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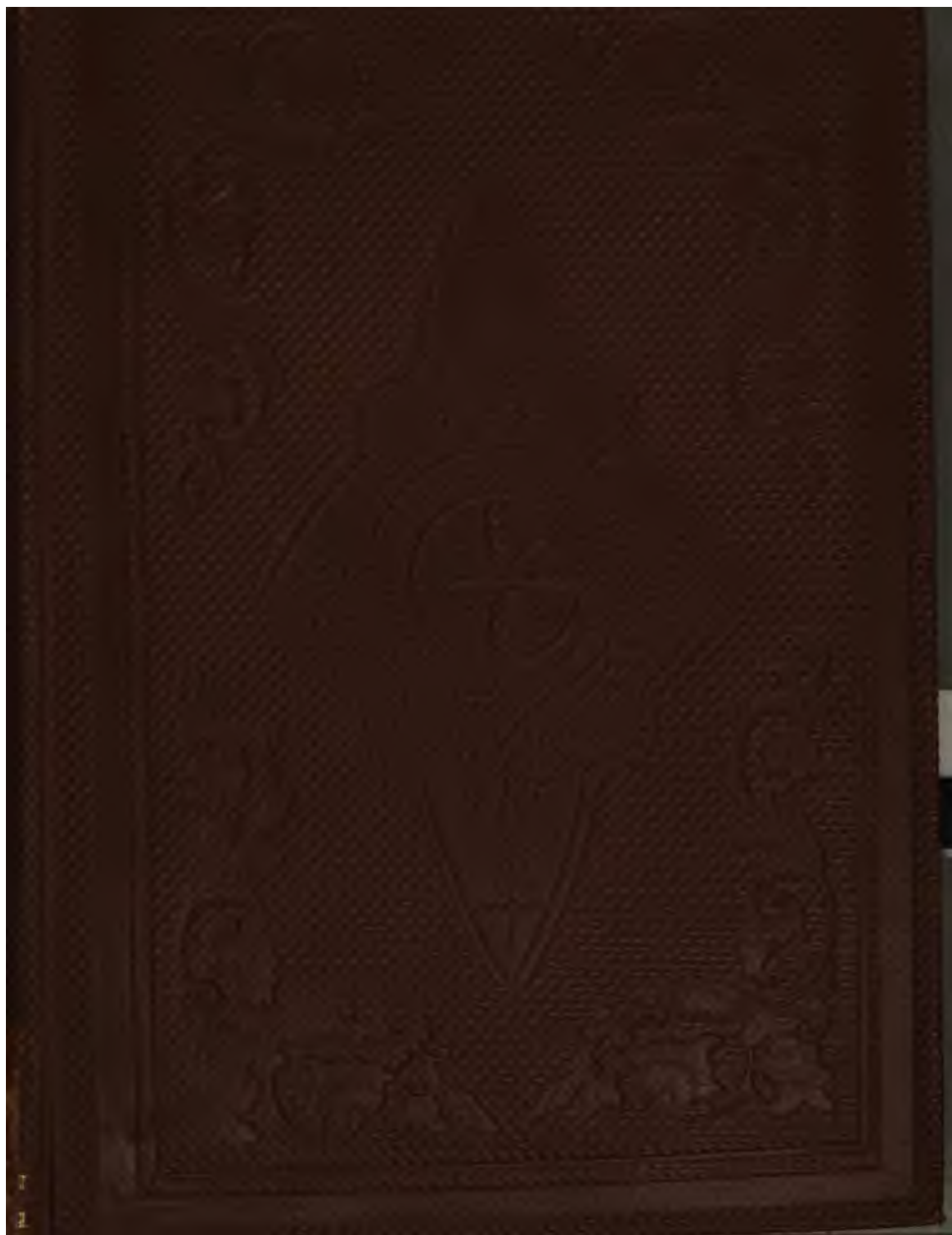
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21 22 23 24 25 26 27 28 29 30

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# HINTS TO MOTHERS

ON

# HOME EDUCATION.

BY

FREDERICK BRIDGES,

AUTHOR OF "PHRENOLOGY MADE PRACTICAL," "CRIMINALS, CRIMES, AND THEIR  
GOVERNING LAWS," ETC., ETC.

"Is not that the best education which gives to the mind and to the body all the force,  
all the beauty, and all the perfection of which they are capable."—PLATO.

LONDON:

GEORGE PHILIP AND SON, 32, FLEET STREET;

LIVERPOOL: CAXTON BUILDINGS, SOUTH JOHN STREET,  
AND 51, SOUTH CASTLE STREET.

1862.

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## P R E F A C E .

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It is not many years since that the proposition, that education should be guided by phrenological and physiological principles, was generally received with ridicule or doubt, and by many with absolute disgust. Of late, however, public opinion has been steadily growing in favor of the usefulness of the educational doctrines taught by phrenology and physiology; and their laws are now frequently referred to by philosophical minds as a standard by which every proposition for the physical, social, moral, and mental improvement of our race should be tested. This happy change is likely to be progressive, from the fact of it having arisen from the gradual diffusion of sounder views of human nature, and useful truth being clearly presented to the understanding.

As health requires the observance of the laws inherent to the different organs of the human constitution, it is not only important that boys, but girls, should acquire a knowledge of the laws of their organization. If sound morality depend upon the inculcation of correct principles in youth, equally so does a sound physical system depend on a correct physical education during the same period of life. If parents who are deficient in moral feelings, are unfit to communicate to children and youth, those high principles demanded by the nature of man—so are they equally incompetent directors of the physical



training of children, if ignorant of the organic laws and physiological conditions upon which health and disease depend.

Hence, the study of the human system, and the laws of the different organs, and the conditions upon which their health and disease depend, are subjects of interest to all, as this knowledge is required in practice in daily life.

One of the most extraordinary facts of the kind that this enquiring age presents, is, the general neglect of the study of the sciences of the nature of man. While, on the other hand, not to know the composition of most of the inorganic substances, and not to have a knowledge of the steam-engine and spinning-jenny, is considered disgraceful by men who live and die totally ignorant of the far more curious and wonderful mechanism and laws of their own bodies.

The author makes no pretensions to originality. His great aim has been to present to the reader the subject in a concise and practical form, and as free as possible from technical expressions; so as to render the matter as plain and comprehensible as the nature of the subjects will admit.

The volume is offered in the hope that it may afford aid and comfort to parents. That it is far from sufficient to supply these wants, no one is more fully aware than its author; but it may, nevertheless, help to guide them in a right direction, and enable them to pursue their responsible labours with more success.

THE AUTHOR.

SCHOOL OF PRACTICAL PHRENOLOGY AND PHYSIOLOGY,  
MOUNT PLEASANT, LIVERPOOL.

November 20, 1861.

# CONTENTS.

## CHAPTER I.

### INTRODUCTION.

The question of education—Man in his cultivated state—Man and the faculty of reflection—The relations of the brute to the objects among which it is placed—Man's insatiable desire for knowledge—The education of man—The designs of education—The general improvement of man—The term education—The natural characteristics of human nature—The question as regards the utility of Phrenology and Physiology—One of the most important wants of the age . . . . . PAGE 15

## CHAPTER II.

### THE PHYSIOLOGY OF THE BEING TO BE EDUCATED.

The period of childhood and infancy—The order of nature—The laws of nature—The physical laws—The organic, moral, and mental laws—The striking features of the natural laws—The combinations of organized bodies—The process by which organized bodies increase—The endowments which distinguish animals from vegetables—How vegetables and animals are nourished—The law of nature that limits the period of life in animals and vegetables . . . . . PAGE 21

## CHAPTER III.

### THE SKIN.

Explanation of the skin—The skin to the naked eye—The external layer of the skin—The material of the cuticle—The process of formation of the cuticle—The cuticle when examined chemically—The cause of the difference of color of the skin—The color of the skin in relation to the energy of its action—The dissimilar offices of the *cutis vera*—The arteries and veins of the true skin—The capillary veins of the skin—The circulation of the blood through the arteries and veins of the skin—The cutaneous nerves—Parts unlike in their structure are different in their functional operations—The conditions of the brain and the sensitiveness of the skin—Remarkable examples—The varying health of the brain in relation to the sensitiveness of the skin—The state of the conducting nervous trunks, and sensitiveness of the skin—The quantity and quality of blood and the sensitiveness of the skin—How the sensibility of the cutaneous nerves are modified—The cutaneous absorbents—The oil glands of the skin—These glands are worthy of particular notice—To insure their healthy action—The animalcula of the skin—The agency of the oil and perspiratory glands—The temperature of the system—How modified and regulated—With regard to clothing—Bathing: its necessity—The hair—The nails—Cellular Tissue—Adipose Tissue . . . . . PAGE 55

## CHAPTER IV.

## THE BONES.

The mechanism of our system—The bones of the cranium—The teeth—The temporary teeth—The formation of the teeth—The irregularities of the teeth—The composition of the bones—The changes through which they go—The organic nerves, arteries, veins, and absorbents of the bones—The framework of the system—The health of the bones—The kind of exercise adapted to the age and health of the bones—The back bone and ribs—The joints—The ligaments . . . . . PAGE 66

## CHAPTER V.

## THE MUSCLES.

The study of the muscles—The structure and number of the muscles—The most striking characteristic of the muscles—Their relation to the pleasures and employments of life—The best exercise of the muscles—Tight lacing; slender waists; and deformity—The attitudes of children—*The natural law of muscular exercise*—The nerves of voluntary motion—Muscular action modified by the health of the brain—Difference in muscular strength and activity—The physiological characteristics of M. Blondin—The carriage of children in relation to a healthy development of their physical system. . . . . PAGE 78

## CHAPTER VI.

## MUSCULAR EXERCISE.

Rules for muscular exercise—Facts, illustrative of the inutility of exercise, without calling into play the co-operation of the mind—The different intonations in reading, speaking, and singing—Two things are necessary in writing—Mothers who are afraid to trust nature . . . . . PAGE 87

## CHAPTER VII.

## DIGESTION AND ITS EDUCATION.

The digestive organs—The abdomen—The mouth—The *pharynx*, or swallow—The *oesophagus*, or gullet—The stomach—The intestines—The liver—The spleen—The pancreas, or sweet-bread—The *omentum*, or caul—The substances which we eat—Their preparation, to undergo digestion—The mastication of the food and the action of the stomach—The different changes in the process of digestion—The healthy action of each organ is influenced by its appropriate stimulus—The perfection of the digestive process—1st. The quantity of food to be taken—2nd. The nature and character of the food taken—3rd. The manner in which the food should be taken—4th. The condition of the system at the time the food is taken . . . . . PAGE 101

## CHAPTER VIII.

## RESPIRATION.

What are termed the organs of respiration—Inhaling air into the lungs—The way that impure blood is conveyed into the lungs—The agency of inhaled air—How carbonic acid gas is eliminated from the system—Experiments—The walls of the air-vesicles—The affinity of oxygen and nitrogen for blood—The venous blood—The lungs require pure air, in proportion to the carbonic acid

gas eliminated from the system—The quantity of carbonic acid gas eliminated—The quantity of air inhaled—The necessity of ample volume of lungs—The contraction of the chest—The baneful influences of tight dressing—"Lady-like waist"—Motherly regard for the health of their daughters—Ladies defend the use of stays—One prevalent error among women—Boasted civilization—The heathen darkness of the Chinese—Change in the right direction—How to determine whether the apparel is worn too tightly—Respiration influences the different conditions of the brain—The effects of impure blood upon the general system—A common cause of scrofula is the want of an abundant supply of pure air—The dreadful state, in this respect, of the inmates of the Roman Catholic Female Orphan Asylum, Faulkner Street, Liverpool—The contrast of the Protestant Orphan Asylum for Girls, in Myrtle Street . . . PAGE 125

