; averring that neither a London fog nor a starless night gave him any trouble. This offer was accepted by the visitant, who, availing himself of the arm of his blind guide, marched forward with nearly his usual speed, through the darkness impenetrable to the keenest vision. Suddenly the guide exclaimed, "Stop! here is an obstruction!" — "I can perceive nothing, neither can I feel any thing with my cane," said the man of eyes. — "Still there is something, and something quite large, just before us," replied the blind man; and, carefully feeling their way forward inch by inch, they immediately struck a hackney-coach, which the drunken or heedless driver had left across the sidewalk instead of taking it into the yard.

The same blind person, it is declared, will enter a guest-chamber, shake hands with each present, and first address every guest by name

unless there are some in attendance whom he has never before met. His fingers know their man even before a word has been pronounced!

How wonderful, how successful, are the new efforts which the members of the society-man put forth to compensate for the loss of power in a kindred sense or faculty! Is the exercise of vision suspended? The tongue *sees* the needle's eye, and the muscles, the mouth's fingers, pass through it the finest thread; the modified sense of feeling and hearing perceive the barrel and the coach across the path in time to prevent the slightest accident; the fingers' ends instantly recognize the name of any individual they have before met; the deaf feel the harmony of music, and in the dance or march move in exact time to its inflections; the deaf, dumb, and blind, through the only remaining sense of touch, are instructed in domestic duties, moral uses, and religious obligations. And, if we look within the system, we find each minutest fibre striving to compensate for a suspension of power in its neighbor. We see new joints, new circulations of the blood, new formations of bone, new secretions of fluid.

It will be seen, upon the slightest reflection, that we have daily and even hourly evidence of the support and protection which one member of the society-man renders to others; for these kind offices even come down into the external and physical plane of life, and are as evident, although perhaps not as often recognized, as the most benevolent actions which are reciprocated between members of the larger forms of society. Thus, if the body be threatened with violence, ten thousand fibres spring to the defence of each and every part. The joints are firmly drawn together, and all the muscles are strained, to present the greatest defence to the more vital parts, and to prepare the body for instant action, in any direction which may be necessary to escape the danger. If impending violence threaten from above, and the exact course of its descent be unknown, so that no promise of an escape from the blow is given by a quick removal from a particular position, in an instant of time every muscle is exerted whose action can, in any degree, contribute to the defence of the head. The muscles of the neck are

firmly braced; the shoulders are carried upward, forward, and inward, thus reducing the surface exposed to danger, and strengthening the connections of the joints most liable to dislocation, and further securing the position of the neck, whose slender, bony column might be fatally injured by a slight oblique blow on the head; the forearms are carried over the head, and the unbraced, gradually bending, knees bring the head into a receding position from the threatened shock. In this position, a force, sufficient to fracture the cranium or dislocate the shoulders if received when the body was erect and firm, might cause but little injury. If a person walk in the dark where obstructions are apprehended, a position is at once assumed which is best calculated to shield the body from violence. The head and body are drawn backward; the arms are carried forward, — one at a slight elevation to defend the face, and the other in a proper direction to guard the chest and stomach; the feet are lifted directly upward, to avoid impediments which are near the ground, carried forward the length of the step, and then

dropped as they were raised, thus describing two right angles at each step; and while the feet and hands kindly explore a course for the body, they, in turn, cautiously guard their more defenceless parts from exposure, — the toes and anterior parts of the feet are elevated, and the fingers are drawn backward; for a blow which might dislocate the toes and fingers would, perhaps, scarcely injure the palms and heels. If a person fall from a height, all the muscles which can assist are exerted to keep the feet downward: the lower limbs are braced together, and the arms are brought close to the sides; the anterior parts of the feet are drawn firmly downward, so that the strong tendon of the heel might be ruptured before the violence of the shock should reach the bones of the limbs; for the division of the heel-cord, or the dislocation of the toes, would prove trifling in comparison to the fracture of a limb. In addition to this arrangement of the parts most exposed in falling, every muscular fibre is stretched to render the defence more perfect: the chest, by quick and strong inspirations, is filled to its utmost capacity, by which

action the diaphragm is pressed downwards, and thus the tensely-drawn muscles upon the surface are rendered still more firm by the pressure from within; and, in order that these arrangements may be fully preserved to the last, the person falling neither speaks nor utters any sound indicative of alarm; for the least vocal exertion would diminish the pressure of air within the chest, and thus tend to weaken the means of defence.

. . . . . .

Many of the internal organs, or receptive forms of human life, seem to disclose in their vital movements a consciousness of their purpose and legitimate use. When man is in the order of his life, these organs act in perfect accord; and through such action he has the health and strength by which he is enabled to perform the highest material uses of human life. The physiologist is not content, however, with the assignment to these vital forms of powers and properties which may seem to some to represent much more of mechanical than voluntary power: he sees in their exercise the appearance of a moral force, a sense of

sympathy and affection, and, at certain times, a predisposition for an interchange of the kind offices of life, — a willingness, if not a desire, to assist other organs, when incapacitated for a time for the performance of their ordinary functions; and thus assuming, for the moment, new offices, to compensate for the disability of other forms receptive of life, but disordered for a season.

In relation to the voluntary assumption of new duties by certain organs, to relieve the indisposition of others to act, something has been previously said in this essay, and perhaps future reference will be made to this subject; but no further remarks on this topic seem necessary at present.

Life, existing in material structures, is a constant activity, and is ever demanding and receiving natural support. This sustenance is elaborated and secreted from our daily food, and, after certain preparations and purifications, —which will be more particularly treated of hereafter, — is constantly ascending, whether we sleep or wake, into the blood, and entering the arterial circulation;

thus enriching the fountain of life, and, being thus recreated, goes forth in its perpetual, life-giving round, reaching and refreshing every part of the body, even to the smallest component thread or fibre of the human frame. The blood, in this sense at least, is the life of man.

It may be said, while all this is an accepted truth, still it does not present any appearance of a moral quality, or of seeming intelligence in its operation; that it moves in its perpetual circuit, and never varies in its round of duty; that one circulation is the exact image of all others; and that the use it performs in one of its courses is exactly the same as in all those which may have preceded or may follow. Possibly this is the common, superficial thought of the uses of the blood; but, if so, it is not only very superficial, but quite erroneous.

The blood adapts itself to all the requirements incident to animal life. If a bone be broken, the blood immediately assumes a new function; and if it be the first fracture of the individual, then for the first time the blood assumes a new

office; and if no similar accident happen to the person in the course of his life, then this function is assumed for the last time; it immediately secretes, and deposits between the fractured extremities, a new ossific secretion, which hardens into bone, and thus heals the disability of the limb. Where cartilage, which is neither bone nor fibre, is wasted or diseased, on the articular surface of the joints, the blood secretes precisely the matter for its renewal. If the lubricating fluid is deficient between the articulating surfaces, and the motion of the joint is thereby impeded or rendered painful, the blood deposits the exactly required synovial liquid, which at once restores the limb to its full use. If a tendon be severed, or a muscular fibre be wasted, the blood secretes just that which will heal the tendon, and restore the muscle. Whatever may be the physical wants of the human organization, the blood meets them, and as with a personal knowledge of its necessities; never mistaking the nature of the disorder, nor delaying to furnish the appropriate remedy for its removal. Well may we exclaim with the great poet, as

expressed in the extract which is prefixed to this essay, —

"What a piece of work is a man!"

We are constantly seeing in the world attempts to reform the character and manners of individuals or communities, who are evidently declining in their moral condition, and are thus tending to disorder and disease; and, when these efforts fail of producing any visible good effect, many are ready to say that the philanthropists who have thus labored have been foiled in their endeavors to do good; that they have lost their toil and spent their strength for nought: but herein lies a grave mistake. No good act is ever performed in vain, whatever may be the appearance; no kind intention, no friendly thought even, towards other men, is wasted. The mutual kind offices of humanity are the offsprings of that LOVE which is the inmost of life. From this never-failing fountain, true humanity derives its existence; and, from and through this receptive life in man, he performs all his worldly duties. Genuine love is ever active for good, and the result of these activities can

neither be dissipated nor destroyed. We may not, in many instances, perceive the blessings it confers; for we look through material eyes, and form our opinions from fallible senses: still we have sufficient evidence to believe that the unremitting exertions of genuine love are as sure to confer its blessing as that the ceaseless round of the blood is certain to nourish and sustain the physical forms of man.

"Talk not of wasted affection: affection never was wasted.
If it enrich not the heart of another, its waters returning
Back to their spring, like the rain, shall fill it full of refreshment:
That which the fountain sends forth, returns again to the fountain."

In the extract from Shakespeare which is placed at the head of this article, it may be thought that the character of man is greatly overdrawn, and that such language is only to be excused on the broad ground claimed by "poetic license." It should be remembered, however, that the lines above referred to are a description of man living in the order of his creation, or, perhaps, we

should say, of the primeval, or most ancient, man, — while he remained in the image and likeness of his Maker, and co-operated with his fellow-men of the golden age in doing good; of which age and of which men we shall have occasion to speak more particularly in the chapters which follow.

But man is defined even with higher enthusiasm by some of the more ancient philosophers, whose names are held, even to the present day, in the highest respect for their learning and eminent ability, — by men who seem to have studied for the highest and most significant terms through which they could express the greatest admiration for the character of man. Zoroaster, the Persian philosopher, calls man the most excellent and noble creature of the world, the principal and mighty work of GOD, the wonder of wonders, the greatest miracle. Plato characterizes him as the great marvel of marvels; Pliny, as the abridgment and epitome of the world. Other philosophers, as if striving with a strong desire to exalt the human character even to a higher degree of

perfection, call man a model of the world; sovereign lord of creation; viceroy of creation; sole governor and commander of the universe, to whom all things of earth are subject and yield obedience; created into God's own image, and endued with all the highest powers and faculties which appertain to human life, to man as a spiritual being who, in his first and best estate, was pure, happy, and comparatively perfect.

If it had not been expressly stated that this description of man especially applied to his primeval condition, some of the foregoing expressions might be considered not only as irreverent, but perhaps as profane. Indeed, some of the powers which these philosophers claim for man — even for him who is in the perfect order of life — cannot be admitted; but when we understand that these attributes were accorded to those who were created a little lower than the angels, and imputed to them only so long as they continued in this nearly perfect estate, which some suppose continued through very many ages, in which they were ever active in their labors of love towards others,

we may pardon, perhaps, those statements of the power of man, which may justly be regarded as extravagant and untrue. Man is *not* the governor and commander of the created world; and, were it not for superhuman influence constantly flowing into created forms, the world would perish in a moment.

II.

LIFE.

"Life 's more than breath, and the quick round of blood :
'Tis a great spirit and a busy heart.
We live in deeds, not years ; in thoughts, not breaths ;
In feelings, not in figures on a dial.
We should count time by heart-throbs. He most lives
Who thinks most, feels the noblest, acts the best."

FESTUS.

II.

LIFE.

LIFE is the most exalted and the most useful subject of study for the physiologist and philosopher. In its inmost sense, life is infinite, eternal, and inscrutable. From the earliest time it formed and animated the universe. All things that are, and were made, were formed by an influx of this life into and through material instrumentalities. The entire creation is momentarily animated and sustained by this forth-flowing life into its recipient organs; and thus preservation is the result of constant re-creation. Should this influx intermit for a moment, all created forms would perish.

We have said that life — life in *esse*, or in its inmost — is eternal and inconceivable: yet we may understand that it must have motion, or activity, into and through the creations of time; and when

this activity, or influx, fills the human form, it becomes man, — the image and likeness of the Divine life.

Thus we may see there is but one life, infinite and eternal, — but one substance and one power; and that all created forms have a life derivative from this power and substance; that man lives and moves from an influx of this life, becomes a living soul, and employs the material covering and organs in which he dwells, as an instrumentality for the performance of uses in the material world.

We can describe life as it exists in ourselves but very imperfectly, because it is of and from the Divine life. But we can conceive of it as a gift; as the motive and inspiring power of all our actions, which incites us, as far as possible, to act in freedom, — which is also its gift, — to perform kind and useful acts, for the good, the help, and happiness of all.

From this gift of life, rationality, and freedom to act as we may desire, we are enabled to look upward, — unless we imprison ourselves in matter — and perceive that we have no independent

existence; and to acknowledge that we do not live and move of ourselves, but that we are vivified and made active, every moment of our lives in the natural world, by a spiritual influx into the material forms of humanity, which makes man to be man, and which, flowing in and through lower receptive forms, creates and sustains the world of matter. Thus all things were created, and are being re-created; and thus will they be sustained for all coming time.

We have said that life, in its inmost, is indescribable; yet we find it frequently defined by physiologists and philosophers, but almost invariably as self-derived and independent, as viewed through its material manifestations, and they scarcely ever seem to recognize fully a higher life than that of man.

We subjoin some of the definitions of life taken from the copious lexicography of a recent popular author: —

"Life: state of living, or being alive; that state of animals or plants in which the natural functions and motives are, or may be, performed; also, the time or

duration of such state, whether generally or individually, — as the life of an ox or a flower; the condition or circumstances attendant on the period of human existence; animated existence; system of animal nature; a living person; a human being; social position; worldly status; spirit; resolution; animation; vivacity; nerve; vim; eternal happiness; heavenly existence."

Many other definitions are given by our author; but, among all these, the two last, and these only by implication, rise above the plane of material life.

A recent writer of physiology and hygiene, whose large work upon these subjects is now used as a classic, or for professional purposes, in our schools and colleges, does not attempt to define life; and, so far as I have been able to learn, recognizes no life out of or above matter.

The ancient philosophers seem to have had a higher appreciation of this subject than our modern writers. Aristotle says, the animating principle is considered by physiologists as entitled to our highest consideration; and at this splendid theme the greatest minds have toiled. Hippocrates calls life fire, light, immortal, intelligent. Gir-

tenner considers it as oxygen, vital air; and with this definition Abernethy, Echard, and others seem to sympathize.

Others have denominated life as the vital principle, spirit of animation, *impetum faciens*, organic force, *vis plastica*, &c.

Almost all these definitions seem to relate to material life, — to human life as independent and self-sustaining; and to all forms of life in all the kingdoms, or departments, of creation. Nearly all physiologists who have written upon this theme describe life as exhibited in created forms as the all of life.

Is it not better to say that life finite is a gift from the Life Infinite; a gift to man to use as his own, in his freedom; another gift from the Divine; a gift clothed in a material covering, with interior material organs receptive of this life Divine, through which he is enabled to perform the uses and purposes of his being while he dwells in matter?

But there are varieties of life in all the kingdoms of nature. To man are given the highest conceiv-

able gifts or blessings of immortality, rationality, and freedom; to lower animals, the instinct which teaches them to seek their food, and perpetuate their species, for the use of man; to the vegetable world, the seeming inherent ability to yield the corn and fruits for the support of the animal creation. But this seeming inherent ability of the vegetable kingdom is only apparent. No created thing is self-existent. Every lower form of life derives its being from and through a prior and higher medium, and thus reaches upward to the Source of life.

As we descend from the animal to the vegetable kingdom, while we behold the evidence of life all around us, we see these forms much more restricted and subdued, and we find the high characteristics of the animal kingdom are all wanting. We have taken a great step downward. We leave the world of mind, of will and understanding, of activity and freedom, and of affection and thought; but we enter a kingdom of life and of uses, of fruitfulness and beauty. We see the teeming, life-sustaining grain-fields, the rich

pastures, the delicious fruits, the beauty of the landscape and the flower. We come into a department of life indispensable to and inseparable from the support of animal life; into a kingdom which sustains the material forms of the highest human activities, — a kingdom perfect in its beauties and its proper uses.

The vegetable kingdom derives its power to produce its crops from the earth and the atmosphere, as we may explain hereafter, when we speak on the subject of nutrition. But it is within the power of men, by fertilization and skilful cultivation, to increase the products of the earth, and to improve their quality; to enlarge and enrich its fruits; to add new beauty to the flowers and the landscapes.

An eminent pomologist says that all apples were crabs before they were codlings; but this fruit, by careful cultivation, has become so improved and enriched in flavor that it requires no cooking to improve its quality. The wild pear-tree produces very small, hard fruit, and generally offensively acid; but, by frequent reproduction and liberal

fertilization, the tree now produces large fruit, of fine flavor, and is highly prized for the dessert. The small single flower of the forest — beautiful in its parts and tints, as all flowers are — becomes, by cultivation, double, and more brilliant in its colors. In like manner, the single rose becomes double, and, as is asserted, has a richer perfume. The wild lily of the field, scarce worthy of the name of a flower, is transplanted to the garden, and, in time, becomes the tiger lily, — bright and showy, if not beautiful.

There are some cases in the vegetable world that present something like a glimmer of instinct.

I will mention an instance in which a tree, through its roots and through their extension, disclosed something like a cognizance of purpose. The tree was a very large elm, standing by the roadside, which, a few days before, had been struck by lightning. I observed the slight fissures in the wood, in places where the bark had been thrown off; and the appearance that the fluid had passed into the earth, through a very large root running just under the sward, which was broken

in many places by it. I wondered, at first, at the great size of the tree, as it stood in a bank rather gravelly and dry, and was bounded upon one side by a hard-trodden road, which its roots could hardly penetrate, and which could yield but little support. I followed the course of this large root; and found it ran in a straight line, seventy-five feet at least, to the stable in which the cattle of a good-sized farm were kept. It seemed to me that this case presented the evidence of something like instinctive power in the vegetable kingdom; and I ceased to wonder at the majestic proportions of the noble elm.