## CHAPTER IX.

## THE CIRCULATION OF THE BLOOD.

The heart—Its weight—The right side of the heart—The capacity of the ventricles—The arteries and veins which supply the heart—The elasticity of the arteries—The termination of the arteries—The pulmonary artery—The way that the brain and the stomach is supplied with blood—The use of the veins—The structure of the veins—The capillaries a microscopic network—The way that the blood is carried from the heart, and returns to it—The composition of the blood—The complete revolution of the blood throughout the system—The danger of impeding the circulation by compression—The temperature of the system—The action of the muscles in the circulation of the blood—The purity of the blood in the economy of health—Effects of impure blood . . . . . PAGE 128

## CHAPTER X.

## THE VOICE: ITS USE AND EDUCATION.

The voice: how produced—The larynx and its connections—The formation of the voice—What the sound of the voice depends upon—The difference between the larynx in men and in women—How the voice is changed—The effect of attitude in the modulation of voice—Speaking and singing in relation to atmospheric elasticity—Modification of the voice—The effects of compression upon the muscles of the neck and larynx by close dressing—The cause of the varied tones of voice in speaking and singing—How to produce a proper state of the vocal organs—The vocal organs in those who stammer—A cure for stammering—The art of cultivating the voice . . . . . PAGE 145

## CHAPTER XI.

## THE BRAIN, AND ITS ORGANIC CONDITIONS, IN RELATION TO THE GENERAL ORGANIZATION.

The brain a subject of much discussion—Different opinions regarding the use of the brain—The brain the material agent of the mind—The relation between the brain, and the mental and moral powers—The important relation that the brain holds to all the organs of the system—The brain is subject to the same general laws as all other parts of the system—Defects in the parent traced in the progeny—Hereditary predisposition—Distinct orders of mind phenomena—The influence of parentage on the mental, moral, and physical qualities of children—The baneful influence of human deterioration—Intermarriages—Early marriages—Debased criminals—Drunken parents—The law of the fitness of things—"Each after its kind"—The health of the brain and nervous system—The conditions to be observed in maintaining their health—The employment of the brain—Evils arising from ill-timed exercise of it—Mischiefs done in youth

—Cerebel disorder—The spinal cord and spinal nerves—The ganglionic nervous system—The importance of the ganglionic nerves—The five senses—The distinction between tact and touch—Remarks on the five senses . . . PAGE 189

## CHAPTER XII.

## THE PHYSICAL EDUCATION OF THE BRAIN.

The education of different parts of the system—Is matter a clog to mind?—The physical education of the brain—The brain is not a simple organ, but a compound organ—"Can the organs of the brain increase in size?"—Practical illustrations of this principle. . . . . PAGE 197

## CHAPTER XIII.

## INFANCY, AND EARLY ERRORS OF HOME EDUCATION.

The unanimity of philosophical writers on early education—The work of education to begin at home—The desire of parents to have their children educated—"What will!"—"What can best educate our children?"—The education of circumstances in moulding character—Refined sentimentality . . . . . PAGE 204

## CHAPTER XIV.

## THE NATURE OF THE BEING TO BE EDUCATED.

The order of nature in the scale of instinctive sagacity—The human brain is composed of distinct orders of mind instruments—Mental idiotcy—Moral idiotcy—The human constitution—Moral action—Mental and physical action—Harmony of functions depends on symmetry of form—*The Abdominal Region—The Thoracic Region—The Cephalic Region*—The object in educating is to train the mind and body to act harmoniously—The influence of the temperaments in educating children—The use of the cane or strap in education—Man, viewed in regard to the constitution of his mind, as an animal, moral, and intellectual being . . . . . PAGE 224

## CHAPTER XV.

## EARLY EDUCATION.

*The nature of the material upon which we have to operate—The fundamental principles—As regards early education—THE ANIMAL FEELINGS* . . . . . PAGE 260

## CHAPTER XVI.

## THE EARLY EDUCATION OF THE INFERIOR SENTIMENTS, COMMON TO MAN, AND THE LOWER ANIMALS. . . . . PAGE 286

## CHAPTER XVII.

## THE EARLY EDUCATION OF THE SUPERIOR SENTIMENTS.

PAGE 312

## CHAPTER XVIII.

## THE EARLY EDUCATION OF THE INTELLECTUAL FACULTIES.

PAGE 320

## APPENDIX.

# HINTS TO MOTHERS ON HOME EDUCATION.

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## CHAPTER I.

### INTRODUCTION.

WHEN we venture to enquire into the nature of man and the progress of society, unless we commence dispassionately, and with some knowledge of the philosophy of mind and the principles of physiology, our views will be liable to be obscured by early prejudice, and our conclusions partake of fanciful conjectures, instead of being in conformity with actual fact. We shall only submit that which is founded on a positive knowledge of man, and of the physical, organic, social, moral, and intellectual laws on which his being is dependant.

The question of education is one the more it is thought about the deeper becomes its importance; in all ages the wise and far-seeing look to it as the source of true progress and moral elevation. Without education, man is the most helpless and miserable of all animals. With education, he becomes the noblest of all earthly creatures.

Regarding man then, in his cultivated state, it may be asked, how does he differ from the animals below him in the order of creation? In answer, we may observe, that man is endowed with intellectual capacities in a far higher degree than the lower animals; and with moral and religious sentiments, which they do not at all manifest.

Man alone seems endowed to any extent, with the faculty of reflection, which gives the power of bending the thoughts inward upon themselves, and by a sort of mental chemistry, creating new combinations of thought out of the knowledge obtained, through the medium of the senses. From this compound operation of the mind, he derives new motives to action, which increase in relation with his knowledge of external things.

The relations of the brute to the objects among which it is placed, have reference chiefly to the gratification of its bodily wants, and its preservation from injury or destruction. Its desires gratified, and unthreatened by danger, it falls asleep or remains at rest. But such is not the case with civilized man. With all his bodily wants gratified, and ample provision for every physical necessity, without the least apprehension of harm ; still, he is influenced by a class of wants far above those of his mere animal nature, which prompt him to observe objects and phenomena, and reflect on his own mysterious constitution, and its intricate relations. Not satisfied with the present, he ranges far into the dim, uncertain future, trying to judge of coming events in the world in which he dwells. But his expanding mind cannot stop here, he grasps at the universe and eternity.

This insatiable desire for knowledge, and the discovery of new truths, seems a special attribute of human nature, ever urging onward in the path of intellectual and moral advancement. The infant has scarcely become familiar with the light of heaven, or expression began to brighten its vacant eye, when it manifests curiosity in touching, tasting, smelling, and hearing, thus accumulating ideas of sensation to be afterwards compared, and worked up into new combinations of thought constituting the source of mental progress.

The education of man, comprehends all that conduces to the cultivation of his nature, to the highest state of perfection of

which it is capable. The human body may be viewed as a large assemblage of organs and faculties, possessing innate energy, and extensive spheres of action, each capable of being used or abused, according as it is directed. The extent of the range of these powers is a prime element in the character of man, and it is this which renders education so important.

The designs of education are to strengthen each organ and faculty that is weak, to restrain those which are too vigorous, and to store the mind with moral, religious, scientific, and general knowledge. Any scheme of education that does not provide for the physical, moral, and mental improvement of those placed under its influence, will do little towards human improvement. But before the desired effect can be produced, the system pursued must be in conformity with the constitution of the being whose improvement is intended.

Those who take upon themselves to devise a system for the general improvement of man, or in skilfully applying it, should be acquainted with his constitution; because without such an acquaintance it is impossible to become a successful educator. For an individual to rectify and improve a piece of machinery, it is obvious that he should understand its structure and principles. Now, to alter human nature for the better, we should know it as it is. Education should, therefore, be a system designed for a given purpose, and each human being should be specially trained and instructed in accordance with that purpose. General training and instruction do nothing more than improve general powers, while special training and instruction fit for some definite corresponding pursuit.

The term education is of more frequent occurrence than any other, but as respects its real meaning there is not one less understood; yet, every one supposes that he understands it, and the cry is loud for universal education. But no sooner is



the question put—"What is education?"—than we have answers in abundance, and many of them are so confused and complex, that no rational idea can be formed on the subject. Many, however, suppose that education consists of the cultivation of the intellectual faculties, and such is generally called the cultivation of the mind. But the idea, that they attach to the term "mind," is merely the mental powers which suppose man to possess only intellect, and that if this be cultivated he is educated. This notion of human nature is ill-founded. Man is not a mere intelligence. He possesses other faculties, which are termed animal propensities, and moral feelings. Now the education of these two classes of feelings is of such vital importance to the social and moral elevation of humanity, that we are persuaded that the mere statement will command the respect of every thoughtful mind.

The natural characteristics of human nature are that the animal propensities are first brought into action, and if not brought under the control of the moral and religious feelings they run to abuse. Hence, in educating the propensities, control is requisite; and stimulation, in training the moral feelings. This is in beautiful harmony with the mandates contained in the Bible, directed against the abuse of the propensities—"Thou shalt not kill." "Thou shalt not steal," &c. But the moral feelings are addressed in commands—"Thou shalt love the Lord thy God with all thy heart, and thy neighbour as thyself"—and are stimulated to acts of obedience by the most tender and powerful motives we can conceive—"Love one another as I have loved you." It is evident, that a much more extensive and definite knowledge is indispensable, than is generally possessed, of the being to be thus trained and educated. A moment's reflection will convince any one, that those who would undertake to educate a child with advantage, ought to understand the elementary principles, at

least, of that nature of which the child is a specimen. It will readily be perceived, that the mother would labor with greater advantage, in proportion as her knowledge extended into the nature of the little being placed in her charge. To what advantage would an artizan work in metals if he knew not their general properties? Should we not expect that he would work more skilfully and effectually, in proportion as his knowledge was exact as to the properties of that metal, and the relation in which they stood to the properties of other metals. The same rule applies to education, and no one can be well qualified for educating and training children without a knowledge of their nature.

As education relates to the operations of the mind as well as the body, it must be presented with some system of mental philosophy. Of all the systems we have examined, there is only one that we can either believe, or understand, and that is the Phreno-physiological.

The question as regards the utility of Phrenology and Physiology, in relation to education, is now commanding considerable attention. It will be readily admitted that whatever is true, is more or less useful. After due consideration of the practical utility of these sciences this question cannot be asked. Who can question seriously whether true and definite knowledge of our nature is useful? But how can our efforts at improvement be wisely directed, unless we are previously possessed of sound practical information as to the nature and power of the faculties of the mind, and the way that they are influenced and modified by the conditions of the body, during its various stages of development from infancy to manhood. Now, Phrenology and Physiology enable us to see clearly the want of a true scientific basis in the various theories of mental philosophy which have from time to time been propounded, and to substitute a rational, mental, and moral science that can be turned

to practical account; though the laws of moral science are found in the Bible, and are of that nature that can be practically developed. But Phrenology and Physiology point out what human nature really is, and show the adaptation of man to the moral laws contained in the Bible, and that man is the subject of them. We are thus presented with a beautiful system of the philosophy of morality and religion. Indeed, the practical importance of these sciences cannot be over rated to all who are called upon to influence and mould the character of others; but they are the most important to those who exert a controlling and moulding influence at the early period, when it is the most powerful, whether for good or evil. To parents, then, are they pre-eminently so, for to them is intrusted human nature in its most plastic state, and in the charmed circle, home. But it is to one parent, principally, on whom the moulding of character falls in early life, and that is the mother. To her, then, will the practical principles of these sciences be found most useful, and the strong instinct of parental love makes her desire to know any means by which she may be aided in the discharge of her responsible station.