Another case, coincident with the one just named, — and, perhaps, more suggestive of the appearance of animal instinct in the vegetable kingdom, — now occurs to me. Two or three years since, as I was riding very leisurely in the country, and looking at the wild scenery around me, I saw by the wayside a wild-cherry tree, growing from the cleft of a rock, which had probably been riven by the force of frost, which fissure had been filled with dust, and in which a cherry-stone, deposited,

no doubt, by the action of the winds, had taken root in the rift. The rock was nearly twelve feet long, and from three to four feet broad; at one end rising four feet from the earth, and declining at the other end to a level with the sward. The fissure in the bowlder was across the highest part of the rock, and was from three to three and a half inches wide. The tree had outgrown the stony limitations at its base, jutting over the surface of the rock, so that the diameter of its trunk was double the width of the fissure from which it grew. At first, it seemed a marvel that a tree, nearly or quite fifteen feet high, could have resisted the winds, confined, as it was, at the surface within such narrow and unyielding limits; but the wonder was soon explained, and in this wise: A root issued from the trunk close to the stone, at right angles with the cleft in the rock; and, after running straight downward towards the declining end, twelve to fifteen inches, it turned, almost at a right angle, leaving a distance between the turning point and the declined end, some eight or nine feet, and thus reaching and entering the earth in

half the distance which its extension in a straight line would have required. This root was very large, — almost as large where it left the body of the tree as the trunk itself; and it fitted so close to the inequalities of the surface, that it seemed almost as immovable as the rock itself. The elbow in the root was in the exact direction to brace the trunk against the force of the winds; and its entrance into the moist earth afforded a support to the tree which the dry dust within the rift could not supply.

Herein is a question for our solution: What gave this sudden turn to the root, against the force of gravity, by which the tree was strengthened to withstand the stormy winds, and by which it was enabled to enter the earth in less than half the distance required if it had continued in a straight line down the declivity or length of the rock; and how many months — years, perhaps — earlier did it in this manner contribute to the growth and bodily strength of the tree?

But there is a further descent of life into the earth, or mineral kingdom, where it rests, as upon

its basis, or in the ultimate forms of creation. The manifestations of life in the depths of the earth are far less distinct than those of the vegetable world. Still, we are assured that life pervades the mineral kingdom, in subdued forms of activity and use.

When accretions are effected of the constituent particles of the gems, through the affinity of their atoms for each other, they are crystallized into the diamond, ruby, emerald, &c., when their active life ceases; and there is little reason to doubt, but great reason to believe, that these affinities are ever at work, and succeeding accretions are formed, and that there are continuous crystallizations of all manner of precious stones. Gold is sometimes found pure in a consolidated, if not crystallized form; and it is frequently found in minute particles, — in particles awaiting the operations of their affinity, their accretions, and their solid form, in which their activity, as with the crystallized diamond, ceases. But other particles are gathering, and coming into the exercise of their attraction; and thus there is an uninterrupted

succession of the birth and gathering of these atoms into larger forms. Gold is a continuous production of mineral life.

Very many metals are taken from the earth in their crude form, or in oxides. Quicksilver is thus obtained from its ore, or its mercurial oxide, and is forced from its impurities by the art of man, through the agency of heat; and there is no reason to doubt that coal is a continuous production in the great laboratories of the earth.

We know it is, or has been, a common thought, that all the treasures of the mineral kingdom — the gems, the gold, silver, the baser metals, coal, and all the treasures the earth yields up to man; all that have been, or may hereafter be, found and taken from its depths — were there placed in the earliest time, or from the creation of the earth. But it should be remembered, from the manifestations of life in the higher kingdoms, that it is ever-active and all-pervading, ever at work until the purpose for which it labors is accomplished, — until the jewels are perfected, and the gold gathered. But life's labor is never finished: other

precious metals are to be gathered, and other brilliants to be crystallized. Life never remits its activity.

How inestimable are the treasures which rise from the depths of the earth, uplifted into the hands of men! The silver and the gold express the price of every purchase that can be made, of every thing serving for man's material support and comfort, and constantly blessing each and all who will use their values aright.

But there is an ascent of life above matter, as well as a descent into it; for nothing of life can be lost or impaired in its constant operation. Forms of life may change; but life itself is indestructible. The gold and the precious gems, which come from the depths of the lowest kingdom into the highest of creation, even into the hands of man, — who, in the order of his life, was made a little lower than the angels, and to whom was given the dominion of the earth, — are the rising types of what John saw in vision, in the Holy City coming down out of heaven, the walls of which were of jasper, and whose foundations

were garnished with all manner of precious stones, and whose streets were pure gold.

Life, from its Source, is constantly flowing forth into material forms, and exciting them to action; but, as these forms are material, they require material support. There can be no perpetual giving forth without a constant returning. The fields give to the animal kingdom their grains and their grasses; the trees yield their fruit, and the vines their clusters. The power to do this they derive from the earth and the atmosphere; but the grain and the fruit gathered must be in the near proportion to the support they receive: to raise more abundant crops, the lands must be enriched by the skill of the laborer.

The broadest rivers are made up from smaller rivers; and these are formed by smaller streams, which are supplied from brooklets, rills, and springs; and these are refreshed from the rains of heaven. But whence are these rains? From the vapors which are drawn upward from the great reservoirs of water, and which return to the clouds from whence they came; again and again return-

ing, and replenishing the springs and fountains. Life is perpetually giving and receiving, descending and ascending. The blood is propelled by that powerful muscle, the heart, through the arteries,—through their almost infinitesimal ramifications to every smallest organ and fibre of the body, giving them the power of action; and it returns through the veins to the region of the heart, freighted with new strength for each successive coursing through the system, continuously supporting and vivifying the material forms through which the influent life of man operates.

The brain is the parent of our voluntary motions. No finger is raised, no word spoken, no step taken, no motion of the external man is made, except by the command of the brain, through the telegraphy of the nerves. How this influence reaches the voluntary muscles has not yet been satisfactorily explained. Whether it is communicated by the power we call sympathy, or by a vibration of its fibres, or by the movement of a subtle fluid within the nerves, has not yet been determined. It is a question which relates to the

first proceeding forth, or the influx, of Life itself in and through the first and highest receptive form, which is the human. The question *how* these operations or communications are instantly effected, no physiologist has been able to solve. But we know that the will or command to speak or move, and the word spoken or step taken, are simultaneous, or as nearly so as the electric spark courses the circle from its incipient to its returning point.

How far the brain can influence the involuntary actions is not yet determined: indeed, some doubt whether it has any power in this direction. Yet it seems probable it may exercise some influence even over the power of the heart. We know it can exert an influence over those mixed muscular movements which are partially within the province of the will. When the ear is most attentively turned to gather the import of a distant sound or a near whisper, the breathing ceases for a moment; and we know that respiration intermits at any time through the command of the brain; and, by long practice, swimmers and divers can restrain

their breath for a minute of time, or even more ; and amphibious animals can do this for an almost indefinite time.. In intense thought or careful effort the eye seldom closes. The portrait-painter spreads his colors with a steadily open eye; the watch repairer and the type-setter seldom wink; but the sculptor or stone-cutter closes the eye with every blow of his instrument.

The nerves reach every organ, every smallest fibre, of the body. When the connection of the principal nerve of any organ is severed, that organ is instantly paralyzed. The tongue cannot move, nor the mouth speak, if separated from their nervous connection, or if their functions be greatly impaired by disease. The limb is not dead which is deprived of its nervous influence; for the blood cherishes or sustains it: still, it is cold as well as as motionless, — not plump and hard as its fellow, but flaccid and wasting.

Man is made man, or is human, by the reception of life into organized forms of matter, as has already been said ; and all these forms, incessantly active, being material, require material support.

This fact seems now to bring us to the consideration of a most important matter; namely, that of nutrition.

The process and power of nutrition is a most important study for the consideration of the physiologist; and it may also prove an interesting subject to the unprofessional man, inasmuch as he can follow the course of its operation even from the reception of food into the mouth; through its analysis, the ascent of the chyle into the blood, and its assimilation with the organic forms of life; but the information thus obtained, although it affords instruction, is a mere tracing of the nutritive material through the anatomical courses. And it may be well to repeat here, that the study of inmost human vitality — the *vis vitæ*, or prime influx of life — can never be comprehended, except from its going forth, or descent into action. The physiologist can judge of life only by the effects which flow from it; but these effects afford ample study for the most acute and diligent mind.

The instant the food enters the mouth, especially if it be of a solid character, that ever-ready muscle,

the tongue, places it in a position for mastication; and the first maxillary motions excite a flow from the salivary glands; and, by this joint action, the food is divided, moistened, and thus prepared for deglutition. The tongue then places this in the œsophagus (gullet), which at once assumes a peristaltic or vermicular motion; and a ring-like, muscular contraction of the throat, as though grasped by the hand from above, presses it downward, and thus it reaches the stomach. Here it is mixed with the gastric juices, through the operation of which the contents are farther softened and diluted, and an analysis or separation is effected of the chyle, or nutritious portion of the food, from that which is comparatively refuse; and, through the peristaltic motion of the stomach, — which motion exists through the whole course of the alimentary canal, — these pass the lower orifice of the stomach, where the mouths of the absorbent lacteals open, and draw upward the chyle; while the grosser parts, not yet valueless (as will be seen hereafter), pass toward their elimination. These lacteals convey the chyle, or the nutritious ele-

ments of the food, to the thoracic duct, — so called because it ascends through the thorax or chest, — and discharges the same into a large vein near the heart. The blood, thus re-enforced, is not yet sufficiently purified to enter the arterial circulation; but its further preparation will be hereafter explained.

But the nutritive quality of the food is not all taken up by the lacteals and carried upward, as has just been described, into the great vein. The whole extent of the alimentary canal is lined by an absorbent membrane, upon which are nap-like threads, or *villi*, which absorb the remaining nutritive portions of the food through all the long convolutions of its course, until it is all received into the minute veins, — as the plant roots take their nourishment from the earth.

These minute blood-vessels, thus refreshed with new strength, still to be further prepared and purified for its destined use, continually join or inosculate with each other, and by these unions form the portal vein (*vena portæ*). Thus we see all the sustaining qualities of the food we receive

are taken into the venous circulation; for it is a law of the human economy, that any thing taken into the system for the support of the material organs or recipient forms of life should not be lost; and, in the ordinary action of life, no particle of nourishment is wasted. Another vital law is, that substances no longer contributing to the support of life should be at once eliminated; and, unless this law is carried out, discord and disease are sure to follow. But this subject of elimination will be further treated in another division of our subject.

We have now followed the course of food from its reception through its digestion and secretion, or the separation of its life-sustaining qualities, — from the matter which becomes useless, even into the blood; but what has thus entered into the venous circulation requires further preparation and purification before it can enter the arterial system, and send forth its support to every organ and fibre of the body, and thus be assimilated to them by the formation of new tissues and by renewing other forms which sustain the material organs which

constitute the instrumentalities of human life. This further preparation we will now attempt very briefly to describe.

It is clearly to be inferred that the chyle, which is taken up by the lacteals as it passes the lower orifice of the stomach, contains less of impurity than that which is subsequently absorbed by the membranes of the canal, even to the last particle, and enters the portal vein; but does not, as in the case of lacteal absorption (before described), rise directly upward to the vicinity of the heart. It is almost without exception that the office of the veins is to collect the blood from the extreme arteries, and return the same to the heart, and not distribute it. But the portal vein, as soon as it enters the liver, — the greatest gland in the body, — divides itself into minute ramifications, which permeate the whole substance of that organ; on leaving which they reunite, and form what is called the hepatic vein, which rises to the region of the heart.

Through the spreading net-work of the portal vein in the great gland, a purification of the

ascending nutrition is effected by secretions into the gall vessel. This fluid, called gall, is acrid, bitter, somewhat saponaceous, and sub-alkaline, charged with phosphates and carbonates, and, as Fourcroy avers, with a small portion of prussic acid. The question is sometimes mooted as to the use of the bile secretion. It has no further use, excepting, perhaps, to increase the peristaltic motion of the convolutions of the canal. It is a depraved secretion, is furnished with excretory ducts; and, in orderly action, is constantly passing downward to its elimination. If, through a disordered function, bile rises into the stomach, it irritates, inflames the membrane, increases the heat, occasions a distaste for food; and the subject of this derangement is said to have a bilious fever. If bile flows into the stomach frequently, and in small quantities, it disturbs the digestive organs and occasions indigestion. If the excretory ducts of the bile-receptacle become inactive, it is absorbed into the blood, and jaundice follows. Every thing unduly retained in the system, after its nutriment is secreted, irritates locally, and tends to the

introduction of general derangement and disease. But we propose to say more upon this subject at a future time.

The venous blood, now loaded with aliment, is brought to the very door of the heart; but it is not sufficiently purified and vivified to enter its portals for arterial circulation. It is thrown outward, and, through its ramifications, pervades the whole substance of the lungs. Every breath we draw, then, purifies and prepares it for arterial use; every inspiration of atmospheric air is analyzed; the oxygen is absorbed into the blood, which it warms and vivifies; every succeeding expiration throws off the noxious gases.

But what are the uses of the blood thus refreshed, purified, and vitalized? It nourishes, sustains, and repairs the vital energies; in its incessant round, in every course, the arterial blood visits every component organ of life, even to the smallest filament; it restores the abraded membranes, supplies the wasted bone, unites the bone fractured by violence, restores the wasted tissues. In the language of an eminent physiologist, "it

adapts itself to every material want." Brain, nerve, muscle, gland, — every component fibre of man, — drinks in life from this great fountain of life. If it were otherwise, we could not exist; for every secretion of the gland, every movement of muscle, every pulsation of the heart, every thought of the brain, every motion of life, weakens some small — perhaps we should say smallest — portion of the material instrumentalities of human life. Thus, while we are daily wasting, we are every moment being re-created. Surely "the life is in the blood."

We have already spoken of the nutrition which the fields receive at the hands of man, and shown how the life-sustaining grains, the grasses and the fruits, are improved by the skill of the cultivator. The high activities of animal life require a constantly recurring, maintaining power; but the vegetable kingdom, although greatly improved in its productiveness by the labor of man, still in its life and growth continues independent of any aid he can render. It eats and drinks, lives and grows, produces seeds and fruits, grasses and

grains; and it is strengthened to do these things continuously, by an influx of life suited to the support of its life and growth: and, when we reflect on the difference of the animal activities as compared with those of the vegetable, we readily understand that the requirements of nutrition for the latter are almost as nothing in comparison with the demands of the former.

The vegetable world lives and grows from the material nourishment derived from the earth and from the air, from the showers and from the dews, from the carbonates, phosphates, and muriates, which were formed, and are forming, in the earth; and in the economy of vegetable life we think we can perceive something of the glimmer of instinct, as we have before stated. In the season of drouth, the roots continue to grow downward in search of food, and appear to increase their activities; and, if a sufficient amount of nutrition is not found, they extend laterally, and, as it is asserted, always in the direction of richer soil.

The active life of deciduous trees declines on the

approach of the winter frosts, and the nutritious juices descend to the roots; and the leaves, declining in their life, disclose the brightest tints, splendid in the variety and blending of their colors, and more beautiful in their death than in their rich emerald green of early summer. But when, at last, the brightness of their coloring has faded, they fall, almost with seeming reluctance, around the roots from which they had derived, in part, their nourishment, and thus enrich and strengthen the tree for its annual return of life.

But the spring season returns, and the frost-fetters are removed from the roots of the trees: the sap ascends again to the topmost twig of the highest trees, — even into the incipient, and as yet seeming lifeless, forms of the buds; and continuously enlarges these, opens the flowers, passes into the fruit, and sustains its growth, — even to its mature and perfect form.

The question may be propounded: By what power is this life of the tree carried up to its full height, and spread through all its branches, against the well-known laws of gravitation? By the power

of that life of which the tree is a recipient form, — of life not limited, certainly in this respect, by the laws of gravity; life which pervades and animates all created forms, from those of the highest to those of the lowest kingdom. The Inmost of life, in all its forms, as we have already said, is inscrutable. We can conceive of life only in and through its activities. We know the sap ascends and carries its sustaining, vivifying power to every part of the tree. It rises as the blood from the heart ascends through the veins and returns to the heart; as the vapors to the clouds, and the chyle to the arteries. We can understand that every motion is from the outflow of life, — of the only Life. Above this the human mind cannot rise.

In animal respiration the oxygen of the air is absorbed into the lungs, and the carbon eliminated; but the reverse of this takes place in the vegetable kingdom, — in trees and plants. By these the carbon is absorbed; and the atmosphere is purified by the disengagement of vital air. Every breath we inhale is carbonized or decomposed; the oxygen is taken into the blood and vitalizes it; every

breath we exhale frees the lungs from gases which are hurtful to animal life. What the animal rejects as noxious, the vegetable inspires as nutritious, receives and appropriates, and from such appropriation lives and grows. These nutritious juices of the tree, as aforesaid, ascend from the roots, through the pores of the exterior wood, and form the buds, flowers, seeds, and fruit.

The carbon taken in through the leaves passes downward, just between the ligneous and cortical portion of the tree, and annually converts a portion of the inner bark into wood. Thus, while the ascending nutrition produces the fruit or seeds of the tree, the descending food contributes to the growth of its wood. These rings, or the annual conversions of the inner bark into wood, are distinctly marked. And, by counting these when the fallen tree has been cut through, its age may be accurately determined; except in very large or old trees, where these circles are less easily distinguished near the centre of the tree, — sometimes becoming invisible to the naked eye: but, by the

aid of the microscope, the age of the oldest tree may, perhaps, be revealed.

In considering the nature of the support of the lowest forms of life, in the depths of the mineral kingdom, it should be remembered that the required nutrition of all the forms of the vital operations is and must be in proportion to their activities. Animal digestion is ever active; and the chyle derived from the analysis of food is constantly rising and entering the blood near the heart, as has been stated. It is asserted that these nutritious juices pass into the large veins, drop by drop, nearly marking the time of the pulsations of the heart.

But, as we descend to the vegetable world, we behold a great change in this respect. With occasional refreshing showers, the cultivated fields, grass-lands, and fruit-trees require only annual fertilization for the production of full and continuous crops; and the same cultivation is sufficient for gardens and vineyards. We are to look, then, for a corresponding declension in the forms or activities of life, in the depths of the earth; and

to these subdued activities we have already referred, under the names of affinity, accretion, consolidation, and crystallization.

There is another power in the deep laboratories of the earth, of tremendous import; namely, fire: and fire was formerly used by physiologists and philosophers as the synonyme of life and love. But our conceptions of the uses of this form of life in and through the lowest created forms are much clearer than our knowledge of its operation.

We know it throws up mountains, — apparently bringing up the treasures of the depths nearer the hand of man, — and sometimes breaks through the mountain tops and overwhelms cities, as a destructive power. But there is a good use of fire as well as a destroying force. Its good use in the mineral kingdom, it would seem, is to warm the earth, to meet and attemper the falling rains and showers. Now, if we accept the definitions of the older physiologists and philosophers, as above, that fire, in its good sense, is the type of life or love, and that water, in the same sense, is the emblem of truth or wisdom; if we can regard

these, not only in their representative sense, but in their living, active union, pervading the earth from its centre to its circumference, — we need look no further to determine what produces the uses, and sustains the forms, of the mineral kingdom.

How wonderful are the orderly operations of life! Every organ, every fibre, every constituent, of man is moving in exact accord, in perfect time, and for the accomplishment of the great use of human life: constant and regular as the pulsations of the heart, — which is laboring to send the life-blood to every part of the body, — and every other organ striving to re-enforce and sustain the action of the heart. Verily, we are fearfully and wonderfully made! How vividly does this definition of the individual man represent a society of men, acting in the unperverted order of life, each for others' good; each happy and healthy; all moving in entire unanimity and in exact harmony; and thus fulfilling the high purpose of their existence!

Life never tires; never ceases to act through its material forms, while these forms remain unim-

paired, and while man, in his freedom, concurs and co-operates with its influence; never ceases until the purpose of his existence in matter is consummated.

Professor Grindon says that there is an offensive and defensive league between every organ of the body. Nothing is proper to any member of this unique and truly loyal society, that does not go forth in turn for the interest and advantage of that society.

Every receptive form of life is seemingly conscious of the action and purpose of every other organ; for the nerves — the instant messengers of life — pervade every filament of the body: hence the strength and tenacity of harmonious vital action.

We have but barely alluded to the brain and the nerves, which are the ever-ready servants of the will to communicate, with electric swiftness, its commands to every part, to every human fibre. Dr. Parr defines the brain as the seat of rational and sensitive transaction. Descartes represents the brain as the seat, and the nerves as the instru-

mentalities, of the soul; which soul he locates, bodily, in the pineal gland of the *cerebrum* (anterior brain). Thus the brain is the soul itself. How difficult it seems for men to elevate their minds above matter, even in theory, — to acknowledge that we live and move, not from inherent ability to do so, but from a constant spiritual influx of life from the source of life; and to realize that, if this influx should intermit for a moment, all created forms would perish! It has already been said that inmost life is indefinable; and it may be further declared, that the first entry and motion of the Divine into its highest recipient form of material life, into the human brain, is above the comprehension and consciousness of man. But the further consideration of this matter properly belongs to another division of our subject.

Thus far we have spoken of the operation and condition of orderly life, as flowing through all its material human forms, with the constant concurrence of man in his freedom; of the health, happiness, and the innumerable blessings it confers on the individual man, and the great society

of men. We will not darken this bright picture at the present time; although, hereafter, we may have occasion to speak of the perversions of life, the abuses of freedom, and of the evils thence resulting.

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Rationality and freedom are the distinguishing gifts of humanity, and the prominent characteristics of man as a spiritual being. By the rationality with which man is endowed, he is enabled to perceive and understand the difference between good and evil; and, through his freedom, he has the power as of himself to determine his own course of life; therefore he exercises his preference, and elects freely the rule or order of life he is inclined to pursue, — whether he will cleave to the good of life, and eschew the evil; or turn to the evil, and neglect the good. Thus he is preserved in an equipoise, or mental balance, until he settles the question whether he will turn himself to the right hand or to the left; but by as much as he removes himself from his equilibrium of freedom, by so much he is the more inclined to continue in his

elected course of life, and less disposed to return to his former condition of liberty, and to consider the matter of his future way of life anew.

If a person is at first disposed to obey the Divine commands, simply because obedience to the precepts they inculcate is therein enjoined, he soon begins to understand that they are the lessons of love and wisdom, by the observance of which he is made happier and enabled to become more useful to his fellow-men; he has made his departure, from his inactive, balanced condition, in the right direction. Man does not lose his freedom, whether he is rising or declining in his condition of life. If he inclines to good or evil, the first step he takes on either hand renders those which follow easier and more certain.

There is truth in the proverb, taken from the vegetable kingdom, however trite it may be considered, that "the tree grows as the twig is bent."

But the bended twig may be brought into an upright position, and the future tree may become shapely, beautiful, and fruitful. The man declining in his moral condition may yet be re-

claimed, and become a good and useful citizen; and he may fall from virtue who is apparently travelling upward. Life is a ceaseless struggle between good and evil.

True happiness results from the love of doing good to others without any expectation or desire of a reward for the benefits thus conferred. With good men, the love of performing kind uses is a constant activity and a perennial delight; while the evil delight only in the exercise of their self-love, and in their attempts to obtain dominion over others. Thus the condition of each individual, whether inclined to good or evil, is, to a very great extent at least, the result of his own free choice and action. The good man is actuated by his love of doing good to his fellow-man; and he enjoys a condition of happiness, resulting from the exercise of his freedom, which has become truly spiritual. The evil have also their insane delights, yet attended by the pains and penalties which self-love and the desire to obtain dominion over others are certain to incur, — delights which flow from a perverted will and a freedom which is fast becoming infernal.

All true happiness results from man's freedom, — from his desire not only to deal justly with all, but from the constant delight he experiences in the performance of kind and useful acts, for the benefit of all with whom he may be associated. It is of man's free will that he does good to others. Kind acts, truly such, — at least so far as it relates to him who renders them, — can never be performed by the compulsion of a higher power.

The enjoyment of life, which some have supposed might be enforced upon man by a superior power, is affirmed only by a contradiction of terms; is illogical, and in direct conflict with the spiritual gift of freedom which heaven has vouchsafed to man as a spiritual being, and, also, as a spiritual blessing.

III.

HEALTH.

"O much desired, prolific, general Queen!
Hear me, life-bearing HEALTH, of beauteous mien,
Mother of all; by thee diseases dire,
Of bliss destructive, from our lives retire;
And every house is flourishing and fair,
If, with rejoicing aspect, thou art there.
Each dædal art thy vigorous force inspires,
And all the world thy helping hand desires.
Pluto, life's bane, alone resists thy will,
And ever hates thy all-preserving skill.

TAYLOR'S *Orpheus.*

III.

HEALTH.

PART I.

PHYSIOLOGY defines health as that condition of the living body in which all the vital and animal functions are performed easily, perfectly, and without pain. This definition, though it may be correct in the abstract, seems cold and imperfect to the student and lover of Physiology, — to one who exalts the noble science which explains the structure of man, the laws of his life, and the entire operations of the vital economy, to the rank of the highest human science.

A recent celebrated physiologist apostrophizes health as the greatest, richest blessing vouchsafed to man; as the blessing of life itself, — of the Divine Life. Perhaps this definition may be considered as correct; but the gifts of rationality and

freedom of action transcend human estimation, and, as it would seem, can scarcely be reckoned as among the lesser favors of Deity.

The Grecian mythology has impersonated health in the goddess HYGEIA; whose name has been employed, even to the present time, not only to signify health, but especially as the authority to prescribe the laws and rules by the observance of which health could be most easily preserved: and, if impaired, to suggest at least the means of its restoration; or, perhaps we should say, to teach how its future declensions may be avoided.

Some physiologists have considered health as the synonyme of life, — a definition which never met with general acceptance. Another has named health as life in act; but perverted life ever acts, and at the expense of health. A better description of perfect health — and of such we would speak — defines it as the orderly development or activity of life; and this definition seems worthy of general acceptance.

Professor Grindon describes health as the delicious spring of all animal enjoyment, and the

finest light whereby both to think or love. Without health, or in the degree of its declining condition, the life of man for a season may lose its elasticity and its brightest aspirations. And some recent physiologists insist that impaired health tends directly and, as they would seem to represent, surely to blunt all the true human affections and sympathies; and, according to its continuance, to make the life of man miserable, burdensome, unprofitable, and a curse to him instead of a blessing: and this is announced as a rule to which no exceptions are conceded! This seems a most extraordinary statement to be recorded on pages otherwise just, and claiming physiological authority; to which, for the moment, we enter our strongest dissent.

Charron, a learned Parisian of the fifteenth century, says that the excellencies of man are health, beauty, sprightliness, agility, vigor, dexterity, gracefulness of motion and behavior: but that health is infinitely above the other virtues; and that one thing only is more excellent, and

that is probity. He also states that strong health is as the parent of good temper and amiability ; that it prompts to neighborly love, heightens our social relations, and awakens the highest sympathies of true manhood. He gives no intimations that these strong characteristic influences of health are permanently impaired by temporary bodily indisposition, or are necessarily destroyed by continued ill-health. He seems to believe that health is vital, elastic, and reactive.

We know that under an occasional suppression of the influence of health it is ever struggling and striving to regain its ability to bless man. It is not a temporary power and frequently quiescent, as many seem to believe, but co-existent with man's life. Nor does disease, under impaired health, so often get the mastery of health, and render man interiorly wretched, as has just been stated by certain writers. It is much more than possible that bodily disease, whether temporary or continued, may improve the moral condition of man, may increase his love and good-will

to others, instead of crushing his true sensibilities, and transforming him into misanthropy and hatred.

But there are some physiologists, whose opinions we have very briefly stated just above, and from whose views we entered our dissent, who seem to insist that impaired health, certainly if long interrupted, is sure to beget fretfulness, petulance, distrust, lack of confidence in others, hatred, and every evil incident to degraded manhood; and all this without a hint that disease was of a moral origin, — the result of internal, vital derangement, — was corrective in its character, and an effort of the inner life for the elimination of its primary cause, and for the restoration of health with all its attendant blessings.

But the theories of those physiological writers who intimate at least (if it does not virtually amount to a declaration) that life is a curse more frequently than a blessing, seem to involve their belief that all the unhappiness, pains, and penalties of man, dwelling in his earthly tabernacle, are the direct result of natural causes: the accidents of

time and place originating in, and acting upon, the lowest plane of material life; yet reacting, with a terrible, destructive power, upward, even upon all the gifts of rational life (to which life they scarcely elsewhere allude), and thus converting all the highest human, moral, and social qualities of the man-spiritual into a curse!

It seems sad to contemplate the slight and most external causes to which a class of writers impute the good or ill condition of human life. They declare that people born and living on high lands are cheerful, hospitable, social, and happy; while those living on marshy soil are unsociable, selfish, morose, and misanthropic. There can be no doubt that the natural condition and position of man in society exercise an influence — sometimes a very strong influence — upon his physical, and even on his moral, character; but it cannot but seem strange to those who acknowledge the higher life within the material body — from which and through which the body lives, moves, and performs all its earthly uses — that this higher life should be so constantly ignored by those who have become

authors and expositors of the laws of human life.

In a very late, elaborate, and popular work on physiology, — now, as we learn, much used in our seminaries and colleges, — learned, and apparently correct in all its *material* statements, we have been unable to find a sentence or a word recognizing the moral or internal influences which affect the human condition; or that man is made to be man by the influx of spiritual life into his material organs. It is true there is a general acknowledgment, when occasion seems to call for it, that there is a higher life within man, from which his external is the outbirth, and through which external, as the instrumentality, he performs the uses of the natural world; but this confession generally seems merely technical, and does not appear to exercise any influence, or to excite a second thought in the minds of biologists or philosophers. Many men seem willing, and some almost wishing, to imprison themselves in matter.

The explanations of the phenomena of human

life, in our later ages, appear still more materialistic when viewed in contradistinction to the opinions entertained by the poets and philosophers who lived and wrote in the thousand years preceding the Christian era. Ancient philosophy and poetry is fraught — absolutely laden — with the repeated recognition of the Life Divine as the source and constant support of animal or human life, — of all life. They seemed to understand that their outer life was the outbirth of their inner or higher life, from which the former acted; that every animal motion, even to the turn of the eye or the raising of a finger, was a response to an interior command or motion; that every human act was from the prompting of inner life; and, when it descended into externals unperverted, it was constantly prompting man to good acts, or restraining him from evil.

Homer constantly recognizes the Divine influence in the promotion of every good purpose, and in the repression of evil. That great poem, the "Iliad," opens with the account of Achilles's transgression and Agamemnon's violence, and of the

Divine agency through which the captive Briseis was restored to her father, and the trangressors were punished; and very frequently — perhaps on every third leaf of his poem — there is a direct reference to the exercise of a spiritual power ruling or influencing the affairs of men.

We know that some have believed that Homer was a myth, that the city of Troy never existed, and that the "Iliad" was purely an imaginative work; together with all the agencies introduced into his poem. But Herodotus, the highest authority in ancient history, substantially confirms the history of Homer, and the truth of the Trojan war; Diodorus, the Sicilian, adds his authority to the statements of Herodotus; and Apollodorus, of the first Christian century, confirms them both. Mr. Gladstone, the ex-Premier of England, who devoted himself for a long period to this portion of ancient history, considers these histories, in their chief characteristics, as true.

The machinery of Homer, in his history of the gods, goddesses, and heroes he is constantly intro-

ducing, may have been, as has been charged, to a great extent the coinage of his fertile invention; still, they were, without doubt, created and moulded to accord with the general belief of the people of that period, and to represent their faith and trust in spiritual influences.

But we need not rely on the authenticity of the Homeric records to prove the statement made just above; as the most ancient writings now extant are in the continual acknowledgment of a Supreme Existence,— the Creator, Governor, and Preserver of the universe. All the systems of Grecian and Egyptian mythology — the theology of those early times — are continually asserting their belief in a Supreme Being, from whom human life, all created life, descends, lives, and acts; and constantly recognizing the existence and care of a Divine Providence. This statement is confirmed by Hesiod, Herodotus, Pindar, and by all the great writers of tragedy and ancient history.

Orpheus, who is said to have flourished before the Trojan war, thus describes Deity: "There is

one Being above and prior to all others. This exalted Being is Life, Light, and Wisdom; the Author of all things; the Cause and the Energy of all things: there is but one only God, — one only power, and one universal King of all." Apollonius Rhodius describes Deity as the eternal, wise, self-perfect Love; and says that "good and evil, virtue and vice, knowledge and error, arise from the difference of the reception of the Divine influence." The declarations of Sophocles, Pythagoras, and many others are to the same effect; but there is no need of further proofs in this respect.

This light of life came glimmering down through the centuries to the time, and into the person, of Cicero; which those may see who are willing to read his "Tusculan Disputations," and others of his philosophical and moral works.

The compilers of the systems of physiology now in use in our colleges and medical schools, so far as I have been able to learn, are, without exception, men of marked ability, — thorough anatomists, acute histologists, and close observers of the opera-

tion and uses of the natural forms of life. If these writers would rise above their materialistic forms, and explain the economy of human life in its constant connection with, and dependence upon, an inner and higher life, — even the life which makes man a spiritual being, — would regard the material form, through the reception of this life, as a temporary instrumentality by and through which he would be enabled to perform the uses appertaining to the natural plane of his existence, through which he might be prepared for a higher and happier state of being, and become blessed with increasing strength, full and permanent health, and increasing ability, together with a desire, to perform the higher duties of such higher life, — such a system, so composed, would prove most welcome to many readers and students of the present day, and could not fail, as we think, to become useful and interesting even to the general, as well as the professional, reader; and, may I not add, in every way more excellent, — perhaps I may say more beautiful, as being in full accordance with the laws of life.

I have not followed the course I proposed when I commenced this essay. I departed from the consideration of health in its free and unrestricted energy and virtue; and did this almost unconsciously, following the course of an author then before me, who suddenly changed from his description of health in its fulness to the consequences of its obstructed energy and impaired action. The conclusions to which he arrived, and his statements which followed, and which seem to have been fortified by the opinion of some others, appeared to me so strange, and even unjust, that I was induced, as above, to enter my protest, and to reply to them, — but with greater brevity than their importance demanded, in my wish to return to the more immediate subject of my essay.

But, lest I have stated the case to which I have just alluded (and from which I further back dissented) in too strong language, I will quote a paragraph of the author to whom I refer (Mr. Grindon): —

"Without health, a larger part of our time is at once wretched and unprofitable. Sickness, which

in its more intense degree is disease, turns existence from a blessing into misery. It makes us go mourning all the day long; and, if not checked in its inroads, soon ends in the death it foretells."

Sickness and disease, if not synonymous, seem at least to be convertible terms; and that sickness "turns existence from a blessing into misery" seems, as above, to be given as the rule. No exceptions are expressed, or are even hinted at. If we consider the statement as it stands, it seems impossible to regard it as a physiological or moral truth. We are constrained to insist on very many exceptions to this declaration; so many, indeed, as to endanger, perhaps, the rule itself.

I have often had occasion to witness the fearful character of disease, and frequently, as I think, to perceive its corrective, chastening influence, as well as its destructive tendency; and that disease operates sometimes — many times, I must say — as a sanative, soothing and purifying the affections and elevating the higher attributes of man, I fully believe.

There is reason to suppose that physicians,

quite generally, from their observance of the effects of disease upon the moral character of man, consider it as morally sanative in its operation; and certainly not, as a rule, as an active power superinducing a morbid influence, and impairing the most estimable traits of our nature; *not* as inducing misery, envy, distrust, and misanthropy, but developing kindness and good-will to man, and increasing the disposition to love and do good to others: and thus that the chastening influence of bodily infirmity may be transformed to a blessing; ever operating, as far as the freedom of man will permit, to bless, but never primarily to curse.

It is hoped it may not seem irreverent in this connection to offer evidence confirmatory of the frequently salutary effect of the chastening influence of disease, or of the affliction arising from impaired health, which, in its import, transcends the testimony of all human science: —

"Blessed is the man whom Thou chastenest."
"Whom the Lord loveth He chasteneth.
"If ye endure chastening, God dealeth with you

as with sons; . . . but if ye be without chastisement, whereof all are partakers. . . . ye are not sons."

"The Lord hath chastened me sore; but He hath not given me over unto death."

"Many are the afflictions of the righteous; but the Lord delivereth him out of them all."