One of the most important wants of the age is, to bring the government of the nursery into harmony with modern science. It is time that the improvement which our sheep and oxen have derived from the investigations of men of science, and the experiments of our stock traders, should be shared by our own children. Some may, however, be startled at the statement, but it is a fact nevertheless, that human beings are subject to the same organic laws as the inferior animals. No anatomist, no physiologist, no chemist will for a moment hesitate to assert that the general principles which rule over the vital processes in the inferior animals, equally rule over the vital processes in man. "Consider the fact from any but a conventional point of view," says an able writer, "and it will seem strange, that

while the raising of first-rate bullocks is an occupation on which men of education willingly bestow much time, enquiry and thought, the bringing up of fine human beings is an occupation tacitly noted unworthy of attention. **Mammas, who have been taught little but languages, music, and accomplishments, aided by nurses full of antiquated prejudices, are held competent regulators of the food, clothing, and exercise of children.**" It is high time that this disgraceful indifference to the rearing of human beings should have an end. "It is somewhat unaccountable," says Dr. Dick, "and not a little inconsistent, that while we direct the youth to look abroad over the surface of the earth and survey its mountains, rivers, seas, and continents, and guide their views to the regions of the firmament, where they may contemplate the moons of Jupiter, the rings of Saturn, and thousands of luminaries placed at immeasurable distance, we should never teach them to look into themselves; to consider their own corporal structure; the numerous parts of which they are composed; the admirable functions they perform; the wisdom and goodness displayed in their mechanism; and the lessons of practical instruction which may be derived from such contemplation."

## CHAPTER II.

### THE PHYSIOLOGY OF THE BEING TO BE EDUCATED.

THE period of childhood and infancy are those in which the human frame is the most susceptible of injury, and in which those influences causing disease exert the greatest power. The total of deaths in proportion to the number of births is a proof of this; and even those who survive infancy and childhood, disease is too often implanted by improper treatment at those periods. It is, therefore, of the highest importance to take every possible care of the health at the commencement of existence, if it is desired to attain old age free from disease. But the care of the health of children, at this early stage, devolves principally upon mothers, and they are bound by every principle of morality and religion to make themselves acquainted with those things on which the life and happiness of their own offspring, as well as themselves, mainly depend.

If we look upon the order of Nature, we see that the Creator has provided everything in the best possible way, and that the whole of creation is based upon the fitness of things; that the structure of all beings and each of their organs correspond with their functions, and that all shades and diversities of organization and their functional manifestations are in strict accordance with the laws which govern the fitness of things.

“Law,” says Blackstone, “in its most general and comprehensive sense, signifies a rule of action; and is applied indiscriminately to all kinds of action, whether animate or

inanimate, rational or irrational. When the Supreme Being formed the universe, and created matter out of nothing, He impressed upon that matter certain principles from which it never can depart, and without which it would cease to be. When He put matter into motion, He established certain laws of motion, to which all moveable bodies must conform."

"Every natural object has received a definite constitution, in virtue of which it acts in a particular way; there must, therefore, be as many natural laws as there are distinct modes of action of substances and beings, viewed by themselves. But substances and beings stand in certain relation to each other, and modify each other's action, in an established and definite manner, according to that relationship. Altitude, for instance, modifies the effect of heat upon water; there must therefore be also as many laws of nature as there are relations between different substances and beings."

Now, these individual natural laws, although innumerable, may be brought under three classes, namely—the Physical, the Organic, and the Moral or Mental.

The Physical laws embrace all the phenomena, or modes of operation of mere matter. For instance, an acid and an alkali, when brought in contact, neutralize each other; an acid applied to a vegetable blue, converts it into red; and these changes are said to take place according to chemical laws.

The Organic laws are the established modes of operation connected with the production, growth, health, decay, and death of animals and vegetables.

The Moral and Intellectual laws relate to all the manifestations of the mind.

The most striking features of the Natural laws, are, that they act independent of each other, and that they are universal and invariable in their operations.

We may strictly obey one set of laws, but that does not save

us from punishment for disobedience of the others. For example, we may strictly obey the Moral laws and do all in our power to promote the well-being of others ; but should we, in doing this, violate either the Physical or Organic laws, all our moral excellence will not preserve us from the penalties of such disobedience.

Our bodies are subject to the Physical and Organic laws, and so long as we act in strict accordance with those laws we enjoy health and happiness ; but every infraction of them produces a proportionate deviation from those states.

It may be said, that if men are ignorant of the Natural laws they cannot obey them. Now, although that is true, yet their ignorance will not exempt them from the penalties of disobedience. The first thing, then, to be done, is to acquire a knowledge of the Natural laws, and, so far as these relate to our subject, we will endeavour to make them clear to the reader.

Physiology is the science of the properties and functions of animals and plants. It is derived from the Greek *Phusis* Nature, and *logos* discourse.

Human Physiology treats of the laws by which the various functions in man are carried on.

Comparative Physiology treats of the functions of other animals than man, with the view to compare their structure with that of human beings.

Vegetable Physiology treats exclusively of plants.

The kingdom of nature is divided into organic and inorganic bodies. Organic are such as possess organs, on the action of which depend their growth and perfection. This division includes animals and plants.

Inorganic bodies are devoid of organs, or instruments. In this division are classed earths and metals, and other minerals.

Organic matter in general differs so materially from inor-

ganic, that the one can readily be distinguished from the other. In the organic world, the parts are mutually dependent on each other for support. Break the stem of a small flower, and it soon withers ; or girdle the bark of a tree, and it soon dies ; because it cannot receive support from the ascending sap. So in man, amputate his leg, or arm, and the vitality ceases, for the vessels communicating with them have been severed. With inorganic bodies the result is different. Break off a piece of stone, and it is exempt from those internal changes and effects which impair and finally destroy organic structure and arrangement.

Organized bodies always present a combination of solids and fluids ; the solids, differing in character and properties, are arranged into organs, which are endowed with peculiar functional powers, and so associated as to form of the whole a single system. The fluids contained in these organs hold such relations to the solids, that the existence, nature, and properties of both, mutually and necessarily depend on each other.

Every inorganic body consists wholly either of the solid or liquid, or gaseous form of matter ; and all parts are alike in structure and properties, and may exist as well when separated into parts as when united in a single mass. But whether solid, liquid, or gaseous, or composed of one or more of the chemical elements, the collection and arrangement of the atoms of matter, in every substance, takes place according to fixed laws, in a regular and determinate manner ; so that the intimate structure of each form of matter is always in accordance with its own nature.

Organized bodies increase in size by a process called nutrition, which consists in imbibing substances and converting them to their own nature, by means of internal organs. They have, within a certain range, their specific proportions, shape, and size, by which they are not only distinguished from



inorganic bodies, but specifically from each other. Inorganic bodies, on the contrary, increase in size, or change in shape, by the simple accumulation of matter to their surfaces. Thus it will be seen, that organized bodies augment in bulk from within, and inorganized bodies from without.

Though animals and vegetables derive their origin from pre-existing bodies of the same kind, and possess the functions of nutrition and reproduction, yet the animal kingdom is as distinct from vegetable, as the latter is from the mineral kingdom. The fundamental endowments which distinguish animals from vegetables, are *sensation*, and *voluntary motion*. The latter are destitute of these qualities. Another characteristic of animals, is a predominance of the fluid over the solid parts. This causes them to decompose sooner than the vegetables, and those plants which abound in fluids, decay sooner than those of a more fibrous, or solid texture.

Vegetables are nourished by the substances immediately around them—as air, water, and the saline properties of the soil. Their support is drawn from without, by absorption at the surface, or by means of roots. Animals, on the contrary, derive their nutriment from a great variety of sources. The aliments, previous to being absorbed and diffused through the different parts of the body, to afford nourishment to the organs, are received into an internal cavity, where they are prepared for nutrition.

It is a law of nature, that all organized bodies have a limited period of life, and this period, whether animal or vegetable, varies with every species. In some the period is limited to a single day, in many plants to a single summer; while some animals, as the elephant, live more than a hundred years; and some trees, as a species of oak and the olive, are supposed to live more than a thousand years. But this period of life is shortened by disease; yet, disease is under the control of

fixed laws, and seldom occurs to vegetable and animal in their native state; while man is subject to disease, and his life is rendered much shorter than its natural period. These diseases do not come by chance, they are the penalties of transgression of the laws of our being, which we are capable of understanding and obeying. If we carelessly burn, or bruise ourselves, pain and soreness follow; or if we take improper food into the stomach, we are warned, perhaps immediately, that we have done wrong. Sometimes, however, the penalty does not directly follow the sin, and it is afterwards very difficult to trace the effect to its true cause. It is then evident, that if we possess good constitutions we are responsible for most of our sickness. Bad constitutions, or hereditary diseases, are the result of the same law—the iniquities of the parents being visited on the children. How important, in this view of the subject, is the study of Physiology; for how can we expect to obey laws which we do not understand.

## CHAPTER III.

### THE SKIN.

SOME explanation of the structure and functions of the skin is necessary, to enable us to comprehend fully the importance of cleanliness, clothing, and the due regulation of temperature.

The skin is that membranous covering which extends over the whole surface of the body. In youth, and particularly in females, it is smooth, soft, and elastic. In middle age, and in males, it is firm, and rough to the touch. In old age, in persons who are emaciated, and about the flexions or bending parts of the joints, it is thrown into folds. The interior of the body, like the exterior, is covered with a skin, which, from the constantly moistened state of its surface, is named the *mucous membrane*.

The skin, to the naked eye, appears composed of one membrane; but it is shown, on examination, that it consists of two layers of membrane, widely different in structure from each other, and which perform very different offices.

The external layer of the skin is called the *CUTICLE*, from the Latin *cuticula*; it is also called the *epidermis* and *scarf-skin*. It is thin and semi-transparent, and resembles a thin shaving of soft, clear horn, and bears the same relation to other parts of the skin, that the rough bark of a tree does to the liber or living bark. The cuticle has no perceptible nerves, or blood-vessels; if it be cut or bruized, no pain is felt, and no fluid will ooze from it. It is the cuticle of the finger which is

pierced by the seamstress in the operation of sewing. The cutler shaves it on his hand to test the sharpness of his blade. It differs in thickness in different parts of the system. It is thin and delicate upon the internal bending parts of the joints, to the thickened covering of the soles of the feet. The greater thickness of the cuticle of the soles of the feet and the palms of the hands is manifestly the intentional work of the Creator ; for it is so in infants, at birth, before exercise can have any influence. Friction, if moderate and often repeated, will increase it in thickness, as may be seen in the hands of masons and smiths.

The cuticle is a sheath of protection to the highly sensitive skin, *cutis vera*, from the Latin *cutis*, the skin, and *vera*, true. The cuticle blunts the impression which causes feeling ; in some parts it is so dense and thick as wholly to exclude ordinary impressions. In the ends of the fingers, where the hard and dense nail is, the cuticle is modified for the purpose referred to. Were the nervous tissue of the *cutis vera* or true skin, not thus protected, every sensation would be unpleasant, and contact with external bodies would cause pain. The *cuticle* prevents disease by impeding the evaporation of the fluids of the true skin, and the absorption of poisonous vapors ; but it only affords protection to the system when unbroken, and then to the greatest degree when covered with a proper amount of oily secretion from the oil-gland.

The material of the cuticle is a fluid exuded by the blood-vessels, and distributed on the surface of the true skin as a thin layer. As successive layers are being formed on the exterior of the true skin, the external layers are converted into dry scales by the evaporation of thin fluid contents. These scales mainly form the thickness of the cuticle.