Thus far I have presented little more of the nature and quality of health than is expressed in the definitions of its power and use, as furnished by various physiological writers.

I have not stated what it is in its essence, — how it lives, moves, and operates; and how and when it rises to its highest state, and falls or declines to its less perfect conditions. And, further, it must be confessed, that, as health is the eldest birth of life, its inmost qualities and powers — as is also the case of life itself — exceed the power of human conception and description. But this subject admits of certain explanations and illustrations, exhibits such harmonious action in its perfect state, and exercises such an important influence upon the human condition; furnishes such a mirror of the operations of the living human economy, that

the medical man may study its movements with great benefit, in the highest exercise of its powers, and watch its elastic struggles to rise and rule, when oppressed by bodily disease. But this part of the subject, namely, disease, will be considered at length in a future chapter, which will treat of disease and its cure.

One of the definitions of health which has already been given, viz., that it is life in its orderly activity, is among the best which has been furnished; and upon the basis of this definition I will now endeavor to speak of its activities, and explain the motions of every other organ of life, — all of which are, and must be, consentaneous and accordant in their action to constitute, perhaps, the richest blessing vouchsafed to man, unless we except the gift of life itself.

The human organization is composed of muscular fibres, or motive powers; of bones, immediately over which many of the larger muscles are placed, and which serve as a framework for their exercise; of blood-vessels, nerves, glands, digestive organs, chyliferous vessels; and of almost countless forms

and filaments: all of which are recipient of life; and which, by their position, connection, and adaptation, constitute the human form. Over all these, the brain presides; and with all these it communicates, through its servants, the nerves, with the quickness of thought. The order of the brain, through the nerves, is received in every part of the body to which it may be directed, simultaneously with its issue. When all these forms of life are filled by an influx from the Source of life, man becomes man, — a living soul; has an internal life which renders him a spiritual, as well as a natural, being.

When the action of every organ, every filament, of man moves in exact agreement and concurrence of purpose with every other organ; when no thread of life moves primarily for its own good, but for the benefit of every other form of life, — we behold the due action of life in health. This enables man to act as of himself, but primarily prompting him to regard the good of others. This life and health enable him to live and love, to be useful to others, and to be happy. It affords full

scope for the exercise of the highest human sympathies, and should excite each and all to make daily acknowledgment of the rich blessing of which he is made the recipient. Herein is life in its orderly activity, — is health, strength exultant, health brimming with blessings; ten thousand fibres moving to the same end, and in perfect concert, like the accordant chimes of many well-trained voices: and thus health becomes, perhaps, the highest type of human blessings, and of gifts spiritual, which seem to be presented for acceptance, as with an outstretched hand, to every form and faculty of man. Such was the health and harmony of the golden age, which is well expressed by the poet in the following lines: —

> "The antique world, in his first, flowing youth,
> Found no defect in his Creator's grace;
> But, with glad thanks and unreproved truth,
> The gifts of sovereign bounty did embrace:
> Like angel's life was then man's happy case."
>
> EDMUND SPENSER.

. . . . . .

Rationality and freedom — and perhaps we may add health — are the highest gifts which bless and

distinguish humanity, and through which man becomes a spiritual being. They are the attributes of life itself; of which life health becomes the crowning instrumentality of uses, both moral and natural, and the perennial fountain of rational enjoyment.

All these powers, capabilities, and faculties are predicated of man as he existed in the earliest times, so long as he continued in the high estate into which he was created, and while he remained as the free and full recipient of a constant influent power which he exercised, as of himself, to sustain him in the ability of doing good to his fellow-man, and to maintain his position in the primeval order of life.

When we contemplate the man of health and happiness rejoicing in acts of kindness, and ever active in the performance of all beneficent deeds, we seem to place before our vision a perfect panorama of orderly life, strongly suggestive of all the blessings conferred on true manhood.

But freedom is the inborn endowment of human existence, through which we may receive the proffered ability to lead a life of true order, which

enables man to become useful to others, and confers on him all the blessings and enjoyment of a good life; or he may listen to the suggestions of evil, may indulge in the exercise of self-love, and in the love of worldly riches, and, so far as he is influenced by merely worldly considerations, he declines in his integrity of character, and becomes the subject of disease and disorder.

Thus it may be said that man in his present condition is, to a greater or less extent, alternating between health and disorder or disease; for the liability to err is the acknowledged lot of humanity, and the number of those who are unchangeably settled either in the order or disorder of life, it is believed, is comparatively very small. The first declension in the moral condition of man — and, perhaps, we may say in every downward step he may take, even to the lowest — is constantly accompanied by an inward conservative force, constantly striving to recover him from his disorder, or to restore him to the blessings of health; and this merciful power never slumbers nor sleeps, but continues to act as the

ever-watchful physician, and with a recuperative force, never remitted in its persistency, — even while the smallest spark of vitality remains unquenched in the material forms of the human organization.

PART II.

HYGIENE;

OR, THE SCIENCE OF PRESERVING HEALTH.

"Daughter of Pæan, queen of every joy,
HYGEIA! whose indulgent smile sustains
The various race luxuriant Nature pours,
And on the immortal essences bestows
Immortal youth; auspicious, O descend!
Thou cheerful guardian of the rolling year.

When through the blue serenity of heaven
Thy power approaches, all the wasteful host
Of pain and sickness, squalid and deformed,
Confounded sink into the loathsome gloom,
Where, in deep EREBUS involved, the fiends
Grow more profane.

Come, then, with me, O goddess, heavenly, gay!
Begin the song; and let it sweetly flow,
And let it wisely teach thy wholesome laws:
How best the fickle fabric to support
Of mortal man; in healthful body how
A healthful mind the longest to maintain."

ARMSTRONG.

IN the Grecian mythology, as has already been said, HYGEIA was worshipped as the sweet, smiling goddess of health. She was believed to

be the daughter of ESCULAPIUS, — who had also been canonized, and was worshipped as the god of medicine. But the mythological definition of *Hygeia* is not regarded at the present day, except as a comprehensive term for the science which treats of health; or, more specifically, of the means and conditions through which health may be preserved.

The primary sustaining power of continuous health, like that of life itself, is above the care and comprehension of man; yet it is most obvious that very much in this respect is confided to his wisdom and freedom, for the preservation of the blessing next highest to the gift of life itself.

In speaking of the means apparently within human control which may be employed for the support of health, we at first felt disposed to divide them into two classes, — internal and external; but as this division could not in all cases be perfectly carried out, as some of the agencies promotive of health are of a mixed character, we simplify our purpose to speak of them in the order in which they may suggest themselves.

First, we would speak of personal cleanliness as a most important sanatory and health-preserving measure. That personal cleanliness is a virtue, no one — not even he who disregards its observance — will presume to deny. In treating of the use of this external virtue, we cannot, as some have done, exalt it to godliness; yet we may speak of it as an influence efficient in the benefits it confers, and as the common demand of civilized society, and may mention the general disgust it creates toward those who are not careful to practise their daily ablutions.

But the benefit of external personal cleanliness is not wholly nor principally of an external character. The most important use it subserves is not generally considered. There can be no strongly marked health, nor even what is called "good health," unless the skin be maintained in a clean, soft, and perspirable condition. To the extent that impurities increase and cover the body, the minute pores of the skin are obstructed, as if mechanically; and to this extent the vital functions are disturbed, and the health of the individual

suffers. If a person allows general uncleanliness, the skin becomes dry, rough, or husky, and many serious consequences result from such neglect, — *must* so result. This will clearly appear when we come to consider carefully the office of the skin in the season of health.

Professor Dalton computes the insensible perspiration of a person in health, weighing one hundred and forty pounds, as from one to two pounds each day. Lavoisier reckoned the minimum weight at two pounds, and the maximum at six pounds. There is so great a difference in these calculations that it may be thought sufficient to create a distrust as to the account given by each: but it may be safe to take something like an average of these computations; by which we should see that each individual loses his entire weight, through insensible perspiration, in about fifty days!

A gross neglect of cleanliness, it would seem, must close the pores of the skin, and prevent the elimination of this great amount of offensive — we might say poisonous — matter; for all the

refuse from the food we receive, if unduly retained in the system, must produce disease.

The human economy in health never ejects any substance containing nourishment until the last particle is extracted from it; and, when this is accomplished, by another law or provision the worthless portions are hastened to their elimination. But the evils arising from obstructed perspiration may appear more obvious, if we should describe the quality of the matter which ordinarily passes the pores of the skin. Without furnishing a strict analysis, it may be sufficient to say, that it consists principally of water, but commingled with other substances, nearly as follows: —

Water	95.00
Animal matter, with lime	.10
Sulphates and substances soluble in water	1.05
Chlorides of sodium and potassium and spirit extracts	2.40
Acetic acid, acetates, lactates, and alcoholic extracts .	1.45
	100.00

The watery parts transmitted through the skin mingle at once with the atmosphere; but the solid

portions remain on the surface of the skin: and herein we see one of the stern necessities for frequent ablutions and bathing.

But if a person, every six or eight weeks of his life, loses an amount equal to the weight of his body by *insensible* perspiration, how is he to know when he is incurring, or beginning to incur, the consequences of its suppression? The question thus naturally suggested is easily answered, and without any necessary reference to any incipient disturbance it may have occasioned to his health. Every one should frequently observe the state of his skin. If he finds it soft, moist, smooth, free from itching pustules, or scabious eruption; if the hand, when placed on a cold pane of glass for a few seconds, leave on its surface a visible moisture, — he may rest assured that the skin is performing its full and proper function. But if the skin be found rough, dry, and hard, as the corn-husk; if the hand placed on the glass leave no perceptible moisture; if pimples, blotches, or small ulcers are found on its surface, — he may be sure it is *not*

performing its office, and that his health is suffering, or must soon suffer, the pains and penalties of obstructed perspiration.

But it may be said, "We seldom hear of diseases of the skin of a very serious or dangerous character, or even of difficult cure." Yet such do exist. We are deceived by names, — or, rather, by names improperly applied. We generally leave all thought of the harsh, dry, itching, and perhaps ulcerous, surface of the body, to regard the effects thereby occasioned. We notice the difficult, labored respiration; the incessant cough, continual thirst, and burning heat; the acute pain in the side, or other parts of the chest; or the agony of external muscular pain, the inability to move the limbs, or to suffer others to move them, without excruciating pain; or the poignant distress in the stomach or in the bowels, which frequently causes the stoutest man to cry out in his pangs. For all these complaints there are ready names; but, perhaps, among all that may be given, no one will have the least reference to the original complaint, but will be named from the effects of the primary disease.

In the first case we have mentioned of the misapplication of names, a choice may be taken from either of the following; viz., lung-fever, congestion of the lungs, pneumonia, pleurisy; and for the second class, neuralgia, rheumatism, or gout; in the last description, inflammation of the stomach or of the membrane of the bowels, internal spasms, cramp, or colic. And if it be well to lose sight of the cause and the primary complaint in considering its effects, the names which may be applied to these effects are of little consequence.

But there are other cutaneous obstructions equally injurious to health, beside those above enumerated. Perspiration is frequently checked by a sudden fall in the temperature of the atmosphere; and, according to the extent of this change, bodily disturbance takes place. The closing of the pores of the skin occasioned by a sudden increase of cold is, under proper care, merely temporary. If the warmth of the surface be soon restored by withdrawing from the increasing chills of the open-air to a warm room, or by suitable changes of clothing, but slight inconvenience will

be experienced from the temporary exposure; but neglect in this respect is most indiscreet, and is too frequently attended with dangerous consequences.

In northern latitudes, the abrupt changes of temperature are most marked; and the avoidance of these baleful influences requires the greatest care. It is not sufficient that we clothe ourselves in the cold months of the year with a certain amount of thick woollen garments for the increased exposure of the open winter, with outer-coats, cloaks, and shawls. Winter dresses require, for the preservation of health, as frequent changes as those of summer; and it is sometimes unsafe to trust to the same amount of clothing continuously even for a week: indeed, the infirm in health should consult the weather almost day by day, and carefully adapt their dress to its requirements. In the cold season, the chest needs much more clothing than the limbs, — perhaps double. It covers and protects the immediate vital powers, which can suffer no chill without instant derangement of the functions of life, and without imminent danger.

The duties of man by day usually require the muscular exercise of the limbs, which adds to their warmth; but the muscularity of the chest, external and internal, — if we except a few external muscles connected with the movements of the limbs and body, — it may almost be said, never varies.

The human system — as we have already stated, and may have occasion yet to repeat — is a bundle of sympathies wrought into the manly form; and when any one organ or faculty of life is rendered inactive, from any cause, others step forth (as we may say) to assume the duty and perform the office of the disabled member of the family; and many times these assumed duties are performed for a season, — imperfectly, no doubt; yet in such a manner that the disabled member is reinstated in its ability, and resumes its function. We have explained how, under a suppression of perspiration, the mucous membranes of the chest secrete and expectorate the offending matter which the obstructed pores of the skin could not transmit; and we would now present one other form, among the

many, which, under the same circumstances, may seem as interposing the same kind offices as we have before stated.

Let us suppose that the secretory and excretory organs, of which the kidneys may be called the centres, assume to transmit and eliminate the offensive matter which could not (as in the case before named) pass the skin. The quantity of irritating matter which is ejected by these organs, under the assumption of these new duties, is very much increased, — perhaps doubled; and, in a few days, the skin may recover its uses, and a cure be completed. But, if this should not be the case, the kindly interposed efforts of the kidneys would in time become overburdened, and their healthful operation deranged; other than the useless and offensive secretions would be drawn into this greatly increased current; viz., the nutritious juices which had been elaborated through the process of digestion and chylification for the support of the material tissues: and thus the secondary disease may become much more alarming than the original.

The daily food we receive has very much to do with the condition of the health of every individual; and we may consider the influence it exerts in this respect, by a consideration of its quantity, quality, and the frequency of its reception. Upon this subject a great variety of opinions are entertained. One considers that a spare and most simple diet is most conducive to health; one, that the appetite should never be fully satisfied, — and he dwells on the virtue of continual fasting; another insists that a purely vegetable regimen is the great preservative of health; some, who claim (whatever their habits may be) to be strictly temperate, advocate the use of a mixture of animal and vegetable food, with the usual condiments, taken at regular intervals, three times each day. Some employ the stronger incentives to appetite, — the highest seasoned food, and the use of stimulants, to provoke anew their declining desire for eating; paying little regard to stated seasons, or frequency of meals. They often fast for one half the day, and eat, perhaps, every other hour in the twenty-four.

What evils exist in these extremes! The

abuses of eating are so great, so numerous, so destructive, that they cannot be fully enumerated or described; although there can be no doubt that they especially attach to excess, or riotous living. Perpetual fasting, which entails a constant desire of food, is not a virtue; but is positively vicious. It does not sustain health, as has been so often asserted; but, being in continual conflict with the vital forces, tends directly to debilitate them. Excess in eating, at irregular intervals, is destructive to health; and continued fasting is sure to impair it. Health is maintained more certainly by the reception of food of good quality, easily digested, taken at regular intervals, in quantity sufficient to appease the desire for food, but without indulging to satiety.

But how do excessive eating and riotous living, with meals at irregular intervals, primarily affect the internal organs? The functions of animal life, in health, are ever active and regular. The pulsations of the heart mark the time, as a rule, of a little more than a second, but with considerable variation in different individuals; the process of

digestion is apparently steadily continuous; the secretion of chyle, and its ascent into the blood near the heart, is ever taking place; the defecation or purification of the blood never ceases; and every drop which passes through the lungs in its every round through the body, by its attrition through its channels, is constantly wasting those forms or material tissues, and the next following drops repair them. Every movement of every form of life weakens that form, and every influx of blood strengthens it; every mental act, every thought even, devitalizes — if we may use this expression — some atom of the brain, and the succeeding influent blood restores it. The consumption and the re-creations of the material tissues are unceasing; and life, in its human forms, is a ceaseless struggle between loss and gain.

The action of the stomach, or the process of digestion, — constant and regular in health, — is the primary operation which sustains the human organization. Whether we sleep or wake, it labors steadily and continually, — yet, perhaps, with short intervals of comparative rest. Every

irregularity of living, or of eating and drinking, disturbs the health and strength of the digestive powers, interrupts the process of nutrition, and thus affects, unfavorably, the vital, healthful action of every constituent fibre of the body.

Intemperance in drinking almost ever accompanies excess in eating; and these combined indulgences of life, if persisted in, lead straight downward, — first to disease, and next to death.

But even while we contemplate the terrible results of intemperate eating and drinking, and regard the fearful penalty which awaits the individual who persists in these excesses, and the distress which inures to the families and friends of those who thus transgress, we cannot join with the extremists on this subject; who, while admitting that wine or ardent spirit may sometimes be useful, in moderate quantities, yet, in consideration of their great abuses, demand their entire prohibition in all cases; and, instead of relying on moral means for their suppression, demand the strongest prohibition of their use that legislative action can frame.

While we acknowledge the great abuses in the use of fermented and distilled spirits, we believe they have a legitimate use. Every blessing conferred on man is liable to perversion, — to become thereby a curse instead of a boon. Indeed, it seems almost to have become a law, that the higher the gift vouchsafed to humanity, the greater may be its perversion!

We believe that spirituous liquors are never serviceable to men in health, in the full strength of age. It is most painful, as well as deeply disgusting, to see young men, with the full blush of health and strength upon the countenance, calling for their daily drams; and it is by no means pleasant to see any one in health, in the full strength of his manhood, indulge in the use of spiritous liquors. The legitimate, moderate use of stimulating drinks should commence *only* when the individual begins to descend the down-hill of life: and, in the course of a long life, I do not remember any person thus commencing, who became, in the just sense of the word, "intemperate;" or who used them to excess, and to the injury

of his health. But, on the other hand, I think I may say with truth, that I have known numbers whose health and strength — moral and physical — have been improved by their moderate use. We cannot, therefore, join in the doctrine, which has frequently been inculcated of late, that any of the good gifts which come down to us, striving apparently to flow into the forms of human blessings, should be declined lest their good influence should be perverted to evil uses; for such a precept seems to us of presumptuous import, pernicious in its tendency, and unworthy of the reception of a truly philosophic and Christian age.

The occasional and judicious administration of narcotic stimulants — but we would speak now only of opium — has very often proved of the greatest benefit. How many tetanic spasms, violent cramps, and agonizing pains have been quickly relieved by its use! yet its habitual administration is in no case to be commended; and the physician who prescribes it to relieve temporary distress, — to bridge over the pangs of sudden disease, — incurs a fearful responsibility if he does

not command its disuse as soon as remedies of slower operation may effect a cure.

Tobacco is a narcotic which, we may say, is never internally useful, but ever positively hurtful, and always disgusting. Most people who use it acknowledge that they are addicted to a vile, useless habit; yet many, with this confession on their lips, continue to cling to it. We speak from experience in this matter, and are prompted to say, Happy is the man who has triumphed over the filthy habit.

But perhaps it is time to answer the inquiry which seemed to propound itself on a previous page, — how the irregularities of eating and drinking, neglect of clothing, of personal cleanliness, &c., affected the action of the physical forms of life. If a person would reflect on the fact, that all the organic fibres and forms of life move, in health, in exact unison and in perfect time; and that these fibres and forms, with their operating life, constitute the living man, the man of health, — he must see that such interruptions and irregularities as we have partially described *must* interfere with the perfectly

healthy movements of life, impairing their strength and legitimate vital functions; and it may, under a careful review of the great abuses known to exist in our manner of living, seem strange that man attains to the present measure of his days.

An untainted atmosphere is indispensable to the enjoyment of perfect health. We are surrounded by air, breathe it, and live from it. The atmosphere is considered as pure when its component parts are in just proportion; viz., when it consists of twenty-two parts of oxygen, or vital air, and seventy-eight parts of azote, or nitrogen; or, if bulk be considered, of twenty-six parts of the former, and seventy-four parts of the latter. It is computed that each inspiration requires from forty to sixty cubic inches of atmospheric air; but it is apparent that this statement can only be approximate to the true quantity of air inhaled, as the capacity of the chest differs greatly in individuals. As a general rule, it may be said, that the larger the animal organization is, the greater is the capacity of the lungs to receive the air. But the quantity of air inspired at each breathing (as stated

above) is generally received by physiologists as expressing the average amount. It is also reckoned that the quantity of air emitted from the chest each minute greatly exceeds the quantity inspired at each breath. The air thus received comes almost in contact with the blood-vessels of the lungs, and is at once decomposed, or separated as to its constituent parts: the oxygen is absorbed into the blood, the color of which is changed into a bright or arterial red; and, at the same moment, the blood is invigorated by this union of the vital air; the nutritious matter, returned by the veins near the heart, is finally purified for arterial circulation, by the elimination, at each succeeding expiration of the chest, of substances which cannot be assimilated to the animal tissues, and whose retention in the system would soon destroy life. Thus, at every breath, we take in the life-giving food; and, with every collapse of the chest, we emit the destructive gases: but of the gases thus expelled we shall have occasion to speak more particularly.

Reckoning the quantity of air taken into the

lungs at every breath at thirty to forty cubic inches, — which computation has been assumed by some physiologists as near the average quantity, — and the respirations at twenty each minute, we shall have by this computation about 900,000 cubic inches of air which pass through the lungs every day, or more than one hundred times the bulk of the body. This computation almost challenges belief, even of the credulous.

Physiologists consulted as authority reckon the weight of oxygen daily absorbed into the body at one pound; and some state the minimum amount at two pounds. The quantity of vital air thus daily consumed by the population of large cities will astonish those who have not given particular attention to this subject. But physiologists differ *very much* in their estimation of the quantity of atmospheric air inhaled at a single inspiration, and of the measure of gases expired at every fall of the chest. It seems almost impossible to fix upon any just principle upon which to found any true calculation in the matter. The *data* assumed are little more than conjectures; and, upon such a

basis of calculation, the results are of little value, except that it is certain that the smallest quantities (as stated above) exceed, in a very high degree, all the common apprehension upon the subject.

But the wonder becomes intensified when it is considered that, while this great and constant abstraction of the vitality of the atmosphere is being taken into the lungs, they alternately emit a much larger quantity of poisonous gases or vapors, which commingle with the atmosphere, rendering it, as it must seem, at least less respirable.

Important questions are here suggested, — questions of some difficulty, perhaps, to answer. How is this constant loss of vital air supplied; and, with this great comminglement of deadly gases with the atmosphere, how is it that it does not destroy life, or at least impair health?

The formation as well as the consumption of oxygen is constant, and the composition of vital or respirable air is always the same. Vital air is ever generating and floating in the currents of the atmosphere, and constantly compensating for its daily uses, as aforesaid; and it is among the wise

provisions of life that the gases expired from the lungs, poisonous to animal life, are the legitimate food of the vegetable kingdom. Carbonic-acid gas is also constantly forming, and borne by the currents of air to the performance of its proper use.

But the exact balance of use and supply of oxygen and other gases is not always and in all places maintained. The air of populous cities is not, as a rule, as favorable to health as that of the country. The strict adoption and enforcement of sanitary measures, the improvement in the method of drainage and modes of ventilation, the enforcement of cleanliness, the prompt removal of filth, and all decomposing substances, — compensate, to a considerable extent, for the evils resulting from a crowded population.

As a rule, city life is not as favorable to continued health as a residence in the country, or among a comparatively sparse population. The death-rate of cities exceed that of the country; yet the difference in this respect is not necessarily very great, — although greater in the hot

season than in the cold. In spite of all sanitary diligence, there are pestiferous exhalations (not all of which have been named) which affect the health, and predispose to epidemic disease.

In the cold season, the condition of life in the city is somewhat more favorable to continued health than that of the country. In the former case, the exposure to cold is not necessarily so great, and the degree of cold itself is not quite so intense; the strength of the winds is generally less violent, the walls of the many buildings breaking the force of the current; and, perhaps, we may say, the thousands of fires which are kept up day and night in the city serve to mitigate the severity of out-of-door cold.

The sudden changes of temperature in countries remote from the tropics are the frequent causes of impaired health, and often act as the proximate cause of acute disease. Under the sudden changes of temperature,—which sometimes amount to thirty or more degrees in the space of twenty-four hours, —the danger to health may be generally averted by a suitable change of clothing; but a single

neglect in the observance of this caution often results in most serious consequences.

Physical exercise is promotive of health, and is especially necessary for students and all men of sedentary habits; yet the exercise frequently taken, with special regard to the preservation of health, is not always useful, and in some cases it is positively injurious. The student often rises from his books to walk his mile, — which he too often strives to accomplish in the least possible time; and he returns to his room within fifteen minutes, reeking with perspiration, and panting for breath; another leaps from his table to the saw-horse, puts forth his utmost muscularity, and accomplishes as much, perhaps in half an hour, as one who makes this labor his vocation does in twice that time. Violent movements are never conducive to health, but are almost invariably hurtful. Moderate exercise is ever useful; but extremes of physical activity should never be indulged, except when superinduced by stern necessity.

The belief is so generally entertained and so well founded, that a retirement from crowded cities

to the country, for a temporary residence, is promotive of health, especially during the months of most oppressive heat, that such a change is now considered a necessity of life, — an indispensable duty for all who need to strengthen either their mental or physical condition. But there is reason to fear that grave mistakes are made in this matter. Every one who retires from a dense population to the purer air of the country does so, ostensibly at least, for the benefit of his health; but all are not thereby improved in this respect. Some people leave the city irritated and disgusted through the perplexities of trade; and this feeling is augmented, perhaps, by the unsatisfactory results of their year's business. They wish to remove far into the country. They would prefer not to hear the word *business* pronounced, not to read the daily news of busy life: they eschew companionship and seek solitude. Under such circumstances, the disturbed equanimity and rising nervous irritability with such a person is nearly sure to increase; and the recluse is in imminent danger of becoming misanthropic and ascetic, as well as prostrated in his

bodily strength. The health and happiness of man is in great danger when he seeks to avoid companionship, — expresses a disrelish for social intercourse, and for a participation in the kindly reciprocities of friends and relatives.

The usual effects of solitude or seclusion from society seem to be truthfully described, by a hygienic physician and poet (the author of a popular poem on the art of preserving health), in the following lines: —

> "Chiefly where solitude, sad nurse of care,
> To sickly musing gives her pensive mind,
> There madness enters; and the dim-ey'd fiend,
> Sour melancholy, night and day provokes
> Her own eternal wound. The sun grows pale;
> A mournful visionary light o'erspreads
> The cheerful face of nature; earth becomes
> A dreary desert, and heaven frowns above;
> Then various shapes of curs'd illusion rise."

We know that some of the advocates of solitude, as an escape or remedy for the ills that man has become heir to, have ever been considered as intelligent and pure-minded persons. These men are well represented by the poet Cowper; who, in his desponding moments, exclaimed: —

"Oh for a lodge in some vast wilderness;
Some boundless contiguity of shade,
Where rumor of oppression and deceit,
Of unsuccessful or successful war,
Might never reach me more!"

It is well known that Cowper, with his many excellent traits of character, was a man of melancholy temperament, which, at last, terminated in disgust of the world. His verse, as above, clearly explains his own tragic end.

Mistakes are also made by some who retire to the country for the improvement of health, who seem fond of company and of social intercourse. They seek the most popular resorts of fashion, and become willingly subject to all its laws and observances; but continuous excitement, and the fashionable restraints of dress, make heavy drafts upon the vital energies. The exhausting exercises of the day are frequently protracted far into the hours usually and properly devoted to sleep and rest; which, when quietly enjoyed, refresh both mind and body, and in a great measure compensate for the labor and usual duties of the day. Perfect health can never be enjoyed when

the hours of sleep are cut short, or where the excitements of the day are carried far into the night; for the rest obtained thereafter cannot be of the kind which composes the mind and refreshes the strength; and the votary of continued excitement is morally sure, in the end, to be enrolled on the long list of confirmed valetudinarians.

We would add something further on the character of sleep as an absolute demand of health and of animal existence.

Sleep is a necessity of life. It is as imperious in its demands, and as requisite at regular intervals, for the maintenance of health, as the calls of the appetite are for its needful supply of food. The requirements of active life or health cannot be neglected with impunity. Every human function must receive its even and continuous support, or the health of man will suffer in proportion to every neglect of such provision. Dr. Young characterizes balmy sleep as tired Nature's sweet restorer; and a much earlier poet seemed desirous, not only to personify, but to deify, this animal and mental power, which philosophers have represented as

one of the most mysterious phenomena of the animal world.

The following is an ancient poet's apostrophe to sleep : —

"Sleep, king of gods, and men of mortal birth,
Sovereign of all sustain'd by Mother Earth ;
For thy dominion is supreme alone, —
O'er all extended, and by all things known.
'Tis thine all bodies, with benignant mind,
In other bands than those of brass to bind.
Tamer of cares ; to weary toil, repose ;
And from whom sacred solace in affliction flows.
Thy pleasing, gentle chains preserve the soul,
And e'en the dreadful cares of death control."

TAYLOR'S *Orpheus.*

All the benefit to health which may reasonably be expected from a change of residence from city to country, or from a crowded to a sparse population, may be much more certainly attained without incurring the factitious and unnecessary exactions of fashionable society, with all the continual and unhealthy excitements ever attendant upon such a life.

There is scarcely an Atlantic city in the country, lying very much north of the tropic, or of the thirtieth degree of north latitude, which has not in

its vicinity, within an hour's ride, pleasant situations, commanding good views, enjoying all the benefits of a pure atmosphere and good drainage, — with churches, good schools, pleasant drives, retired walks, frequent mails, and, withal, an intelligent population, not subject to the arbitrary demands of fashionable life, or the perils of undue excitement.

The common dread of crowded cities, especially during the hot season of the year, of pestiferous exhalations, in spite of the adoption of the most rigid sanitary measures to perfect the drainage, and preserve the atmosphere from the taint of poisonous gases, ceases to exist in the country; where the rich grain and grass fields, the ripening fruits, the stately shade-trees, and beautiful flowers, are within the view of every resident, constantly absorbing their legitimate food, — the poisons of animal life, — and leaving the air free from the taint of carbonic-acid gases. Thus the poison of man becomes the food of the vegetable kingdom, leaving the air respirable and pure

for the support of animal life. No substance in nature is valueless, no atom lost.

How the pulses quicken, the affections warm, and the strength — moral and physical — recuperates, when a person, fatigued with the cares and confinement of city life, revisits the scenes of his childhood and youth; especially if those scenes are rural, and further endeared by the pleasant remembrance that he beholds again the place of his nativity! What thrilling suggestions present themselves! Not only does the old mansion repeat its history, but every tree (forest or fruit), every spring, rivulet, field, church, school-house, and former play-ground, — tell to him the tale of his early life; and all their little histories, as well as the collective volume containing the full relation of the incidents of his youth, revive his pleasures of memory, and tend, directly and strongly, to refresh, elevate, and strengthen both his mental and physical condition. Any incipient feeling of sadness or melancholy he may have experienced before his arrival, vanishes at once; every thing

within his vision has the color of the rose; and the lessons of life which surround him afford instruction and amusement. He

> "Finds tongues in trees, books in the running brooks,
> Sermons in stones, and good in every thing."

Where is the man, fatigued and care-worn by long application to business, and the confinement of city life, who would not gladly retire for a season to his birthplace or the scenes of his youth? and where else would he so certainly and quickly regain the full measure of his health, and his wonted elasticity of mind and body?

The charms of our early homes are never forgotten; and how beautifully are they described by one of our American poets! —

> "How dear to this heart are the scenes of my childhood,
> When fond recollection presents them to view!
> The orchard, the meadow, the deep-tangled wild-wood,
> And every loved spot that my infancy knew:
> The wide-spreading pond, and the mill which stood by it,
> The bridge, and the rock where the cataract fell;
> The cot of my father, the dairy-house nigh it;
> And e'en the rude bucket which hung in the well, —
> The old oaken bucket, the iron-bound bucket,
> The moss-covered bucket which hung in the well."
>
> WOODWORTH.

The city also offers its healthful influences — particularly in the cold season of the year — to many who are accustomed to dwell in the country; to such as are unfavorably affected by the severe frosts of winter, and the frequent limitations of travel or exercise, occasioned by the snow-obstructed avenues, and who lack the salutary and pleasant excitement of the warmer months in the care of their gardens and fields; of seed-time, and the in-gathering of the harvest. With persons thus situated, and who may be predisposed to mental depression or nervous irritability, a change from the country to the city is frequently productive of great good.

There can be no doubt of the soothing, sanitary effect of music in certain cases of bodily indisposition; and while we pay no regard to the most extravagant and chimerical relation of its powers, as described by several writers of the ancient, mythological ages, whose judgment seems to have been held in entire abeyance to their ideal, flighty fancy, — who represented that Amphion built Thebes by the enchantment of his lyre; and that Orpheus and

Apollo, by the power of their music, made the terrible fierceness of the famished lion to subside into the gentleness and the patience of the quiet ox, — we still believe there is a peculiar power in music to relieve those complaints which grow out of mental dejection and a phlegmatic temperament. Music, in its sweetest strains, is soul-inspiring and elevating; and it is affirmed that people who love and are proficients in music are, as a class, cheerful, social, and trustful.

The very learned Robert Burton ("Democritus, Jr."), who flourished three centuries ago, and who left to posterity that very popular work, the "Anatomy of Melancholy," speaks, substantially, in the following terms of the power of music, after characterizing the earliest accounts of its influence as "mere declamations." With his strong disclaimer of the views of the earliest writers upon this subject, he yet imputes to music very high virtues for the cure of certain diseases. He declares it will expel from poor, possessed humanity a most evil presence, which he characterizes by a

shorter, though not less expressive, name; and he fortifies his declaration by citing authorities, both Divine and human. He refers to David's harmony, which drove away the evil spirits from King Saul; and to Elisha, who, when he was much troubled by importunate kings, called for a minstrel; and, when he had played, the hand of the Lord came upon him.

Burton also presents the testimony of others: of Timotheus, the musician, who compelled Alexander to leave his dinner, and skip up and down through the halls, keeping step to the music of the former; of Chiron, the centaur, who, it is affirmed, cured melancholy and many kindred diseases by the power of music alone; of Canus, a Rhodian, who, when asked by Apollonius what he could do with his pipe, replied, he could make a melancholy man merry, and him that was merry much merrier than before, a lover more enamoured, and a religious man more devout; of Empedocles, who cured many cases of melancholy, before considered desperate, by the power of music; and of

Aristotle and Plato, who recommended it highly as a cure in all cases of mental depression and nervous irritability.*

But when we would avail of music, as a remedy for melancholy, which is ever tending downward, through the whole class of diseases which are frequently called nervous, even to misanthropy, and, sometimes, to moral debasement, — let its strains be cheerful, hopeful, life-inspiring, elevating the affections above the suggestions of disease and disorder; for herein consist the benefits — may we not say the blessings — of true harmony.

There is that which, by a sad misnomer, is called music, which weeps, wails, and groans, in the intonation of almost every note; and which, if indulged, tends directly to habitual sadness and asceticism. There is "L'Allegro" and also "Il Penseroso" in music as well as in poetry. Choose the former in all cases, and eschew the latter, if you would avoid the evils of a melancholic tem-

* See Burton's "Anatomy of Melancholy:" London, 1745. pp. 368, 369.

perament, and the morbid excitement to which it ever tends.

Contentment, cheerfulness, good-will towards others, are sterling virtues, and contribute, in an eminent degree, to the preservation of health; and if we may add to these the personal virtues of temperance in eating and drinking, a love of regular employment, — not only on account of the material and personal support it affords, but also for the benefit which may incidentally accrue to others, — we may justly be called the observers of the Golden Rule, and thus continue healthy and happy.