The cuticle is constantly undergoing a process of formation and growth at its under part, to make up for the wear that is

taking place continually on its surface ; so that a proper thickness of the cuticle is in this way preserved, which properly regulates the sensation of touch, and replaces the little scales which are constantly falling off from friction and washing, which is necessary not merely to the health of the skin, but to the entire body.

The cuticle, when examined chemically, is found to be composed of a substance resembling the dried white of egg, or albumen. It is soluble in alkalies, and these are the agents which are commonly used for purifying the skin. Soap is a compound of the alkali soda, with oil, the soda being in excess. When used in washing, the excess of soda combining with the oily fluid with which the skin is naturally covered, removes it in the form of an emulsion, and with it a portion of any adhering matter. The alkali softens and dissolves the superficial portion of the cuticle, and when this is removed the cuticle is free from all impurities. So that every washing of the skin with soap, removes the old face of the cuticle and leaves a new one ; and were this process repeated to excess, the cuticle would become so thin as to render the body sensible to a touch too slight to be felt through its ordinary thickness. When the accumulated impurities are rarely disturbed the sensibility of the skin is impaired. Hence, a proper use of soap is required to keep the skin in a clean and healthy state.

There is another point of view in which the cuticle is very interesting. The difference of colour between the blonde and the brunette, the European and the African, lies in the deeper, softer, and newly formed layers of the cuticle. In the whitest skin, the cells of the cuticle always contain, more or less, a peculiar pigment or colouring matter, incorporated with the elementary granules which enter into their composition. In the white races, the pigmentary tint is extremely slight, and less in the winter than in the summer. In the darker races,

on the contrary, it is deep and strongly marked. The various tints of colour with which the human race are marked, is owing to the amount of the colouring principle contained in the granules of the cuticles. In the negro, the granules are more or less black; in the European of the south they are amber-coloured; and in the inhabitants of the north they are pale and almost colourless.

The colour of the skin has relation to the energy of its action. In the tropics, where light and heat are the most powerful, the skin is stimulated by these agents to vigorous action, and the colour is very deep; while in the frigid regions, where both light and heat are feeble, the lungs, the liver and kidneys relieve the skin of a part of its duties. The same is the case in winter and summer. This law of colour applies to animals, birds, and vegetables, as well as to man, as may be seen by comparing the plumage of birds, the hues of plants and animals indigenous to the torrid zone, with those of the temperate and frigid zones. This colouring matter is called the *Rete Mucosum* or mucous coat of the skin.

The *cutis vera*, or true skin, performs two dissimilar offices, one as an organ of sensation, the other as a defence to the deeper parts of the body. That part which performs the office of sensation is the upper stratum or layer; the other office is performed by its entire thickness, but principally by its middle and deeper layers, which is that portion of the skin that is converted into leather by tanning. The sensitive part of the skin is a thin, soft, uneven layer composed of blood vessels and nerves. The unevenness of this layer is produced by little elongated, conical prominences, termed *papillæ*, which are arranged longitudinally in fine ridges, with a common centre, as seen on the palms of the hands and the fingers. As these *papillæ* exist in every part of the skin, their number is immense, but from their extreme minuteness they are imperceptible to

the naked eye ; yet, every *papilla* is composed in its structure of a minute artery, vein, nerve, and absorbent. In addition to these vessels, the *cutis vera* is supplied with oil-glands and tubes, and perspiratory glands and tubes.

The arteries and veins form a beautiful net-work upon the upper surface of the true skin. The larger arteries, which pass through the open meshes of the skin, are subdivided into innumerable minute tubes, called *capillary* vessels, a branch of which goes to each *papilla*, which opens into and terminates in a minute vein. By the agency of this wonderful and complicated system of vessels, the skin is supplied with the vast quantity of blood necessary to sustain its functions.

The minute capillary veins which accompany the capillary arteries are equally numerous. They receive from the arteries that portion of blood which has given up to the skin its nutritive properties, and has therefore become unfit for the healthy operations of the skin.

The circulation of the blood through the arteries and veins of the skin is the most energetic when the heart acts with vigour, and the system contains a proper quantity of healthy blood. The sickly paleness that we too frequently see in persons of close, protracted, sedentary habits, shows that the circulation of the blood is not going on properly. But let them ride, or walk in the open air, and their paleness soon grows into a carnation glow of health, from the arteries of the skin being supplied with a larger quantity of blood. When the brain and nervous system are in a healthy state, we readily see the difference in the flushed cheek of the person stimulated by hope and joyful expectations, with the paleness of the unfortunate person who is depressed by sorrow. The influence of the mind upon the circulation of the skin is seen in the instantaneous suffusion in blushing. There, the minute arteries of the skin, through which the lymph or white blood usually passes,

become suddenly dilated and filled with red globules of arterial blood. The skin requires a proper temperature to keep up the circulation of the blood, which is shown in the contracted and wrinkled appearance of the skin when exposed to cold, with the smooth, full, and increased colour that attends and follows the application of heat. When the skin is compressed by clothing or other means, the blood is prevented from passing through the minute arteries of the skin, as may be observed in the paleness produced when the skin is compressed by the finger or hand. On removing the pressure the colour returns, from the restoration of the circulation. The regular removal of the saline and oily matter that collects on the skin by washing, increases the action of the oil glands and perspiratory apparatus.

THE CUTANEOUS, OR NERVES OF THE SKIN are spread over every part of the sensitive layer of the true skin. As proof of this, no part of this skin can be punctured with a fine needle, without inducing pain. In some parts of the system, these nerves are more abundant than in others. Where the sense of feeling is the most acute we find the greatest number of these nerves, and those of the largest size. Those parts which are most exposed to injury are most sensitive. The *Conjunctiva*, or skin of the eye, is pained by the presence of a particle of dust, because without protection vision would soon be rendered imperfect. The lungs would also be injured by the smallest substance; they are therefore protected by the exquisite sensitiveness of the lining membrane of the *Trachea*, or windpipe, so that a particle of food or dust is ejected by a convulsive cough before it reaches the lungs; while the bones are not exposed to injury, they have, in health, scarcely any sensibility.

The cutaneous nerves are more numerous in the upper than in the lower extremities; and in greater numbers upon the palm than the back of the hand. They are likewise more abundant and larger at the extremities of the fingers, and in the lips, than



in any other parts of the body. The proboscis of the elephant, and the extremities of the tails of certain species of monkeys, have a greater supply of the sensitive nerves than other parts of their systems. In the small papillæ the nerve forms a single loop; while in papillæ of larger size the nerve is bent several times upon itself previous to completing the loop. These little loops spring from a net-work of nerves embedded in the upper porous layer of the true skin at the base of the papillæ. The net-work of nerves take their winding course through the fat at distended openings of the deeper layers of the true skin.

Now, these nerves are the medium through which all external impressions upon the skin are conveyed to the mind, just as a message is sent by the electric telegraph from London to Paris. But before the mind can receive correct information through these nerves, they must be in a proper condition to perform their true functions; and in the degree that they diverge from that condition, the mind receives imperfect messages. These nerves have no innate sensation in themselves, any more than the electric wires of the telegraph. If we cut the nerve that communicates between the mind and the hand or foot, all sensation is lost to the part, and it might be put in hot or cold water without the mind being conscious of the act. This was proved by an incident related by Dr. Jelloly, in the third volume of the *Medico Chirurgical Transactions*. A man who had been afflicted some years with a severe disease of a portion of the brain and spinal cord, was deprived of feeling in the lower extremities. He was directed by his physician to use a warm foot-bath. Intending to follow the directions given him, he immersed his feet in boiling water, which he supposed a proper temperature. While his feet were in the water he experienced no sensation of an unpleasant nature. On withdrawing them, he was astonished to find the cuticle separated

from the other tissues, by the effusion of water or serum, and thus producing a blister over the whole surface. Indeed, portions of our skin would suffer daily, were it not for the sentinel-like care exercised by these nerves. Impressions upon the skin are transmitted to the brain with the same speed and readiness as the communications of the electric telegraph. As the skin is continually exposed to the influence of destructive agents, it is important that the cutaneous nerves should be kept in a healthy state.

It is a law of the animal economy, that parts unlike in their structure, are different in their functional operations. This is shown in the different structure and functions of the eye and ear. As the nerves differ from the other vessels and parts of the skin in structure, so they differ in their use or function. An artery contains blood ; if its coat be broken the blood will flow from the wound. A nerve contains no blood, but it is the channel of communication between the parts upon which its minute filaments ramify ; and the brain is the centre of sensation and the seat of the mind.

The sensitiveness of the skin is effected by the healthy or unhealthy, the active or inactive, state of the brain. In sound sleep, the ordinary impressions made upon the skin are not felt by the person sleeping. Thus the arm may be blistered while sleeping, if it be exposed to the rays of the sun, and the individual will not be aware of it at the time. If there is compression of the brain, as when the skull is depressed, or disease of this organ in severe typhus fever, impressions made upon the nerves of the skin will not be noticed, as the operations of the mind are suspended under the circumstances.

The most extraordinary case of this kind within our knowledge, and one peculiarly interesting, is related by Sir Astley Cooper, in his Surgical Lectures.

A man, by the name of Jones, received an injury of his head,

while on board a vessel in the Mediterranean, which rendered him insensible. The vessel, soon after the accident, made Gibraltar, where Jones was placed in the hospital, and remained several months in the same insensible state. He was then carried on board of the Dolphin frigate to Deptford, and from there sent to St. Thomas's Hospital, London. He lay constantly on his back, and breathed with difficulty. His pulse was regular, and each time it beat he moved his fingers. When hungry or thirsty he moved his lips or tongue. Mr. Cline, the surgeon, found, on examining the head, a portion of the skull depressed; he removed the depressed portion. Immediately after this operation the motion of his fingers ceased; and at four o'clock in the afternoon, (the operation having been performed at one,) he sat up in bed; sensation and volition returned, and in four days he got out of bed and conversed. The last thing he remembered was the circumstance of taking a prize in the Mediterranean. "From the moment of the accident, *thirteen months and a few days*, oblivion had come over him, and all recollection ceased. He had for more than *one year* drunk of the cup of Lethe, and lived wholly unconscious of existence; yet, on removing a small portion of bone which pressed upon the brain, he was restored to full possession of the powers of his mind and body."

In the principles of Military Surgery, by John Hennen, a case is mentioned of a man at the battle of Waterloo, who had a small portion of his skull beat in upon his brain to the depth of half an inch. This caused volition and sensation to cease, and he was nearly in a lifeless state. Mr. Cooper raised up the depressed portion of bone from the brain, and the man immediately arose, dressed himself, became perfectly rational, and recovered rapidly.

THE VARYING HEALTH OF THE BRAIN USUALLY DEPRESSES OR INCREASES THE SENSITIVENESS OF THE SKIN.—This is

seen in grief and fear, which diminish, while hope and joy increase the impressibility of this tissue. It is not uncommon to see the unfortunate insane endure exposure to heat and cold with seeming impunity; whereas it would induce insupportable suffering to the sane person. Diseases of the heart, stomach, and lungs alter the condition of the brain, and modify, to a greater or less extent, the sensitiveness of the skin.

THE STATE OF THE CONDUCTING NERVOUS TRUNKS INFLUENCES THE SENSITIVENESS OF THE SKIN.—If a nervous trunk is compressed or divided, the parts supplied by nervous filaments from the nerve will be insensible to the impressions made upon them, and such impressions are not transmitted to the mind.