But the ill-natured man, dissatisfied with himself and his surroundings, who is a stranger to the blessings which flow from companionship, social intercourse, and the love of the neighbor, is never a comfort to himself nor others, — is never healthy, happy, nor wise. And following close in the train of the indulgence of ill-nature are misanthropy, anger, envy, hatred, jealousy, and all the evils which come from within and defile the man. A person thus influenced by evil passions can

never, during their exercise, know the blessings of health, physical or moral; nor can he experience one moment of true enjoyment. Such must live in the sphere of the selfishness and misery which their evil indulgences have created around them. But life thus perverted is scarcely ever long: it is cut short in the midst of years usually allotted to man. "Bloody and deceitful men shall not live out half their days."

I cannot forbear to mention, in this connection, another virtue most conducive to long life and continued health, and to the full measure of their enjoyment; although in so doing I may seem to incur the imputation of leaving the subject of physiology, and encroaching upon theology. I mean the virtue of continued trust in the Divine Love and Wisdom. And I would urge every man to resist the incipient symptoms of a distrust in the continuance of the Divine bounty, with his whole moral force; for such a distrust, once entertained, constitutes a disease which, more frequently than any other, impels a man to acts of personal violence. It is a disease, as above said, in which

the care of friends and the best efforts of the most skilful physician are of little avail.

Thus far we have chiefly treated of those errors of life which manifestly tend to disorder; and have presented the hygienic lessons by the observance of which they may be avoided. But we shall defer the consideration of those greater abuses of living, which have ultimated in bodily disease, to the succeeding chapters, which treat more particularly of disease and its cure.

IV.

DISEASE.

"What avails
Valor or strength, though matchless, quelled with pain,
Which all subdues, and makes remiss the hands
Of mightiest? Sense of pleasure we may well
Spare out of life, perhaps, and not repine;
But live content, which is the calmest life:
But pain is perfect misery, the worst
Of evils! and, excessive, overturns
All patience."

MILTON.

IV.

DISEASE.

A CONTRAST, sad to contemplate, is presented for our consideration, when we leave the bright, sunny, beautiful forms of health, as exhibited in its true activities, — when every organ, every thread and filament of man, moves in perfect sympathy and unity of purpose; each acting for the good of all, and all for each, — and we come down from the high estate of the abundance of peace, rational enjoyment, and the universal interchange of the kind offices of life, to disorder and sickness; when we leave the highest conditions of humanity, and make the fearful descent to the pains and penalties of disease. Herein we leave the true harmonies of life for the clangor of war and the trumpet-tones of battle.

We would by no means intimate that man, in

his highest earthly estate of health and rational enjoyment, is the subject of unalloyed happiness. Imperfection is stamped upon the best condition of humanity. Every created rational being is balanced in his personal freedom to choose good or evil; and, while imperfection exists, there must be combat in proportion to such imperfection. No man is exempt from the contingencies of personal moral warfare; and when we have spoken of orderly life, health, and happiness, we intended to represent these blessings as the highest conditions of frail manhood.

The derangement of health commences when a single fibre fails in the performance of its legitimate action; and herein, also, is the beginning of disorder and disease; for, however trifling may be the disturbance in an unimportant function of life, yet, to the same extent, every other office is unfavorably affected. Disturb the healthy action in the highest or lowest forms of man, and all others are affected to a corresponding degree.

But before we proceed to speak further of disease, or to treat of its removal or cure, it seems

expedient that we should premise something of the brain and of its nervous energy or sentient property, by or through which there is a constant communication between the receptive forms of influent life in man through the nerves, to every part and portion of the human body; for, so far as we have treated of the subject of life and health in their most orderly condition, the operation of the nervous system has not been very apparent, — or, rather, has not forced itself upon our consideration as the primary receptive form of the inflowing life of man, the unceasing action of which is necessary to continuous animal life.

The nerves are spread out and permeate man as do the blood-vessels; and, as has been said of the blood-vessels, would present the exterior form of man if every other constituent particle of his form were removed, leaving the nerves alone in their exact normal condition. The nerves are the brain's messengers; and communicate throughout the system, even to the smallest thread of life, with electric swiftness. No thought is conceived, no word uttered, no finger raised, no eye opened

or closed, except by order of the brain. Thus far, and for reasons assigned, we have heard and seen little of the nervous energy. But now that we are treating of disease, we shall hear from the brain. We may hear from it any day in which we visit the sick-room of the patient suffering the pangs of acute disease, or whenever we may look down upon the table of the operating surgeon. It sometimes speaks out with such terrible force that it excites the sympathies of those who witness it, to almost a corresponding degree of suffering. Blessed be the boon vouchsafed to man in these latter days of etherization! How many agonizing pains and heart-rending cries have been smoothed down — even under the knife of the surgeon — to such a degree, by its judicious use, that the subject of the severest operation has scarcely been conscious of pain! The monument erected amid the flowers in our beautiful public garden is a fitting tribute to the discoverer of the new application of this remedy.

The subjects of disease receive and accept its visitations with a difference corresponding to their

personal genius and character; or in agreement with the ruling plans and purposes of their life. A person who is closely attentive to the business which yields him a support, but is still not neglectful of the social duties which should be performed in a well-ordered community, is, as a rule, softened in his character through the access and progress of bodily disorder. He withdraws, to some extent, his thoughts from the perplexities and responsibilities of worldly life; and, as far as he does this, considers with closer attention his moral duties and religious obligations: he thinks less of his external, and more of his internal, condition. His worldly engagements and occupations are, for a season at least, placed in abeyance to moral considerations; he studies, to a greater or less extent, the lesson and the purpose of his indisposition; and, under these circumstances, it must be acknowledged that such a subject of temporary physical disease will be profited by its admonitions.

Another class of persons are under the habitual

belief that physical disorder is ever of a disciplinary and remedial character; that it comes to them as a messenger of love and mercy, fraught with kindly influences, meted out and attempered to the condition and strength of the subject of its visitation; and, under the belief of its chastening and corrective character, such persons are comforted, elevated, and made even happy under its influence.

Others, on the approach of disease, become at once sad, desponding, and oftentimes querulous in its access, — sometimes even to the arraignment of the goodness of HIM who loves all, watches over and protects all. The thoughts of such persons, and their daily labors, in their states of health, are confined almost exclusively to their external or worldly duties. Their plans, purposes, and activities of life (even while they may be wholly unconscious of the fact) are prompted by the suggestions of self-love and personal aggrandizement.

This class, as soon as the approach of sickness

and its accompanying pains restrain them from their manual or intellectual labor, lose their only earthly delight; and, as their thoughts had seldom been elevated to a higher or happier state of existence, very soon become unhappy, complaining, and miserable.

Such are the sorrowful men described by the poet, whose verse is worthy of a better and higher theme than misery or misanthropy can suggest: —

"'Ah! what avails the lengthening mead,
By Nature's kindliest bounty spread
Along the vale of flowers?
Ah! what avails the darkening grove,
Or Philomel's melodious love,
That glads the midnight hours?

"'For me, alas! the god of day
Ne'er glitters on the hawthorn spray,
Nor night her comfort brings;
I have no pleasure in the rose,
For me no vernal beauty blows,
Nor Philomela sings.

"'Ten thousand beauties round me throng;
What beauties say, ye nymphs, belong
To the distempered soul?
I see the lawn of hideous dye;
The towering elm nods misery;
With groans the waters roll!

"'Ye gilded roofs, Palladian domes,
Ye vivid tints of Persia's looms,
Ye were for misery made.'
'Twas thus the man of sorrow spoke;
His wayward step then pensive took
Along the unhallowed shade."

GREVILLE.

Perhaps the inquiry may be made, whether the people of the character just described are in any wise benefited by the visitation of disease? To such a question an affirmative reply must be given. Every bodily pain and all external disorder (as has been said already) are permitted by the Divine Love, for the removal of an impending liability to a greater evil; and, as far as the freedom of man allows, they tend to promote his restoration to orderly life. The determined purpose of a base man to perpetrate a great crime — the commission of which called for the exercise of physical power — might be restrained, and the deed perhaps averted, by the intervention of disease coming forth into externals, as the effect or the direct outbirth of the interior conceived and concerted iniquity of the person who had meditated the great evil. Thus, as the iniquitous purpose

to commit a crime falls short in the extent of its guilt to its actual commission, the physical disability superinduced by disease, which prevents its actual commission, saves the criminal, for a time at least, from the consummation of his purpose; prevents him from taking yet a lower step in the downward course of his life; affords him further time for reflection, and, possibly, for repentance and reformation.

It has before been stated, that all bodily disease was the outbirth or external manifestation of internal disorder. One or two cases were suggested which did not so clearly seem to come under this general law; but, on further examination, they seem to form no exception to the rule. But there is another class of physical disorders which may *seem* to demand an exception to this law: we allude to diseases of a contagious and infectious character.

Small-pox does not appear, in the least degree, to be a respecter of time, place, or person. It seizes, so far as can be perceived, on the most temperate, cleanly, healthy, and in all respects

orderly, subjects for its victims; and, with the same destructive force, visits the intemperate, dissolute, and squalid. It knocks as often upon the palace gates of monarchs and kings as it does upon the doors of the humblest hovel of the menial and slave; regarding neither the frost of winter nor the highest heat of midsummer, and respecting neither the strength of manhood, the debility of age, nor the weakness of infancy. Here a question presents itself: If all bodily diseases are the outward presentment of internal evil or disease, of what inner disorder is small-pox the outward type?

Difficulties present themselves in the attempt to reply to this question. Contagious disease has its own laws; and, *apparently*, these laws have little regard for or reference to the condition of the person who is suddenly brought to the experience of its terrible power.

Small-pox seems to be, primarily at least, a disease of the skin; but much more virulent, and more often early and certainly fatal, than any other complaint of this class. It is of the same family and

general character as the loathsome LEPROSY, which is both contagious and infectious, — with this important exception, that the latter is far more chronic in its character, more confined to certain extents of country, and seldom immediately fatal.

Small-pox has some characteristics, especially in its origin, in common with those cases occasioned by a suppression of perspiration to which we have before alluded; namely, to severe cases of a complaint which we, in common language, call in its access a *cold;* which, if not early removed by proper treatment, extends to the membranes of the chest, increasing in the severity of its character. But in these cases this difference is most observable: In a cold, when the pores of the skin are obstructed, the poisonous matter which usually passes off in the form of perspiration cannot be eliminated through the cutaneous openings, and it recoils, most frequently upon the lungs; and the first comparatively slight disease may become a severe one in its secondary character. In the former disease, or small-pox, the complaint fixes fast upon the skin, and there remains: indeed, it

is doubted by some whether it affects the internal organs except in a sympathetic or secondary manner. In cases of small-pox, the large pustules generally appear on the third day, and frequently cover the entire body; and, in a short time, they suppurate, and the whole surface of the body becomes purulent. The force of the complaint continues in the skin, in the last case; in the former, it is transferred to the membranes of the chest, — the similarity between them only existing in their causes and incipient forms.

But the question recurs, which has already been propounded: — Of what internal disease is small-pox the external type? To this I reply as far as I am able.

The contagion of small-pox is not a disease, but a proximate cause of it, — a cause of that specific form of disease which we have above stated. It becomes small-pox when it has a basis and conditions to work upon; and these it *must* find in the living body.

Let us again suppose the contagion operates, and the openings in the skin are closed by an

exposure to this influence, and the disease is thus created. The poison, or contagion, in this case becomes the proximate cause of the closure of the skin; but it becomes this cause for the reason that it finds a *susceptibility* or predisposition in the skin to receive its influence; and while we are unable to define this susceptibility, except in a summary manner, we may say it is an evil, — and evil ever seeks the co-operation of evil to consummate its purposes. If I have stated the case correctly, contagious diseases are not exceptions to the rule we have stated; namely, that external or bodily complaints are the types of internal disorder.

Believing, as I am inclined, that the proximate cause of small-pox is the suppression of perspiration, occasioned by the atmosphere of contagion coming in contact with, or in proximity to, the body, it seems to me that the surest preventive of the complaint, next to vaccination, may be found in the strict observance of bodily cleanliness, of clothing adapted to the wants of the season, and the employment of other means most promotive of keeping the skin in a soft and perspirable condition.

But let us leave, for the moment at least, the contemplation of the forms of disorder and the pains of disease, and anticipate an inquiry the reader may very likely make in relation to the times and places in which those people lived who were, in the true order of their life, healthy, happy, strong, and ever seeking to be useful to others (as set forth in a preceding essay treating of life in its orderly activities).

We intended, in our previous remarks upon this subject, to represent only the blessings that would follow, *must* follow, from the true activities of life, when all the constituent forms, sympathies, and affections of true manhood, of every man, were exercised for the good of all; each striving to be useful to all others. But, if we accept the question in its broadest sense, we must look back, perhaps far back, into the records of early history.

We read of a GOLDEN AGE of the world, — of an orderly, happy, healthy age, when wars were unknown; when mutual good-will and the interchange of kind offices universally prevailed;

when diseases were unknown. This age is described by the ancient poets, who were historians also; by the Greek tragedians, and the theologians, or the mythologists, — among whom there seems to have been a wonderful agreement upon this subject; and, in our descriptions of this age, we shall substantially employ their language.

In this Golden Age there were neither calamities nor crimes, pains nor diseases. The poet-historians compared the existence of mankind, in the age we are now considering, to the life of an individual; and the earliest period of the world, to the tranquillity and happiness of youth. The people were free from the restraints of external law, — had neither ships nor weapons, wars nor soldiers; the fields were fertile without cultivation, and perpetual spring blessed the earth.*

Such, they declare, was the Saturnian or Golden Age. GOD, say they, was the PRINCE and common Father of them all. He governed the world by Himself, as He governs it now by

* Hesiod de Seculo Aureo; Orpheus apud Proclum, lib. 8, cap. 10; Lucretius, lib. 5; Ovid. Metam. lib. 1; &c.

inferior deities. Rage and cruelty did not then reign upon the earth; war and sedition were not so much as known. GOD HIMSELF took care of the sustenance of mankind, and was their Guardian and Shepherd; there were no magistrates nor civil polity, as there are now; the fertile fields yielded fruits and corn without labor or tillage.

Among these descriptions of this age, there are some to which grave exceptions must be taken, but which do not conflict with the statements above: such as the declaration that men sprung out of the bosom of the earth, which produced them of itself, like flowers and trees; and, being troubled with no inclemency of the seasons, they needed no clothing, and took their rest on beds of turf of a perpetual verdure; and other statements, perhaps intended to be understood only in a figurative sense.

How long this happy age continued, cannot be computed, and perhaps scarcely conceived of; certainly, not by those who estimate the age of the world at less than six thousand years. The ancient poets, however, reckon the Golden Age by

a length of years which almost tasks the power of figures to express.

But these happy years, our authorities declare, declined into the Silver Age, which they describe as comparatively licentious and wicked; and even down to the Iron Age, when justice and honor left the earth, and barbarism reigned triumphant. They speak to us also of the Golden Age to be revived when Astræa will return to the earth; when justice, peace, and innocence are to flourish again with their primeval lustre; and when every thing is to be restored to its original perfection.*

It cannot be determined whether the golden period, as above, refers to the very early ages of the world, or to the earliest times; but that such a period has existed as has been referred to, does not depend on human authority. That the world has enjoyed a truly golden age, or a first season at least of mutual love, peace, health, and happiness, with exemption from disease, and where the passions which degrade manhood were unknown, is confirmed by several verses of the eighth Psalm,

* Virg. Ecl. 4; Trag. Œdip., act 2.

the transcription of which, I hope, may not seem improper: —

"What is man, that Thou art mindful of him? and the son of man, that Thou visitest him?

"For Thou hast made him a little lower than the angels, and hast crowned him with glory and honor.

"Thou madest him to have dominion over the works of Thy hands; Thou hast put all things under his feet:

"All sheep and oxen, yea, and the beasts of the field;

"The fowls of the air, and the fish of the sea, and whatsoever passeth through the paths of the seas."

Under these conditions of life, the history of the men of that period, if truly written, would certainly be considered as of a golden character. Brotherly love, or the regard for others, would be presented as the ruling principle of action; and, with "honor and glory," there could have been neither disorder nor disease; and, it would seem, with a perfect command over their affections or moral impulses, they must have derived their highest happiness from their continued acts of kindness and good-will to others.

When we present the condition of the world

of these later days in contradistinction to the golden period as above described, what thanks should we render for the assured promise, that, in the last days of the world, as in the first, there shall be a return of orderly life, a reciprocity of good-will, a constant interchange of useful offices, and an exemption from disease!

But to return from our brief digression: we have now to treat of the abuses and disorders of life, which are called disease.

We have spoken of health and order, and of the means to be employed for their preservation; also, of the process of digestion, and the assimilation of food, while the functions of vitality are, in all the offices of life, moving in unison. But, in our present chapter we have a less pleasant picture to contemplate; viz., the perversions of life and health, or of disorder and consequent disease. We shall now speak more particularly of some of the irregularities of living, as among the more efficient causes of diseased vitality and bodily disorder.

First in this order, the subject of food seems to

claim attention; as this constitutes, in its reception, elaboration, and assimilation, the support of the entire human organization. It is of primary importance that the food should be of good quality, easily digestible, and well cooked or prepared; for if these primary requisitions be not complied with, though every other function of the organs of nutrition be in perfect order and harmony of action, they cannot secrete, and send upward into the blood, the health and strength sustaining chyle. The food should also be prepared in the plainest manner, and not served with stimulating condiments for the purpose of exciting a stronger appetite.

The stomach understands its own wants, and suggests these wants to — or rather calls up — the appetite; and, when the necessities of that organ are properly supplied, the appetite ceases. If the attempt be made to re-create the desire for food, by the use of high-seasoned sauces or stimulating drinks, and in consequence more food be taken, we may see in this case, so far as the nutriment of man is concerned, the first abuse of life and

health, — the first descending step to bodily disorder and disease. If, when the stomach gave notice of the reception of a sufficient quantity of nourishment by the withdrawal of its desire for a further supply, the intimation had been regarded, the digestive function would have been easily and perfectly completed within the proper interval; at the termination of which the appetite would have sent up its demand for a further quantity. But with an over-supply, furnished by the call of an artificially stimulated appetite, the digestive powers are overburdened, — are subjected to unusual labor and, to a slight extent it may be, debilitated.

As we see this indiscretion on the part of man repeated daily, and a still greater excess of food taken each day, — for such is the strong tendency, through the use of unnatural stimulants,— we witness a just cause of alarm. The descent from health is thus seen to quicken in its downward force; the derangement in the order of life is more apparent; and, in exact proportion to the violation of the rules of life by excessive eating, the prac-

tised eye beholds the development of disease. Instead of witnessing symptoms of marked indisposition, a slight cutaneous eruption may appear, and a pressure or heaviness in the head may be observed, not yet amounting to a headache; unquiet sleep, occasional pain in the stomach; and the incipient transgressor begins to complain of loss of appetite, irregularity in the bowels, heartburn, nausea. Indeed, the sufferer's catalogue of his diseases has become quite extensive: and inquiries begin to be made as to the virtues of the waters of Saratoga; for the mineral-springs most celebrated for the cure of rheumatism; for a particular description of the virtues of the sulphur springs; for the names of physicians most celebrated in the profession for the cure of dyspepsia, and other diseases of the functions of nutrition. And the inquiry is often made by people thus indisposed, What *can* be the cause of their aches, pains, faintness, debility, languor, and of their growing indisposition to live, move, and hold on to their being, or to consider life as a blessing? If such a person at last consults a skilful,

faithful physician, who inquires particularly into the manner of the patient's living, he will give them some insight into the cause of the pains and discomforts they are suffering. He will tell them the evil is of their own creating, and that the remedy is in their own hands. If the patient receive this information gratefully, and will follow the direction of his physician, it will be well for him; but how many will ejaculate, in their astonishment, "What! have *I* been in fault? Have *I* been intemperate in eating and drinking? Ridiculous! the doctor does not in the least understand my case." And after sundry mental expressions, by no means complimentary to the skill of his faithful physician, he leaves him to consult another, not more learned, and perhaps less candid.

The subject of intemperate living was considered at some length in the second section of the preceding essay, which treats of HYGIENE, or the art of preserving health; for all the tendencies to excess, as far as they are indulged, interfere with and abridge the powers of health.

The person who appreciates the blessings of health, and is anxious to preserve the ability and happiness it confers, should ever bear in mind, that the material organs of humanity, from the highest to the lowest, — even down to the smallest fibre and filament, — all become alive when man receives the breath of LIFE, and all have their legitimate use; and that no one of these can be obstructed, or impaired in its office, without interrupting the harmonious action of every other part. Such a person can appreciate the lessons which Hygiene inculcates, — that every excess and irregularity of living should be carefully avoided.

But we are now considering the cases in which the precepts of Hygiene have been neglected; in which disorder and disease have asserted their empire, and the primary conservative rules of life seem to be silent, and stern disease commences its combat between order and disorder, between life and death.

Thus it may appear that the precepts enjoined by the "Art of Preserving Health," and the rules prescribed for the management and cure of disease,

differ more in the degree and necessity of their use than in their intrinsic character. Prevention of disease recommends the observance of many virtues; among which, temperance in living stands pre-eminent: but the authority which disease confers commands obedience to its prescriptions.

The abuses we have just spoken of are by no means the greatest we shall have occasion to mention, nor are the complaints they superinduce generally of a very alarming character. The sufferer is still salvable; and may be restored to health, strength, and perhaps to the full measure of his former usefulness and physical ability, if he will yet listen to good counsel, and obey faithfully the prescriptions which medical skill may enjoin.

The class of people we have just spoken of have not abused the energies of life, probably, to a very alarming extent: indeed, very many of them can scarce be made to confess that they have committed any offence against the laws of health or the precepts of temperance; but those who are first brought to see and confess that they have been transgressors are the soonest enabled to dis-

miss their physician, and to return with renewed health and strength to their former employments.

Health is a blessing of most tenacious power. Like truth, if crushed to earth it will rise again. It is not coeval with, nor the coequal of, life; because it is of, and perhaps we should say from, life: yet it is the vital spark from the great *fountain* of heat and light, which will kindle into flame and burn brightly under the concurrent influence of man, moving in the true order of his creation; and, if not opposed by a life of disorder, will act in full force, — even to the longest measure of man's earthly pilgrimage.

We have alluded to greater abuses of the powers of life and strength; and, of course, to a class of more grievous diseases, and to greater transgressions than those of merely excessive eating: for the intemperance we have already spoken of is frequently aggravated by disregarding the regular and duly appointed seasons of taking food, — by connecting fasting and feasting by very uncertain intervals, as whim or accident may suggest.

In the previously considered cases, we have sup-

posed there was an observance of regular, stated hours for refreshment; and, so long as these proper intervals were observed, the manner of living, although it may justly be called intemperate, can scarcely be deemed riotous and imminently destructive of life: but long fasting, followed by excessive eating and drinking, soon develops diseases of the most alarming character.

Life struggles, strives, rises, and falls; yet ever combating, to its utmost strength, not only the access but the progress of disease, through all its most destructive forms; and never remits its efforts until it is overwhelmed in the conflict, and the last vital spark is quenched.

The healthy functions of animal life all move in exact order; receiving and giving to every form and thread of life just so much as their support requires. We know with what regularity the heart alternately dilates and contracts; and we can both see and feel, and sometimes hear, its steady motions, — can see them throb at the temples, feel their pulsations at the wrists and on the breast, and hear them in the stillness of night

in our recumbent posture. The stomach does its work steadily; signalizing, at regular intervals, its wants for further supplies of food: the chyle is continually and steadily passing into the veins, and ascending to the heart, and receives its final purification and full vitality in its passage through the lungs; and is then propelled, by the muscular power of the heart, through the arteries; and thus, in every round of life, visiting, strengthening, and refreshing every constituent atom of the material form of man: and, as it would seem, all these movements are in the exact time and full accord with the vital pulsations; each and every function being in harmony and response to every other motion.

Health is the result of all the orderly offices of life: disease is the offspring of disorder. With this view of the case, how easy it seems to understand, that the vitality of man is deranged and impaired by the irregularities of living to which we have referred, and to still greater excesses which we have yet to offer in explanation of the extremities of disease!

Let us suppose the man has risen from breakfast, and gone to his daily duties. On account of the excitement or competition of trade, perhaps eight or more hours are passed without taking any refreshment. He is faint at two o'clock; and that faithful monitor, the stomach, admonishes him of the necessity of taking food. He toils on to five o'clock, and returns to dine at six. He partakes heartily, and eats the quantity sufficient for two meals or more: he is merely making amends for his long abstinence, — without a thought, perhaps, that he is indulging excessively, or endangering the condition of his health. Or, to vary the case, agreeably to the custom of too many he does leave his place of business, for a very few minutes, at eleven o'clock in the morning and at three in the afternoon, to take something to relieve his faintness, — presumably of a diffusible nature, — and possibly excites his appetite by the same means at his late dinner. After a meal partaken with such heartiness, exercise may be deemed necessary; and the club-room or places of amusement are visited, and supper taken at a late hour in the

evening, — possibly early in the morning; and, after a very few hours of unquiet rest, he rises in the morning to travel the same round again.

With the least conception of the orderly action of life in health, with all its consentaneous and accordant motions, which collectively constitute the true harmonies of life and health, who can wonder at the prevalence of disease, or at the frequency of sudden deaths; at the quick work of apoplexy or palsy, or the painful, lingering, suffering of chronic disease; or that hereditary infirmities are entailed on so many, who, in their own persons, have ever lived temperately and prudently?

Let us see what are some of the immediate penalties of the alternations of long abstinence from food, followed by excessive indulgence. Perhaps we might place at the head of the list apoplexy or palsy (as before said), and add to these a list of acute diseases. But let us suppose a case which the reader may be able to follow directly from the cause to the effect immediately following; in which he could witness, unmistakably,

the violent struggles of an overburdened stomach to dispose of the load thrust upon its office not only against all the prescribed laws of the animal economy, but in positive violation and conflict with the priceless gift of rationality, which connects man, through the ties of love, to his Maker, — the human to the Divine.

We would premise that what might be called the *rest* of the digestive powers, during the long abstinence which may have preceded the excessive reception of food, does not strengthen the office of the stomach for the heavy task now about to be imposed upon its activity: on the contrary, it weakens its force; as every irregularity of the vital movements not only debilitates the function primarily affected, but, by its sympathetic connections, unfavorably affects or weakens every other power of life.

Yet, under all these unfavorable conditions, the stomach seems to awaken its utmost remaining force to meet the unreasonable demands now made upon its energies. The vermicular motion, common to the whole alimentary canal, is in-

creased; the muscularity of the organ is excited to an unusual effort for moving the mass of food received; turning it to the action of the digestive solvent, or gastric juice, and also thus diluting and softening it by the admixture of other liquids: but pains seize the stomach, occasioned by its unusual efforts, and constantly increase in severity. There are incipient symptoms of its spasmodic action, or violent contraction; and the chances of the moment seem to be about equally balanced between immediate death and ultimate recovery. There is a strong visible combat between the impaired powers of life and the apparently growing strength of disease.

How ends the conflict in the above-supposed instances, as having been wrought up to such a degree of severity as to cause serious alarm for the life of the sufferer? It may terminate in sudden death. But this result is scarcely to be expected, except in those cases of long-continued abuse of the vital powers, through which the digestive forces have become greatly enervated: but more probably, a violent contraction of the stomach may invert the

order of life, and throw the whole oppressive load upward; when the anguish occasioned by the trespass on the laws of the animal economy is at once relieved, but at the continued expense of the digestive strength. Or the convulsive contraction of the stomach may be postponed to the still struggling digestive energies, until a portion of the nutrition has been secreted and sent up to the blood, and the grosser parts ejected by the greatly increased peristaltic motion of the lower portion of the alimentary canal; in the latter case, the relief from distress being much more gradual than in the one previously described.

But what a train of chronic complaints follow in the track of such repeated indulgences! all hastening in their march to take advantage of other debilitated faculties of man; for it is a law of life (as has already been said) that the derangement or disease of any one vital function affects and weakens every other form of life, — every elementary fibre of man. Gout may take its seat in the small joints, and gnaw at the ligaments, with its accustomed remorselessness; dyspepsia make a lodge-

ment in the stomach, and press its claim for perpetual possession; chronic rheumatism abide in the muscles, with its dull, but constant twinges, ever teaching you to move with great caution and care, lest its dull pains should suddenly become intolerably acute; neuralgia seize the face or head, with temporary paroxysms of distress under which the most stout-hearted cannot remain silent; and cramps most distressing grasp the muscles of the limbs, interdicting its subject, for a time, from all locomotion. Consumption, although more insidious in its access and progress, is usually less painful. It quietly inwraps man in the toils of destiny, and does its fearful work in the gentlest, yet surest, manner.

We would by no means represent that sorrow and sighings, pains and ceaseless complaints, are, or ever will become, the rule of human life. It is true, they are, to a great extent at least, the sad incidents of man's transgression of the orderly rules of living, and the evils thence resulting. He may, in the exercise of his freedom of action, — even against the convictions of his rationality, —

incline to disorder; and, just in proportion to this inclination, he becomes the subject of diseased influences. The chastening he may receive in consequence of his declension from order should be considered — as in truth it ever is — as an admonition of kindness from that FOUNTAIN of benevolence which never deserts any human being; as an effort of the LOVE which watches over all, to recall him, still in his freedom, to a perception of his error, and to strengthen him in his purpose to return to and abide in the true order of his life.

Freedom of action is one of the great and distinguishing gifts of human life, the unrestrained exercise of the will of man to choose the path of life in which he prefers to walk. If he were deprived of this election, he could never be happy; for, we feel constrained to repeat it, rational happiness is ever of the will, — never compulsory.

We ought not to wonder, then, if discord and disease prevail to a greater or less degree; for to some extent they must exist, — at least in our present condition, — or man must cease to be a free agent to make his choice between good and

evil. Let us remember, then, that all disorder does not necessarily imply full depravity of character, nor every bodily disease demand the death of the material human form.

We dwell in the world at a period never free from disorder; but never — no, never — let it be given over to despair, — in a world where physical disease has ever existed since the fall of man and the termination of the Golden Age; and, no doubt, may continue, to some extent, to prevail; but in which it never has obtained, nor ever will obtain, the mastery over the powers of life, — in a world where the cures of both moral and physical disease will yet be the rule, and not the exception.

Let us remember, then, when the treatment of bodily disease is under consideration, how wonderfully recuperative are the powers of life and health: never tiring in the effort to recover the sufferer from physical as well as moral disorder; never remitting, for the least conceivable moment, their kindest, most earnest efforts in behalf of the afflicted, until his recovery is assured, — in which case there is no remission of their continued

kind offices; or until, overburdened and borne down by the power of physical disease, the last spark of life in the material form of man is quenched, — when the patient passes into the hands of those more able, and equally desirous, to do him good.

In view of the tenacity or elastic force of life coming from that LIFE which was breathed into man, through the reception of which he became a living soul, and which is ever striving to preserve him in the order and for the purpose for which he was born; to guard him from moral disorder, of which physical disease is the offspring, and to recover him when his freedom may have led him astray, — the physician who is striving to render the external assistance in bodily disease which the internal life seems to indicate, as becoming co-operative with the inner efforts, has much to encourage him. Every one feels strong in his purpose, when he is conscious that his efforts are in the right direction.

The faithful, skilful physician is ever hopeful, not only because the recoveries from disease are

much more frequent than the fatal results, but because he has seen many cases which, to outward appearance, seemed desperate, and which less observant physicians than himself might be ready to abandon; these persons he has known to recover their health, strength, and usefulness. But he is especially hopeful if he has carefully examined the case, and feels that he has discovered what the powers of life are in the effort to accomplish, which are ever combating the moral evils of which natural disease is the outbirth.

The great study of the person whose duty is to prescribe for bodily indisposition is, or should be, to explore and ascertain, if possible, the cause of the complaint, for which he is to prescribe the most appropriate remedy; and which, by careful inquiry, may be more generally ascertained than is usually supposed: next, to ascertain what are the efforts of vitality to remove the cause; and if he can discover these, and render external aid, tending in the same direction with the operations of life itself, he may never make a mistake. But we now proceed to speak, perhaps more particu-

larly, of the cure of disease; although thus far, in treating of their causes, it has frequently seemed proper, as well as convenient, to refer to the means adopted for their removal.

PART II.

DISEASE, AND CURE OF DISEASE.

"Canst thou not minister to a mind diseased;
Pluck from the memory a rooted sorrow;
Raze out the written troubles of the brain;
And with some sweet, oblivious antidote,
Cleanse the stuffed bosom of that perilous stuff
Which weighs upon the heart?"

MACBETH.

WHILE a few persons in the community give the medical faculty little credit for their professional skill, and a still smaller number denounce the physician as a man of false pretences, the masses of the people take a more reasonable view of the matter, and concede to the well-educated of the medical profession a full measure of their respect and confidence. There is also a class of men, larger perhaps than the one first named, who accord to certain physicians

—generally mere pretenders in the art, unlearned and unscrupulous — an almost miraculous power of healing; and speak of the frequent cures effected by them, which more sensible and honorable members of the faculty at once recognize as impossible, or extremely improbable, inasmuch as they seem to transcend the power of all professional skill, and virtually claim the exercise of superhuman power.

The excessive praises which are now frequently lavished upon the skill of pretenders in the healing art, and the entire confidence reposed in them by the few as regards their ability to work wonders in their practice, have come down to our own times, through the many centuries which interpose between us and the ages of the "fathers of medicine." But these reach us with strong points of difference; and we may say, in certain respects, with an entire reverse of character.

"The fathers," unlike the empirics of the present day, were men of profound learning and most mature judgment. Overflowing in their love and desire of doing good to others, they gave the

efforts of their long lives, with an unremitted devotion, to the discovery of the means, not only of mitigating the pains and penalties of disease incident to humanity, but of devising measures whereby their fellow-man might be restored to the full enjoyment of his strength and ability for usefulness.

These strong men labored, and with remarkable success, to reduce the results of their patient labors to specific forms, as elements of a system which might be recognized as a science.

Hippocrates, the most famous among the Greek physicians, founder of a school in medicine and the author of the first successful attempt to reduce the profession to a science, was born in the island of Cos, and in the city of the same name, B.C. 456; and belonged to the celebrated family of Asclepiadæ, or descendants of Æsculapius, from whom he was the seventeenth in descent. His father, Heraclides, a physician, instructed him in the art of physic; and his education was conducted with all the care that was usual in the principal families during the flourishing period of Greece. He probably enjoyed the instruction of the phi-

losophers then living at Athens ; and, among them, of Heraclitus. He spent the greater part of his life in visiting the chief cities of Greece, for the purpose of improving his art. He remained longest in Thrace and Thessaly, — particularly in the Thracian island, Thasus, — and probably travelled over a great part of Asia. He died in his ninetieth year.

Hippocrates was a zealous, unwearied observer of nature, and considered disease with a free spirit, unprejudiced by the teachings of any system then extant. Hence we have from him the finest descriptions of their natural course, never in any wise disturbed by the very crude opinions then existing on this subject, nor by any extraneous or precipitate influence. He was in this manner more able to become acquainted with the healing power of "*Nature*," *and with the different ways in which she effects the restoration of the sick, as well as with the exterior means by which she was supported in her operations.*

He paid great attention to the external influences, as the remoter causes of disease ; in par-

ticular, to air, food, climate, dwelling-place, and even to the social relations of the sick. In his method of cure, the dietetical precepts take the first rank. At the same time he closely observed the operations and tendencies of the internal life for the removal of the disorder, and endeavored to co-operate, through external means, with the action of the vital efforts for the removal of the complaint. During the increase of the disease, he did not often undertake any thing decisive, lest the efforts of the inner life might be disturbed ; but during the crisis of secretion and evacuation of the matter of disease, or shortly before, he *assisted* "*nature*" by means which promoted the discharges. He cleared this science from the useless subtleties of the many philosophical sects or medical pretenders of that period; he scrutinized all his cases with the greatest attention, ever watching and endeavoring to second the internal efforts for the restoration of health ; and he not only freely communicated the results of his experience to his pupils, but published them to the world, for the benefit of all who might feel an interest in a subject of such importance.