THE QUANTITY AND QUALITY OF THE BLOOD MODIFY THE SENSITIVENESS OF THE SKIN.—If the quantity of blood be diminished, the sensibility of the skin will be impaired. This is shown by the effects of cold upon the skin, which contracts the blood vessels and drives the blood from the skin, and causes it to be pale and shrivelled in appearance. If the skin be wounded while under the influence of cold, little or no blood will exude from the wound, and little pain is felt. The chilling and contracting influence of cold upon the skin can be carried so far as not only to deprive the part of sensation, but of life.

The influence of the blood upon the sensibility of the skin is experienced when chilled hands or feet are suddenly exposed to heat. The nerves, by the sudden dilation of the contracted blood-vessels, are put into vivid and rapid motion, which causes the painful and tingling sensation that we experience. Indeed, in every part of the system, sudden changes produce unpleasant sensations, and frequently a diseased condition of the organs. *It is, therefore, the most safe that changes should be gradual.* When the hands, or other portions of the body are frozen, or severely chilled, safety and comfort demand

that circulation be invited to the parts by moderate exercise in a cool room ; because immersing the parts in warm water, or holding them near the fire, causes pain, and frequently destroys the vitality of the limb. If the blood is impure, the sensibility of the skin is impaired.

When the cuticle has become thick and hard, like horn, impressions on the *cutaneous* nerves are modified. The mason, and others of similar trades, are enabled to use their tools without much suffering, because the thickened cuticle on the hands diminishes the impressions made upon the nerves. But a person not accustomed to such manual labour, the cuticle on the hands would be too thin to protect the parts below from becoming irritated and inflamed ; so that pain and blisters would be the result.

THE SENSIBILITY OF THE CUTANEOUS NERVES IS MODIFIED BY BEING HABITUATED TO IMPRESSIONS.—For example, if an individual should immerse his feet into moderately warm water, at first it might induce a smarting sensation ; in a short time the nerves would not only become habituated to the warm water, but the warmth might be considerably increased. The same result follows if an individual be exposed to cold. The impressions at first are very disagreeable, but as soon as the nerves become accustomed to the surrounding atmosphere, they will impart the most agreeable sensations. In illustration of this, let a person from the tropical regions go to a colder climate, and the cold will at first effect him unpleasantly ; but, after a few days exposure to the cooler air, the sensation will not be so disagreeable. On the other hand, let a person enter a room moderately heated ; gradually increase the temperature until it attains extreme summer heat, not only the cutaneous nerves, but the whole system becomes habituated to the high temperature. These facts show that the sensations are not always a correct index of the real temperature. A well-

adjusted thermometer is the agent that will indicate it with unerring certainty.

THE CUTANEOUS ABSORBENTS are very numerous, and so minute that they cannot be seen with the naked eye. But when these hair-like tubes are injected with quicksilver, the surface injected resembles a sheet of silver. In this way their existence can be shown. They are called *lymphatics*, from the Latin *lymp̄ha*, a colourless fluid. They are a part of the vascular net-work, situated upon the upper portion of the true skin. Each papillæ is supplied with an absorbent filament, the mouth of which opens beneath, and lies in contact with the under surface of the cuticle. This absorbent net-work communicates through the open meshes of the true skin with larger lymphatic trunks, that open into the nervous system.

The process of absorption is carried on with great vigour when the skin is in certain conditions. It is considered the most vigorous when the cuticle is removed by blistering ; as external application is then brought in close contact with the orifices of these vessels, and by them rapidly imbibed and circulated through the system. Thus arsenic applied to these vessels of the skin, and strong solutions of opium to extensive burns, have been absorbed in quantities sufficient to poison the patient. Frequently serious results follow from the poisonous matter from the bodies of persons subjected to post-mortem examinations being brought in contact with the abraded cuticle, and through the agency of the absorbents conveyed into the system. If we puncture any part of the cuticle with the finest needle, that has on its point the smallest conceivable quantity of the *vaccines virus*, or small-pox matter, it will be brought into contact with the absorbent vessels, and through their agency conveyed into the system. The result is, that persons thus operated upon have the small-pox.

It is then evident that it requires great care that the cuticle

should not be broken when removing the skin of animals that have died of disease of any kind, or in handling sick or dead persons ; safety and health require this caution. We should observe the same caution when exposed to poisonous vapours. It would be beneficial to tanners, and to those who handle substances that may contain poisonous matter, to have definite information on this subject. We have known many instances in which persons have had poisonous matter introduced into their systems through small ulcers upon their hands or fingers. From these sores there would be seen small red lines extending up the arm. These swelled tracts indicate an inflammation of the large absorbent trunks, that have been irritated and deranged by the passing of poisonous matter through them into the system.

In accidental wounds it is best, immediately, to bathe the part in pure water, and avoid all irritating applications. When shrouding, or removing the skin of animals that have died of disease, it would be well to rub the hands over with olive oil or lard. By so doing the small portions of the skin, from which the cuticle had been removed, would be protected. In all cases, where there is an ulcer or sore, the part should be covered with something impervious to fluids, before exposing the system to animal or mineral poisons. When any poison comes in contact with the cuticle, broken or unbroken, the oily matter rubbed on the hands and the poison that may have adhered, may be removed with soap and water.

When the digestive organs are in a diseased state, so that food cannot be given with propriety, cutaneous absorption increases. It also increases when the digestive organs are healthy, when a due amount of food is not taken at proper intervals.

It is a law of organized bodies, that they act most effectually when excited to action by an appropriate stimulus. Action is

induced in the organs of our system by different stimulants. One set of vessels in the skin is excited to action by the stimulus of blood; another set by moisture and warmth; a third by a warm and dry state of the skin and air. Now, the practical importance of attending to these facts is very great, particularly in diseases that may be communicated from one person to another. For example, those of the family who are in good health, and others whom humanity calls to perform the offices of nurses or watchers, should be prevented from contracting the disease. Formerly the attendants were excluded from all intercourse with others; decoctions of bitter herbs and alcohol were used by them; tobacco was chewed, smoked, and snuffed. But these practices avail but little, as the poisonous matter generated in the organs of the diseased persons, is conveyed into the system of the attendants, by the absorbents. Tobacco and alcohol do not diminish the activity of these vessels.

To diminish the activity of the absorbents, so that persons may enter the sick room with comparative safety, may be induced by observing the following directions:—

1st.—The stomach should be supplied with nutritive and digestible food, in proper quantities, at proper times, and at stated periods. The chyle formed from the food stimulates the lacteals of the digestive organs, which activity is attended with an inactive state of the absorbents of the skin and lungs.

2nd.—The skin and the apparel should be kept dry, and frequently changed; and the apartment of the sick well ventilated. If due attention be not paid, the apparel and the air of the room will be moistened by the exhalations of the skin and lungs. This exhalation may contain a poison of greater or less power, according to its quantity and degree of concentration, and may be absorbed and re-conveyed into the system, causing inflammatory diseases, and not unfrequently death.



3rd.—The skin and clothing should be frequently washed with soap and water, as well as the furniture of the apartments. This will remove the poisonous matter that may be deposited upon the skin and garments, which, if suffered to remain, might be conveyed into the system by the action of the absorbents.

By taking a due quantity of food at proper periods, keeping the skin and clothing in a clean state, we may visit unhealthy districts with less liability to contract disease.

We will now consider the nature and use of the Oil Glands of the skin. The apparatus for keeping the surface of the skin bedewed with an oily fluid, consists of small tubes which traverse the cuticle, and enter the true skin, where they terminate in small glands. In some parts they are wanting; in others, where they are most needful, they are abundant: as on the face and nose, the head and ears. In some parts these tubes are spiral, in others straight. Indeed, they offer every shade of complexity, from the simple straight tube, to a tube divided into numberless ramifications, and constituting a little, rounded, tree-like mass, of about the size of a millet seed.

These small glands are worthy of particular notice. In some situations, as in the eyelids, where they possess great elegance of distribution and form, and open by very small pores along the lids; in the ear passages, where they produce that amber-coloured substance, known as the wax of the ears; and in the scalp, where they resemble small clusters like grapes, and open in pairs into the sheath of the hair, supplying it with a pomatum of nature's own manufacturing.

These are derived from the blood which flows through the capillaries or tubes of the oil glands, water, salts, and an oil partly free and diffused, and partly mixed with albumen or white of egg. When the cells are full they give up the fluid

they contain, which passes along the tubes to the surface of the skin, and constitutes the oily matter of its economy. The use of this oil is for the defence and protection of the skin. In the exercise of these offices, it is diffused over those parts of the skin which are exposed to the changes of the temperature and moisture, as the nose, face, and head; to prevent from injury those parts where the surfaces rub together, as joints; to counteract the effect of acids, as in the excoriations to which infants are liable. It prevents the evaporation and congelation of the water of the cuticle, which would cause it to become parched and peel off, leaving the sensitive skin exposed. It is poured out in such quantities along the edges of the eyelids that it is necessary to confine the moisture of the eye within the lids. It protects the skin from the irritation of that fluid, and prevents the adhesion of the lids. It preserves the membrane of the drum of the ear and keeps the passage moist, while its bitterness prevents the intrusion of insects.

To insure the healthy action of the oil glands, it requires the blood of the system to be pure, and the skin free from the scales of the cuticle, and other waste matter, by the frequent use of soap and water. These substances upon the cuticle prevents the free use of the oil glands by obstructing the opening of their tubes, thus preventing these glands from purifying the blood in their vital capacity.

Long-continued and often-repeated use of strong soaps or alkalies is injurious, as too much of the oily secretion will be removed from the skin and the oil tubes, as is shown in the hands of the washerwoman.

The animalcula of the skin are found in the oil tubes. In some persons there is a disposition to the unnatural accumulation of their contents. They are found in numbers varying from two to twenty in each tube. To prevent their undue accumulation, or where such an accumulation already exists,

the most effectual remedial means are systematic washing, with friction of the skin, and proper and adequate clothing.

It is by the agency of the oil and perspiratory glands that the exhaled matter, which is carried off through the skin, is separated from the blood. The *perspiratory apparatus* consists of small cylindrical tubes, which pass inward through the cuticle, and terminate in the deeper meshes of the true skin. In their course, each little tube forms a beautiful spiral coil; and on arriving at its destination, coils upon itself in such a way as to constitute a little oval-shaped or globular ball, called the perspiratory gland. The opening of the tubes on the surface of the skin are the pores.

“To arrive at something like an estimate of the value of the perspiratory system in relation to the rest of the organism,” says Wilson, “we counted the perspiratory pores on the palm of the hand, and found 3,528 in a square inch. Now each of these pores being the aperture of a little tube, about a quarter of an inch long, it follows that in a square inch of skin, on the palm of the hand, there exists a length of tube equal to 882 inches, or 73½ feet. Surely such an amount of drainage as seventy-three feet in every square inch—assuming this to be the average for the whole body—is something wonderful; and the thought naturally intrudes itself—What if this drainage be obstructed? Could we need a stronger argument for enforcing the necessity of attention to the skin? On the pulps of the fingers, where the ridges of the sensitive layer of the true skin are somewhat finer than in the palms of the hands, the number of pores to the square inch was 2,268, and the length of the tube 567 inches, or 47 feet. To obtain an estimate of perspiratory tube of the whole surface of the body, I think that 2,800 might be taken as a fair average of number of pores in the square inch, and consequently 700 the number of inches in length. Now the number of square inches of

surface in a man of ordinary height and bulk is 2,500 ; the number of pores, therefore, 7,000,000 ; and the number of inches of perspiratory tube is 1,750,000, that is, 145,833 feet, or 48,600 yards, or nearly TWENTY-EIGHT MILES. To the medical reader, it may be necessary to explain that the sebaceous system, or oil glands and tubes, is included with the system of perspiratory glands and tubes."

The exhaled matter amounts to a considerable quantity daily. Sanctorius experimented upon himself for more than thirty years, weighing himself, his food, and the excretions thrown out daily. He estimated that five of every eight pounds of food and drink passed from the system through the outlets of the skin. Many place the estimate much lower ; but all physiologists concur, that from twenty to forty ounces of matter pass off from the skin of an adult, in the form of insensible perspiration, every twenty-four hours. To prove the existence of this exhalation, take a bell glass, and let the hand, perfectly dry, be introduced into it, at the same time close the mouth by winding a napkin about the wrist, in a short time the insensible perspiration from the hand will be seen deposited on the inside of the glass. At first, the deposit is in the form of mist ; but if the experiment be continued a sufficient time, it will collect in drops. This perspiration contains the useless matter which is carried out of the system by the perspiratory glands, and is one of the channels by which the excess of water is removed from the blood. The waste matter from the bones, muscles, &c., is replaced by newly-prepared atoms from the food. Thus, there is a constant decay and renovation of the system.

As the health of the system depends upon the proper action of these glands, the appropriate stimulus of them should be known. We may therefore observe :

1st.—That they act with the more vigour the first three

hours after eating, than the three hours following. This shows that the system should be supplied with food in proper quantities at regular intervals.

2nd.—That they are more active during sleep. This points out the regularity in the hours of repose, as well as strict attention to the thorough ventilation of the bedding, after being slept in.

3rd.—That the clothing should be dry, porous, and loosely worn ; so that the watery part of the waste matter may escape freely. This fluid, however, contains about one per cent. of solid matter, and if not removed from the skin by bathing and friction, the mouths of the pores become obstructed, and the health affected.

4th.—That sudden exposure to cold should be carefully avoided, as the skin contracts and impedes the proper action of the perspiratory glands, and the free escape of perspiration.

The effect of the contraction by exposure to cold may be observed on the surface of the skin in the great number of conical projections named *cutis anserina*, or goose skin, which are supposed to be produced by the contraction of the vessels in the skin forcing out their contents, which diminishes their bulk, while the papillæ do not contract in the same degree, and are therefore projected, as seen in goose skin.

The temperature of the system is modified and regulated by the evaporation of fluids from the skin and lungs. The human body, however, is nearly the same temperature under every variety of circumstances, whatever difference may be that of the air surrounding—whether in the polar region or in the torrid zone. This property is peculiar to life, and in consequence of which we have the power of modifying our own temperature. Without this power of adaptation, man must have been confined for life to the climate of his birth, and also have suffered constantly from the changes of the seasons. But he is enabled

to retain life in a temperature that will freeze mercury, and sustain, for a time, a degree of heat that would bake meat. It has been observed in all ages that the increased heat of the skin in fevers is abated by free perspiration. The disagreeable sensation of heat that we feel in the sultry days of summer is greatly relieved by free perspiration. Heat is abstracted from the system to convert the watery part into vapour. Thus the evaporation reduces the temperature of the system, and produces the grateful sensation of coolness. This free perspiration produces a corresponding appetite for drink, to repair the waste of the fluids. Another mode of reducing animal heat in very warm weather, may be noticed in dogs with their tongues lolling out of their mouths, and covered with frothy secretions. The skin of such animals does not perspire as much as that of a human being; hence, the tongue performs the office of the skin in regulating the heat of their systems. Burning head-aches are relieved with warm vinegar and water, on the principle of evaporation of fluids, which imparts a cool, comfortable feeling. Warm fluids applied to the skin, in stages of hot fever, produce the same result. If we are thrown into a profuse perspiration, by violent exercise, we feel little or no inconvenience from the dampness of the skin and clothing as long as we continue the exercise; because heat is generated by the increased circulation of the blood, to replace the amount abstracted from the system by the free perspiration. But as soon as we discontinue the exercise, the increased circulation of the blood subsides, and with it the extra amount of heat generated. Hence, the chill we experience when we allow the damp clothing to dry on the body after the exercise.

Now, when the clothing has become wet, it is best to change it as soon as possible, and rub the skin dry with a towel, till reaction is produced. If not convenient to change the clothes immediately, the exercise should be gradually

abated, that heat may be generated sufficient to dry the skin and clothing without a chill. Colds are not contracted by excessive exercise, but by injudicious management afterwards. Therefore, under such circumstances, sitting in currents of air and cool shades, should, by all means, be avoided.

Many chronic coughs are produced from the perspiratory system being suddenly checked. Many cases of dyspepsia, head-ache, and diarrhoea originate in this way. In a person whose lungs are weak or diseased, a chill will cause an irritation, and often inflammation. It is a fact, that should be borne in mind, that if any one organ in the system is in a weak condition, that organ is more susceptible of disease than others.

It may also be well to remember that between twenty and forty ounces of waste matter pass through the outlets of the skin every twenty-four hours. It is, therefore, important that this excretion be maintained with steadiness and regularity. Because when the free action of the perspiratory glands is suppressed, all the different organs will suffer, and become diseased by being overcharged with waste matter that should have been carried from the system. But to maintain a healthy action of the apparatus of the skin it will require attention to clothing, diet, exercise, respiration, bathing, light, and air.

WITH REGARD TO CLOTHING, it does not in itself bestow heat, but is useful in preventing the escape of heat from the body, and in defending it from the temperature of the atmosphere. It is then important that the materials used for clothing should be bad conductors of heat; that is, they should have little tendency to conduct or remove heat from the body, and should also possess the property of retaining what heat they receive. The property of retaining heat depends on the power of the materials retaining in their meshes atmospheric air. In this way, FURS contain a greater amount of air than any other

material, and on that account they are better adapted for articles of dress, than any other material, for those who are exposed to changes of heat and cold. WOOLLEN CLOTH retains more air in its meshes than any other article, except furs : and its comparative cheapness renders it the best for clothes for all classes of persons. The important service of flannel, in cold seasons, in preventing colds and rheumatism, as well as its great utility in the warm seasons, in protecting the system from the chills at evening, that induce diarrhœa and dysentery, is well known. The general use of flannels among children and delicate persons is well understood to be a preventative of the complaints at the various seasons. COTTON contains less air in its meshes than woollen, but more than linen. In texture it is smoother than woollen, and less liable to irritate the skin. When flannels irritate the skin they should be lined with cotton. SILK contains a considerable amount of air in its meshes, and does not irritate the skin. When the fabric is of sufficient thickness it is a good material for clothing. There is one important feature that should always be kept in view in making choice of materials for clothing, and that is, that the materials should be as destitute as possible of the property of absorbing and retaining moisture. Because moisture renders the clothes a good conductor of heat, and retains less heat than when dry. If the perspired fluid and the materials it holds, in solution, are readily absorbed by the clothing, they become sources of irritation to the skin, with which they come in contact. Linen is a poor article for clothing, not only on account of its being a good conductor of heat, but it absorbs the fluids carried from the system by the agency of the oil, and perspiratory glands. If then, clothing is made of linen, the body is surrounded by a layer of moisture in place of dry atmospheric air. This moisture still further increases its power to conduct heat from the body, and on that account renders it more objectionable



as an article of clothing. Now, cotton, woollen, and silk clothing do not readily absorb the transpired fluids of the system and the moisture of the atmosphere. They are, therefore, better suited for clothing than linen.

It should be remembered, that the skin is not only the agent through which the waste of the system passes, but that it exercises great influence in respiration, in receiving oxygen through its tissue, and giving back carbonic acid gas in return. The clothing should then be of a porous character, so as to permit free transpiration from the skin to be readily conveyed to the surface. The importance of this is illustrated in the Mackintosh over-coat, which retains the perspiration, and the residual matter is left in contact with the skin, and re-conveyed into the system by the absorbents, causing head-ache and other diseases. Woollen and cotton fabrics are not only non-conductors of heat, but they are porous, and therefore, well adapted for the free transmission of perspiration. The clothing should be worn loose, so that a warm layer of air may be constantly in contact with the body. Every one is aware that a loose dress is much warmer than one that fits tight. Loose fitting gloves, boots, or shoes afford more warmth than tight ones. The reason of this is very plain: the loose dress encloses a thin layer of air, which the tight dress is incapable of doing. All that is required in the loose dress, is, that it should be closed at the upper part, to prevent the warm air from escaping by the ventilating current which would be established from below. In this way, additional layers of dress maintain a series of layers of warm air within our clothes. Hence, the advantage of putting on a defensive covering, some little time before leaving a warm room, to go into the cold air. The layer of air which we carry with us under the garment may be sufficiently warmed by the heat of the room, and not borrowed from our bodies, as it would be, by putting

on the defensive covering in the cold air, thereby causing a chill.

The clothing should be suited to the temperature of the climate and the condition of the individual. Care should always be taken to wear sufficient to maintain an equal action of the skin, without causing too great action of the cutaneous vessels; because such inordinately increased action would not only debilitate the skin, but the internal organs, as the lungs and the stomach. The quantity of clothing required by different individuals will vary; consequently, *no rule* can be laid down *as to quantity*. For example, those persons with large chests, well-developed lungs, healthy stomachs, and active brains, who take sufficient food to supply the wants of the system, more heat will be generated, and they will require less clothing than those of an opposite character. The heat generated in a child is less than in an adult, owing to the vital forces of the child being feeble. Experiments have proved that heat in warm-blooded animals is at its minimum at birth, and increases successively to adult age; and that young children part with heat more readily than adults, and instead of being warmer are generally a degree or two colder. The system of "hardening" children by an inadequate supply of clothing, and keeping them cold throughout the day, is in every sense of the word injudicious, and nothing but the *most pitiable ignorance* of the laws of health could lead any one to act towards a child with such inhumanity.

Another prevalent error is, to suppose that the constitutions of children are fortified by bathing infants in cold water, even in winter. The circulation of the blood of infants is almost wholly cutaneous, and any severe impression of cold upon their highly sensitive and vascular skin destroys its natural distribution, producing bowel complaints, inflammations, and convulsions; which, if they do not destroy life, at least

weaken the constitution, and prepare it for the reception of disease.

To make children robust and active, they must have nutritious food at stated hours, free exercise in the open air, and a due amount of clothing to protect their systems from cold and chills.

Less clothing is required when the skin is kept clean by frequent washing and bathing, than when it is unclean. The impurities on the skin obstruct the perspiratory ducts, and diminish the action of their glands; causing less heat to be generated. The feet and hands for this reason are less liable to become chilled or frost-bitten when clean, than dirty.

The generation of heat in the system is diminished when the brain, lungs, or the digestive organs are diseased, which is observed in dyspepsia, head-aches, and consumption. Persons having these complaints, need more clothing when exposed to cold air, than those who are free from them.

Those whose habits are active require less clothing than those whose employment is sedentary; because the increased circulation of the blood, by exercise, causes more heat to be generated, and warmth felt, throughout the system. More clothing is required when riding, than when walking; because the exercise is greater in walking, than in riding. A greater amount of clothing is required when resting from laborious exercise. For the same reason more clothing is required during sleep, as not only the action of the body is suspended, when sleeping, but that of the brain. The practical rule is, that when we *cease exercise*, increase the *amount of clothing*.

It is well known to common experience, that the sensibility of the skin to the influence of cold is greatly modified by habit. Those who have been habituated to a warm climate, or a warm room, suffer more when exposed to cold, than those who have been accustomed to colder air. Hence those whose pursuits

are followed in rooms of warm temperature, should wear more clothing when exposed to cold air, while walking or riding, than those who labour in a cooler atmosphere; because, the warm temperature does not only increase the sensitiveness of the skin, but reduces the tone and activity of the digestive, respiratory, and nervous systems, which diminish the means for generating heat; and which is an additional reason for a demand for more clothing during exposure to a cooler atmosphere.