In the above biographical extract, which we suppose to be as authentic as any extant, we ought to say the *Italics* are our own; and were so made because they are expressions of a most important power or principle discovered and presented by him, to which we shall hereafter make frequent reference.

We have been thus particular in our account of Hippocrates, not only on account of the remarkable strength of his intellect, so clearly indicated, and the untiring devotion of his powers to develop a system having for its object the relief of suffering humanity; but more especially because he first discovered and announced, though somewhat obscurely, a fact or feature in the science of medicine which has descended through the many centuries to the present day, with the continued indorsement of the medical fraternity; but which approval has never seemed to meet the full and hearty acknowledgment of all the medical profession; neither, as it would seem, has its wonderful sanitary force for the good of mankind been more clearly developed, nor more carefully

studied, since the day of its first virtual announcement.

In our introductory essay, we spoke of this vital healing power at some length, and have several times referred to it in the chapters following. But, once more, as we are treating of disease and its cure, and on account of its great sanitary virtue, both for the preservation of health — or, if health be impaired, to restore the blessing by removing the disease, — we wish to speak of this important and most beneficent agency, in this connection. Would that I had the power to describe its importance, or to excite the medical student to a much closer examination of its life-preserving quality!

Hippocrates gave to this inner life, whose operation to cure disease he first discovered, the name of "Nature." But he evidently did not regard it as an external or natural property; for he watched its movements that he might second its efforts by external means,—that he might imitate its motions, and not only follow, but sometimes anticipate, its action, and "lead off" by the use of external

means concurring and co-operating with the ever-active vital energy.

He also developed, almost simultaneously, with his acquired insight into the action of "nature," a hygienic system. He ascertained, by questioning his patients and in other ways, their manner and habits of living. He inquired particularly concerning the quality of their food, the frequency of their meals, the regularity of their recurrence, the hours given to rest, the nature of their employments (whether active or sedentary), the situation of their dwelling (whether high and airy, dry or damp), — into their habits of exercise, and their observance of temperance: for, as we suppose, narcotics and diffusible stimulants were known in those days; and, if they were used, it seems fair to suppose that they were sometimes abused.

Well might Hippocrates be called "the father of medicine." He seems to have grasped in his own time all, or nearly all, of the great principles of the art; and, as he is ever represented as devoted and searching in his cases, we cannot wonder

that he was most successful in his practice; for his investigation of the causes of disease was most thorough, and his discernment of the operation of "nature," — for which word we would adopt the term which others have proposed of VIS VITÆ, — most acute; and thus was he enabled to co-operate with the efforts of the inner life for the removal of disease; and we need not wonder that his professional success led, in those early days, to his canonization.

The VIS VITÆ is ever active, for it ever has work to do. In its most common modes of exercise, its movements are invisible; yet it is acknowledged by many medical men of the present day to be the great internal conservator of the health and strength of full manhood, as well as the physician-spiritual, or the inner-life, when the powers of man have become disordered. Indeed, it never for a moment remits its influence; its kind care of man operates even from his birth to his death: but, as before said, in the halcyon days of health and happiness its action is not manifest; neither is it observable in cases of slight indisposition, for

it corrects all trifling interruptions of health without the least manifestation of its power.

To the practised eye of the experienced physician it becomes apparent, especially on the access of acute disease (as has before been stated). When the pores of the skin are suddenly closed, and the irritating matter which they would otherwise have transmitted is thrown inward, a heat, or incipient fever, is at once created; which heat is an effort of the inner-life to reopen the excretory outlets of the skin; and sometimes, perhaps we might say frequently in slight cases, this effects a cure, by restoring the office of the skin.

But, in severe cases, how evidently does the VIS VITÆ seem to call for a concurrent effort of man, or of external agencies! virtually saying, "Apply *external* warmth; *relax* the corrugated skin, by sponging it with warm water, *quite warm;* or give to the patient a warm bath, or administer freely hot drinks," &c. The experienced nurse understands these first duties. The patient is first placed in bed, and liberally covered with warm clothing, and the hot mint drinks furnished; and thus the cold is gen-

erally broken by the reappearance of perspiration. But, if success does not attend these early efforts, the physician should be called; who may continue the external means to promote the opening of the skin and add to these the internal prescription of diaphoretics, and perhaps other remedies.

Thus the disease is engaged within and without: within, if we may so express it, by the ever-watchful *power of life*, and without by the concurrent force of human skill: both efforts tending in the same direction; namely, to open the pores of the skin, and to restore the perspiration.

But we will suppose the disease makes a further advance: a cough appears; the breathing seems more laborious; the patient becomes restless, and perhaps nervous; the thirst increases, and sharp pains are experienced in the breast or sides. The concussive cough is an effort to detach the irritating phlegm from the secretory surfaces of the chest, which the muscular effort, or the cough, is attempting to throw from the system. The physician then adds to his other remedies, expectorants, to facilitate the loosening of the mucus from the lining

membrane; and if the agitation of the cough is greatly increasing the pain in the chest, and the nervous restlessness, he further adds occasional sedatives. During this time, care is taken that all other excretory offices are duly performed, or, perhaps we should say, somewhat increased in their action, to compensate, as far as possible, for the suppressed function of the skin.

The combatants are now opposed in their full force; the powers of life, health, and order, with the co-operative efforts of human skill, in array against the acute suffering of disorder and disease. If the skin grows uniformly warm, soft, and moist; if the cough appears less troublesome, and the pains in the breast abate; if the expectoration becomes more copious and less painful, — we may be reasonably hopeful of a favorable result.

Thus far we have assumed that the physician has recognized the operation of the VIS VITÆ; and has faithfully and profitably co-operated with its efforts for the restoration of health.

It is a misfortune for suffering humanity, that, as the disorder advances, or assumes new forms,

the efforts of the inner life are more indistinct; yet, if the disease we have been considering — which, for convenience' sake, we may call *pneumonia* — has lost its acute form, and extended into a chronic type, to the substance of the lungs, creating a tenderness in these organs, with, perhaps, a slight cough, the duty of the physician still continues; and, although he may not be able to follow any very clear indications of the power of life, he has many helps to direct his judgment; and, even when the condition of his patient seems quite unpromising, there is still much good that he can do.

The physician should never utterly despair, but should ever look to and regard the example of the vital energies; which, although he may be unable to perceive clearly their efforts to remove this form of disease, he knows are always making such efforts: never deserting the subject for whom they strive, while a spark of vitality remains; and if this spark at last is quenched, it expires at the instant the VIS VITÆ was in the effort to raise it to a flame!

The physician has much to do, even to the end

of his cases. He can alleviate the occasional pains of protracted disease, calm the mental nervousness, and show to the patient that his own hopes of his recovery are not extinct. Why should the physician ever utterly despair? Why not toil on, side by side with the vital principle, to the last?

Judging from my own very limited experience, and from the frequent remarks of medical men of extended and successful practice, I am induced to believe that recoveries, generally unexpected, are not very unfrequent. What physician has not seen his patient, in the seeming last gasping for breath, perhaps vomit, and thereupon revive and recover; or a tumor break in the throat, apparently in the dying throe of the sufferer; or in a protracted case of fever, as many might say protracted beyond hope, a free and warm perspiration suddenly cover the body; or in other cases appearing nearly, and to some quite, hopeless, has not witnessed the reappearance of other excretory functions, upon which his patient revived and recovered? Life never halts in its efforts to preserve

its own; and why should the physician desert his charge?

Health is at the head of human blessings. It is (we must repeat it once more) the orderly activity of life. Disorder is the parent of disease, and, may we not say, of all human suffering? Man was born into the highest order of created life, and endued with health, strength, rationality, and freedom of action; balancing in his choice of good or evil. As he inclined to good, he continued in health and strength; but, as he turned to evil, he was unhealthy, weak, and miserable.

It is greatly to be deplored that so little heed is given to the obviously truthful and useful lessons of *Hygiene*, or the science of preserving health. The precepts inculcated in this department of science are so plain and reasonable that he who runs may read and understand them. Indeed, the most prominent and important rules prescribed therein for the preservation of health are almost universally acknowledged to be true, and it is seen that their observance is most useful; yet strange, it seems, to say, there is practically a great neglect

of the lessons they inculcate. We now allude to the instructions of *Hygiea* which partake of a physical character; and we again refer to these for the reason aforesaid, because, with the universal acknowledgment that these prescriptions are most important, they are, to a very alarming extent, utterly neglected; so that bodily indisposition threatens to become the rule of life, instead of the exception.

I now allude to the irregularities of living, — to feasting and alternate fastings; to the common and excessive use of stimulating liquors, and to the uncertain hours devoted to sleep. All these deviations from the precepts of life and health conflict with the order of our existence; and disorder and disease inevitably follow as the consequence of these transgressions; and, while this statement is received and perceived to be true, its injunctions are so generally disregarded that the abuses in this respect may probably be set down as the efficient cause of a majority of the physical infirmities we daily witness. We are aware that this subject has been considered at greater length under its more

appropriate head in the preceding chapter; but so great is its importance that we could scarcely refrain, in this connection, from calling attention anew to this very common offence in the manner of living at the present day, so prolific of evil.

There are some moral evils which we have not directly mentioned, which tend at least to the disturbance of the laws of life, health, and the social condition of man. I refer to the feeling — perhaps not very prevalent, but it can scarcely be considered uncommon — that all labor, but more especially manual, is personally degrading, and even base. Herein commences a grievous error, probably not immediately prejudicial to health; although industrious habits are almost universally considered as promotive of physical ability and personal contentment, while idleness is acknowledged as the parent of mischief, or first step toward vice.

Those who are possessed with the fallacy that manual labor is servile are very apt in the end to denounce all labor as dishonorable, and to seek other means for support; which, in the beginning, they may characterize as enterprise, but which

in reality soon becomes subtle schemes for sudden fortunes; leading, in many cases, to moral evils, — to disorder, dissipation, disease, and crime.

The feeling that any useful industry is degrading is a most serious mistake, and should be resisted in its first suggestions as a destructive falsity. All legitimate physical exercise is honorable, healthful, and commendable; and when performed not only for the material support it yields, but also with reference to the general good, it becomes a high moral virtue. Under these circumstances, the same may be said of all human industry, — whether manual, mercantile, or professional. All orderly labor is honorable, and tends to health. All contempt of it is disorderly, and invites disease.

"Toil and be strong. By toil the flaccid nerves
Grow firm, and gain a more compacted tone;
The greener juices are by toil subdued,
Mellowed, and subtilized; the vapid old
Expelled, and all the rancor of the blood.
Go! climb the mountain; from the ethereal source,
Imbibe the recent gale. The cheerful morn
Beams o'er the hills. Go! mount the exulting steed.
Already, see! the deep-mouthed beagles catch
The tainted mazes, and, on eager sport

Intent, with emulous impatience try
Each doubtful trace. Or if a nobler prey
Delight you more, go! chase the desperate deer;
And, through its deepest solitudes, awake
The vocal forest with the jovial horn."

ARMSTRONG.

When we consider how prone we are to evil, or to the abuse of the greatest gifts Heaven has vouchsafed to man, — the spiritual gifts of rationality and freedom; and that every abuse of these gifts necessarily superinduces disease, with all its consequent inflictions, — we behold on what a brittle tenure our life, health, and happiness depend. Truly, we might despair in view of the ever imminent liabilities of disease and distress which await us. We can look upward, however, to the constant guardianship of our inner life; to the VIS VITÆ, of which we have said so much, as our ever-watchful, protective angel, who is present with us from the inspiration of our first breath to the last moment of our life; who keeps ceaseless watch over us, and is always active and earnest to shield us from disease, and ever striving to bring us back to the true order of life in which man was created. If it were otherwise, we should almost

despair of the health and happiness of the human race. And even with the knowledge of the kind guardianship of this inner power of life, to which we have so frequently referred, we are sometimes tempted to exclaim with the lyric poet : —

> "Our life contains ten thousand springs,
> And halts if one moves wrong ;
> Strange, that a harp of countless strings
> Should keep in tune so long !"

Let us not despond, however, on account of the prevalence of moral and physical delinquency, which, at the present time, seems so powerful for evil ; but rather rejoice at the good and assured time which is coming.

In the most ancient time, or in the first Golden Age, when men were created a little lower than the angels, and for so long a period as they remained in the primitive condition of their lives, it is believed they were not the subjects of physical ailments. The order of life, when most perfect, is most perfect health ; and in such order, it would seem, there could have been neither predisposition nor susceptibility to disease.

In these earliest ages, when men had fulfilled the purpose of the life in the body, and the oil in the lamp of their material organization was consumed, — the last jet of its flame being the highest and the brightest, — they quietly rested from their earthly labors; the external form returning to the earth whence it was derived, as the bright-tinted leaves of the autumnal forest, having accomplished their highest use, fall gently, and even gracefully, to the earth; where they, by their decomposition, enrich the nutritive juices of the vegetable kingdom; retreating from the approaching frosts of winter, but only awaiting the warm influences of the succeeding spring, that they may ascend, with renovated power, into new buds, leaves, and flowers; clothing the tree in renewed beauty, and producing new fruit.

"The tree
Sucks kindlier nurture from a soil enriched
By its own fallen leaves; and man is made,
In heart and spirit, from deciduous hopes
And things which seem to perish."

HENRY TAYLOR.

The ancient poets, who wrote of the Golden Age of the early period of the world, also announced

the future return to earth of the goddess of peace; when justice, innocence, truth, and mutual good-will would flourish, and all things would be restored to the primitive condition of the first ages.

The millennium has been taken for these coming years on earth, — for years of peace, plenty, health, and mutual kindness, — for the second Golden Age to which the Greek poets have referred. Some millenarians consider that it will prove of a temporary character; that it will come for a thousand years of splendor, glory, and power, and for a triumph over their worldly enemies, — with the glory of a second "immortal" Rome, though with transcendent and crowning splendor.

How eagerly the first Christians were looking for the happy days to come, is clearly shown by the continued enthusiasm upon this subject manifested by their successors, even to the fourth or fifth century. Not only Cerinthus and others, who had imbibed this doctrine from Judaism, but other teachers, — as Papius of Hieropolis, Irenæus, and Justin Martyr, — delighted in their dreams of the glory and happiness of the coming millennium.

It seems quite certain that many people of the first Christian centuries had very sensual conceptions of the coming event they so fondly anticipated. There were also some — perhaps we might say many — who dwelt with pleasure on the moral benefits and blessings which they believed they were to receive from its advent. They looked forward to an era of peace, truth, and reciprocal good-will, and to the many blessings which would enure to them from a truly orderly life. But the millennium of the majority was to consist in their feasts of fat things, with abundance of wines well refined, in connection with the dominion they might acquire over other nations, through the plenitude of their physical strength.

Indeed, after the worldly power and dominion of Rome had culminated, and after the Christian religion had been introduced by the Emperor Constantine, and the law-makers had framed their edicts, — subsequently collected and embodied by Justinian, — which gave to every Roman citizen the assurance of his personal liberty and security, — the Roman Empire was supposed by most people

to be the very millennial reign which they had so long been looking for; and, on account of their certainty that they were in the actual realization of their anticipations, they ceased to speak of this subject as a future event.

Then was Rome called "imperial," "immortal," "the mistress of the world," to whom vanquished millions bowed. But Rome, instead of enduring for the thousand years in its glory, declined and disappeared in a few centuries thereafter!

But the true millennium, or second Golden Age, which awaits man, we are assured is approaching; and, although we know not the day of its coming, we are certain both of the event and of its character, from testimony which cannot be doubted. It will come, even as the Greek poets have said, to restore the age of love, good-will, and innocence which prevailed among the early men who were created a little lower than the angels, and who were crowned with glory and honor. It *will* come "*in the last days*," — and who can compute the extent of those days? — when the mountain of the Lord's house will be established on the top of

the mountain; when the law shall go forth from Zion, and the word of the Lord from Jerusalem; when swords shall become ploughshares, and spears shall form pruning-hooks; when every one shall sit under his vine and fig-tree, and none shall make him afraid. These glorious, happy days will come; "for the mouth of the LORD of hosts hath spoken it."

The event which we call death is an inevitable incident of human life. It calls at the palace portals of kings and princes; and, with equal certainty, visits the plebeian and beggar. It is the last act in the drama of earthly life; and is regarded by many, perhaps by most, people as a gloomy and inscrutable dispensation.

There is a general acknowledgment that man is a spiritual being, endued with never-ending life; yet this belief, in many cases, seems rather nominal than practical and real; and the reason of this may be found in the fact, that we live in a material world, and are constantly surrounded by "evidences" of its perishable character. The

lower animals are constantly dying. The stately tree, which grows larger and stronger, perhaps for centuries, at last declines, and falls to the earth through its own weight. The annual flower-plant germinates in the spring season, buds and blossoms in summer; but in the succeeding autumn drops its flowers and leaves, and in the frosts of winter its slender stem withers and disappears.

In the natural world, decay and death are everywhere around us; and, unwittingly perhaps, tend to confine our thoughts to things of time and sense. But even under these circumstances man may, if he will, derive lessons of an elevating character: he may behold a type of the life which never dies. The tree perishes; but before it falls its life was perpetuated, or extended, into other trees of precisely the same character. The annual flower-plant droops from the early frosts of autumn; yet, as it dies, it drops its living seeds into the earth, which germinate and produce the same beautiful flowers in the succeeding summer.

But man is a spiritual, and consequently an immortal, being, endued with the breath of Life

from the Fountain of Life. The spiritual is the real and substantial man; temporarily clothed in the material, perishable garments of time, through which, as an instrumentality, he is able to perform uses in the natural world; and, when the purposes of this material life are accomplished, the earthly covering drops, disappears, and returns to the dust from whence it was taken, while the spirit returns to God who gave it. Man, in the truest sense, can never die.

> "Death is the higher life. We bow our heads
> At going out; we think, and enter straight
> Another golden chamber of the KINGS,
> Larger than this, and lovelier."
>
> FESTUS.

The doors into this KING'S chamber — large, lovely, and golden — are ever open to receive and welcome the approach of every good and true man ascending from the natural into the spiritual world.

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