For the same reason we require more clothing in the evening, than during the day. In the evening we have less vital power; the atmosphere is damp, and the skin has become damp from free perspiration. This also shows the importance of an extra garment being provided to be worn on returning from crowded assemblies. The skin then is not only more moist, by the dampness of the air, in such assemblies, by perspiration, but it is rendered more sensitive. If the system, however, be chilled, on arriving at home, warmth should be restored as speedily as possible. This may be done by friction with warm flannels, and the using of a vapour bath. By this means the bad effects of the chill will be prevented before any disease is fixed upon the system. Is it not then the duty of parents—in fact, of all who have the care of children—to learn these facts, and see that the rules are not only learned, but reduced to practice?

Now, as regards clothing. It should be borne in mind that no article of dress is entirely free from absorption; even wool and cotton possess it to a considerable degree. They take up a portion of the transpired fluids, which contain saline and animal matter, with which the fibres of the garments become imbued, which diminishes the porosity of the clothing, and its power of conducting heat from the system. This residual matter with which the clothing is coated, is brought in contact

with the skin, causing irritation of its surface, and re-absorption of the moist matter thrown off from the system. Hence, to keep the system in a proper state of warmth and health, requires cleanliness of the clothing, and particularly those worn next the skin, which require frequent and thoroughly washing; and it should not be forgotten, in regard to children, that their blood circulates with greater rapidity than that of adults, proportionately throwing off a greater amount of waste matter from the system.

In a bed that has been occupied, the bedding has become imbued with the waste matter thrown off from the system through the skin, which is most abundant during sleep; and which should be removed and washed, or well aired, by the sheets and blankets being thrown over chairs, some hours, with the doors and windows open. If this is not done, the moist bedding will cause a chill or a cold to the system of the next occupant, and the moist matter with which the bedding is charged, will be carried into the system by the action of the absorbents. In this way, diseases of a disagreeable nature are frequently contracted. This fact should be instilled into the minds of all females.

When it is necessary to change dress from thick to thin, it should be done in the morning, when all the vital forces are in full play. How many young people have laid the foundation of disease by disregarding this rule? Many a young lady has contracted a fatal disease in exchanging the thick home dress and woollen stockings for the flimsy dress, deemed suitable for a party or the ball-room. It should then be remembered that sudden changes in dress, as well as in food and general habits, are attended with hazard; and this in proportion to the weakness of the system when the change is made.

**BATHING.**—The utility of water to man cannot be over-rated. It is, perhaps, the most necessary to his well-being and

happiness of any of the gifts of a wise Creator. Baths and bathing have been held in high estimation from the remotest ages. Baths were, by the ancients, dedicated to the divinities of medicine ; and the use of water has been enforced as a religious observance, and adopted as one of the symbols of the Christian religion.

The necessity of bathing is clearly shown in the structure and purposes of the skin. It has been before observed that the cuticle is cast off in small powdery scales. Now, these mingle with the oily and saline products of the skin, and form a thin crust. This crust is adhesive, and collects particles of soot and dust from the atmosphere, and particles of matter from our dress, so that in the course of the day the whole body has become coated with impurities. If this coating, then, be allowed to remain till it becomes thick, and established upon the skin, the following effects will be produced :—

The pores of the skin will be obstructed, and perspiration checked ; and the influence of the skin as a respiratory organ entirely prevented. Thus, with perspiration checked from obstructed pores, the poisonous elements which are thrown off in the fluids perspired, will necessarily be retained in the system if not removed by the lungs, kidneys, liver, and intestines. But if these organs are called upon to perform the offices of the skin as well as their own, the healthy balance of action is destroyed, and the individual becomes the prey of disease.

Bathing is useful for three purposes :—to promote cleanliness, to preserve health, and to remove disease. Water and soap enable us to remove the coating of impurities from the skin. This is effected by the water dissolving and holding in solution the saline matter, and the soap mixing with the oily product of the skin. Soap and water, then, are indispensable agents for removing the impurities which adhere to the skin.

Indeed, in no other way can the substances on the skin be thoroughly removed.

If, after the use of soap, any unpleasant sensations are felt, they may be removed by washing the surface with water slightly made acid with lemon juice or vinegar.

Water may be used cold, temperate, tepid, warm, or hot. A person may apply it to his system with a sponge, or it may be poured over him, or he may immerse himself in it. The simplest mode of bathing, is to apply water to a small extent of surface, by means of a wetted sponge, and after being wiped dry, again cover with the dress. In this way the body may be soon subjected to the influence of water, and to no less useful friction. The water used may be warm or cold. This mode of bathing may be practised by any invalid, and always with benefit, if the bathing produces a glow of warmth over the surface—as this is the test by which all forms of bathing is to be estimated. The bather may stand in a shallow tub, while he receives the water from a sponge squeezed over the shoulders or against the body. In this form of bathing the person is more exposed; it is, therefore, less suitable for very feeble individuals, than the first-named method. In the early use of the sponge, the bather should content himself with a single effusion of water from the sponge, and then dry the body quickly with brisk rubbing.

Another mode of bathing is the shower-bath. This provides a greater effusion of water than the sponge bath, combined with a greater shock to the nervous system. The concussion on the skin by the fall of water, particularly distinguishes this mode of bathing from that of the sponge. The degree of concussion is modified by the size of the holes through which the water issues, and the height of its fall. This bath admits of modifications and adaptation to the most delicate, as well as the robust. The extent of fall, the size of the apertures,

the quantity and temperature of the water, may be regulated at pleasure. It would, however, be judicious in using the shower bath to commence with warm water, for which, by degrees, cold may be substituted. In this way the system may be trained to the free use of cold water. After bathing, the skin should be wiped dry and briskly rubbed.

Another form of bathing, is that in which the body, or a portion of it, is immersed in water. The temperature of the water may be modified to suit the sensations of the bather. This mode of bathing is designated according to the heat of the water. When the temperature is below 75 degrees, it is termed a cold bath; when from 75 to 85 degrees, a temperate bath; from 85 to 95 degrees, a tepid bath; from 95 to 98 degrees, a warm bath; from 98 to 105 degrees, a hot bath. In using this kind of bathing, the skin should be wiped perfectly dry and briskly rubbed. The length of time that a person may remain in a cold bath, with benefit, varies from two to ten minutes; while a person may remain in a temperate, tepid, or warm bath from ten to thirty minutes, or until special indications are exhibited.

In order to increase and promote a re-action of the skin, various processes are resorted to, some of which are practised in the bath, and others after quitting it. The process of rubbing and brushing the skin are most common and important. The friction of the skin with flesh brushes or hair gloves, before taking the bath, will be found of great practical benefit, as well as friction on quitting the bath. In short, this friction with flesh brushes should never be omitted.

Bathing preserves and promotes health by its immediate and remote physiological effects on the system. When the body is wetted with cold water from the sponge or shower bath, the skin instantly shrinks, and the whole of its tissue contracts. This contraction diminishes the capacity of the cutaneous



system of the blood-vessels on a portion of the blood circulating through them, which is suddenly thrown upon the deeper parts of the internal organs. The nervous system, among others, participates in it and is stimulated by it, and communicates its impression of stimulus to the whole system. This causes a more energetic action of the heart and blood-vessels, and a consequent rush of blood back to the skin. This is termed *re-action*, the first object and purpose of every form of bathing. It is the test of its utility and safety. This re-action is known by the glow of warmth and comfort which follow the bath. The bather should direct all his care to ensure this effect. By it the internal organs are relieved, respiration is lightened, the heart is made to beat calm and free, the mind is clear and vigorous, the tone of the muscles increased, the appetite is sharpened, and the whole system invigorated. This is the end and aim of the bather, and to this all his training tends. The great error is to expect results, without taking the means to accomplish them.

Bathing, to be efficient in preserving health, should be regular. It should be commenced by degrees, and proceeded with step by step, by a process of practical training. It should not be permitted to intrude upon hours devoted to some important function, as digestion. It should not precede or follow too closely a meal, or severe mental or muscular exercise, as re-action is less certain and vigorous when important organs are employed, than when they are at rest. When the vital powers are greatest, and the system most free from exhaustion, bathing is the most beneficial. Hence, the morning is preferable to the evening, and the middle of the forenoon to the middle of the afternoon, as the vital energies are the greatest in the early part of the day.

As regards the frequency of bathing, those parts which are exposed to the atmosphere and its impurities, as the face and

neck, should receive two washings in the twenty-four hours, with soap and water. The feet require at least one, owing to the confined nature of their covering. The same with the arm-pits, from the detention of the peculiar secretions. The hand and arm, as many as may seem necessary. The whole person should be bathed every day, if possible, and on no account less than once every second day.

**THE HAIR.**—The hairs of the skin have no blood-vessels or nerves ; they take their origin from the cellular membrane, in the form of bulbs. The hair is dense in texture, and porous and cellular in the centre, like the pith of a plant. Every hair has on its surface pointed barbs, arranged in a spiral direction. The difference of its colour is generally supposed to depend on the fluid contained in the pith. Instances are known of the hair changing from black to grey, in a single night, from the effects of grief, and other causes.

The causes of hair changing grey, are, from the defective secretion of the colouring matter, and the obliteration of the channels which convey the fluids into the hair. When it is from the defective secretion of the colouring matter, the hair will remain ; but when the channels are obliterated, the hair falls off.

In those parts of the system that are clothed with hair, as the upper part of the head, the oil-tubes open into the hair, so that the secretion of the oil-glands is spread over the surface of the hair, and not on the cuticle. This is the reason of the dry, white branny scales, called *scurf*, upon the head. It is natural, and cannot be prevented. When *scurf* exists, it should be removed by frequent brushing, and washing with pure water.

**THE NAILS.**—The nails are semi-transparent scales. They are elastic and flexible, and present the appearance of a *lamina*, or plate of horn. The nail is divided into the root, the body,

and the free portion. The root is that part which is covered on both surfaces. The body is that portion which has one surface free. The free portion is that which projects beyond the ends of the fingers and the toes.

The nails, like the hoofs of animals, and the cuticle, are the products of secretion. They are formed of several plates that are fitted to each other; the deepest is that which is last formed. They have no blood vessels or nerves. If the cuticle be removed, as in severe scalds, the nails separate with it, similar to removing the hoofs of animals by the agency of hot water. The nails increase in length and thickness by the deposition of albumen upon their under surface and at the roots, in a similar way to the growth of the cuticle, of which they form a part.

From the position of the nails, they are very liable to receive knocks, which produce disturbance in their cells, as may be observed in the white spot on the nail that follows a knock.

In taking care of the nails, the instruments used for paring them should be strictly limited to the knife or scissors; and an ivory presser, to prevent the adhesion of the free margin of the cuticle to the surface of the nail. Now, this edge of the cuticle should never be pared, the surface of the nail never scraped, nor the nails cleaned with anything but the nail brush, water, and soap. By the observance of these directions, the irregularities and disorders of the nails may be prevented.

**CELLULAR TISSUE.**—Anatomists consider this the primary tissue. It is formed of innumerable small fibres of every variety of shape and size, running in every possible direction, forming a net-like arrangement. In some situations these fibres are narrow, loose, and comparatively distant. In others they are broad and close, so as to form partial cells, which communicate with each other. To prevent the cells of this net-work from adhering, a fluid formed from the blood-vessels, or the tissue itself, keeps them always moist. But

when this fluid becomes too great in quantity owing to disease, dropsy is the result. From the peculiarity of this tissue, the fluid is allowed to flow from cell to cell until it settles in the lowest part, as noticed in the swelling of the feet of feeble persons when standing, and returning to their proper shape during the night in bed.

The cellular tissue exists throughout the body, and is everywhere accessible to air, which may be forced into its cells till the body is inflated. Butchers avail themselves of a knowledge of this fact, and inflate their meat to give it a fat appearance.

This tissue enters into the ramification of all organs; but it never loses its own structure, nor participates in the functions of the organs of which it forms a part. Though it accompanies the nerves, and every muscle, and every muscular fibre, yet it does not partake of the sensibility and irritability of these organs.

**ADIPOSE TISSUE.**—This tissue is commonly called fat; it is deposited in distinct bags or cells that are seen in the loose cellular tissue. In those who are corpulent there is, in many instances, a great deposit of fat. This *adipose* tissue or *fat* accumulates more readily than other tissues, when a person is of a gross habit. It is the earliest removed when the system emaciates in disease. It is principally formed beneath the skin, abdominal muscles, and round the heart and kidneys; while none is found in the skull, brain, eyes, ears, nose, and several other organs.

The great practical importance of maintaining a healthy action of the tissues and apparatus of the skin, and the different sets of vessels contained in them, will now, we trust, be sufficiently obvious to the reader.

## CHAPTER IV.

### THE BONES.

In the mechanism of our system, the variety of movements we are called on to perform, requires a corresponding variety of component parts ; and the different bones of the system are so admirably fitted to each other, that they admit of this extent of motion.

The bones of the cranium are eight in number. They are formed of two tablets of bony matter, and united by a spongy or porous portion of bone. The external tablet is fibrous and tough ; the internal is dense and hard, and is called the *vitreous* or *glassy table*. The hard tablets or plates of bone are calculated to resist the penetration of sharp instruments ; while the different degrees of density possessed by the two tablets, and the spongy bone between them, are calculated to diminish the vibrations that would occur in falls and blows. All the bones of the cranium are united by ragged edges, called *sutures*, from the Latin *suo*, I sew. The sutures, in some measure, interrupt the vibrations produced by external blows on the head, and also prevent fractures of the skull from extending as far as they otherwise would in one continued bone.

From infancy to the tenth or twelfth year, the sutures are imperfect. Blows should by no means be given on the heads of children, either with the hand or anything else, as a derangement of the brain may be caused, and the entire

character altered by a blow on the head in the half-formed state of the skull.

The teeth are the only bones in the human frame which are exposed to the immediate action of foreign substances. To prevent them being corroded they are covered with *enamel*, from which they derive security as well as beauty.

The teeth which are first formed are called the *temporary* or *milk teeth*. They number twenty. The permanent teeth are more firmly fixed in the jaw, and number thirty-two; eight *incisors*, which serve to cut the food; four *cuspides* or *canine teeth*, two of which, in the upper jaw, are called eye-teeth; eight *bicuspides*, so called because they terminate in two points; eight molars, or grinders; four *wisdom teeth*, so called because they do not usually appear until the individual has arrived at mature age.

As regards the formation of the teeth, a very interesting account is given by Mr. Snape, of Liverpool, in his Work on "The Physiology of the Teeth." He remarks, that "All operations of the animal economy are extremely interesting, but none more so than those which are brought into action in the production of the teeth. Their formation and development, in healthy subjects, are carried on with such wonderful regularity, until their completion, as to excite in the mind of every inquirer, the highest admiration.

"So early as the second month of the embryo's existence, a soft and gelatinous substance is found lying along the edge of the jaws. In another month, this has assumed rather a firmer consistence, and is contained within a shallow groove of bone, which forms the first step towards the formation of the external and internal plates of the sockets. In another month, this pulpy substance is divided into distinct portions, and corresponding filaments of bone may be seen shooting across the bony groove. These form the transverse portions of the sockets.

“The pulps, thus separated, are the basis upon which the teeth are formed, and each is enclosed in a membrane or little bag. Having arrived at this stage of their formation, they now begin to ossify,” or form into bone; “first upon the cutting edges of the incisors, the points of the cuspidate and bicuspidates, and eminences of the molars; from thence over the whole surfaces of the crowns, until they become invested in a complete layer of bone; and so on, one layer is formed within the other, until the process of solidification is completed. At birth, the sockets of the temporary teeth are completed, and the pulps are enclosed in shells of bone. As the formation of the bony substance proceeds, the teeth continue to elongate, until, having filled the sockets, they can no longer be contained within them; they then begin to shoot upwards and to *press against the gum*, a portion of the sac still intervening; but, having performed its office of secreting the enamel, it becomes absorbed at these points where the pressure is first made; and, as this continues, both the sac and the gum become absorbed until the tooth makes its appearance. As there is an established law of nature, that certain teeth shall be developed at certain epochs, and according to a certain arrangement, it is evident when *that* law is followed, the teeth, in their progress, will meet with the gum in a favourable state for absorption; but if from any cause this law is violated, we cannot but expect that a general derangement will take place; and this, in fact, is found to be the case. ‘If, therefore,’ observes Dr. Ashburner, ‘in a child’s mouth, or in the mouth of an older person, a due process of absorption does not go on when it ought, if a proper growth does not take place as it should do, and consequently, if certain teeth do not appear at their correct epochs, or another set fall out when their proper period arrives, one or more of certain serious consequences may supervene.’ It will readily be conceived, that when a tooth proceeds faster than the parts

which enclose it become absorbed, the pressure upon the gum and the intervening membrane will be great; and that the pulps, upon which the ossification is still proceeding, are also subjected to a degree of counter pressure. It cannot therefore be surprising, that such a violent interference with a structure so delicately organized, which is so intimately connected with the whole nervous system, should occasion a derangement of any of the organs of the system in general. Hence, from this cause may, and often do, proceed blindness, squinting, deafness, stammering, St. Vitus' dance, epileptic and cataleptic fits, various forms of nervous and painful diseases, commonly thought of as tic, hysterical affections; several diseases of the skin, especially nettle-rash, warts, scald-heads, ringworm; some, bowel complaints; some, fevers; and a disease which is a union of most of them, commonly called 'water in the head.'

With respect to the irregularities of the teeth, the remarks of Mr. Snape are invaluable, as he speaks on the authority of more than twenty-five years practical experience as a dental surgeon. "The second or permanent teeth," he observes, "in some instances are liable to various irregularities; and as there is no subject connected with operative dentistry which has been viewed so erroneously, or afforded to ignorant practitioners more frequent opportunities for exercising their unphilosophical cruelties, it is one I feel anxious should be generally understood; and trust the following observations will be the means of correcting some of those mistaken views which many of my readers may have respecting it:

"There is what may be called a *permanent* and also a *temporary* irregularity—that is, an irregularity which may, and often does, require surgical treatment to prevent its *becoming* permanent; and one of a mere temporary nature, which seldom requires any other treatment than most good housewives are



enabled themselves to accomplish by means of a strong piece of thread.

“Permanent irregularity of the teeth may be occasioned by the absorption of the temporary teeth not keeping pace with the advancement of the permanent ones ; by which the latter are forced into an unnatural position, and make their appearance either before or behind the latter. In cases of this description, as soon as the edges of the permanent teeth make their appearance through the gum, the temporary ones, which are preventing them from occupying their natural position, should be removed.

“Irregularity may be produced by a want of due proportion between the arch of the jaw and the size of the teeth. This often appears to be the case at the commencement of the second dentition, and most frequently rectifies itself by the maxillary arch gradually becoming more elongated. But if, when the patient is fifteen years of age, the defect assumes the appearance of permanency, then one of the back teeth, or one of the *bicuspides*, on each side of the mouth should be removed ; but upon no pretence whatever should the cuspidati, or eye-teeth, be subjected to a like treatment. In many cases these teeth, from being developed after the incisores and bicuspides, appear very unsightly, and project very much : on this account parents, ignorant of the progress of the development of the teeth, are anxious to have them removed. In the course of my practice, I have known many a beautiful girl disfigured for life, by the sacrifice of these two very ornamental teeth. The deformity may be remedied by removing one of the adjoining small grinders on each side, without effecting in the least, the symmetry of the mouth.

“Mal-formation of the jaw may also occasion an irregularity of the teeth ; and the treatment in every such case must depend entirely upon circumstances. It sometimes happens that one

or more of the upper teeth close within the bottom ones, or one or more of the lower teeth may close over, or on the outside of the upper ones. Such cases are generally very easily remedied, without any pain or much inconvenience, by means of a little shield of gold or silver, so fixed upon the teeth, that when the mouth closes a pressure is exerted upon the irregular tooth, or teeth, in such a direction as will, eventually, force them into their natural places.

“ In addition to these various causes of irregularity, there is, as we have before mentioned, a kind of temporary irregularity to which almost every child is, in some degree, subjected. If this were well understood, much pain and mental suffering would be avoided. It would then be seen that the treatment which, until lately, was so commonly, and even now is too often adopted, was not only unphilosophical and cruel, but generally occasioned the very mischief it was intended to remedy. To torture a child, by wrenching from its mouth a number of teeth to prevent *that* which every individual who has made himself acquainted with the anatomical development of the parts sees no reason to expect, is barbarity the most cruel and unpardonable. It is not, however, to be understood that the temporary teeth are *never* to be removed; on the contrary, whenever they interfere with the progress of the permanent ones, their immediate removal is necessary.

“ The appearance of irregularity of the teeth which is sometimes seen when a child is about changing them, need not excite fear as to their ultimate appearance; nor should it lead to that hasty and erroneous treatment of which we so often hear. It should be remembered, that about this time, the whole body is undergoing a great change, not only in size, but in form; as the jaws now become gradually elongated, if we do not unnecessarily interfere with the teeth, in nine cases out of ten we shall find that they require no surgical

treatment at all. Besides the cruelty and absurdity of the practice, there are other reasons for avoiding the early removal of the temporary teeth. So long as they remain in the jaw, they excite growth ; and by the time they become loose and fall out, the permanent ones are so far advanced as to be ready to occupy their vacant places ; and in this manner the symmetry of the jaw is preserved. But if the temporary teeth are removed before the permanent ones are sufficiently forward, the jaw becomes contracted ; so that, when the latter are fully developed, there is want of room for them, when they so crowd and press over each other, that it not unfrequently happens they are, in a very few years, all destroyed."

The composition of the bones consists of earthy and animal matter. The existence of the earthy portion is proved by burning the bones, by which they are rendered white and brittle, and lessened in weight from the absence of animal matter. That which remains is composed of carbonate and phosphate of lime. The animal part can be made evident by immersing a bone in weak acid. This dissolves the salts of lime, and there remains a cartilaginous body, flexible and elastic, retaining the same form as the bone, and like cartilage or gristle, it may be knotted.

The bones go through many changes before they arrive at maturity. At the early stage of their formation they are a cartilage, covered by the *perioisteum*, or a fibrous membrane that surrounds the bones. At this stage, the vessels of the cartilage convey only the white portion, or lymph of the blood ; subsequently they convey red blood, when true *ossification*, or formation of bone commences at certain points, which are called *the points of ossification*. When ossification is completed, the bones still undergo changes ; they increase in bulk, and become less vascular until middle age. As years advance the vitality diminishes, and the earthy substance predominates, which renders them extremely brittle.

The bones are supplied with *organic nerves, arteries, veins,* and *absorbents*, and decay and renovation is constantly going on, as in every other part of the system. This change is shown by feeding two animals with food coloured with madder, and on killing one at the end of four weeks, the bones will be of a reddish hue. Withdraw the coloured food from the other animal, a few weeks before killing it, and the bones will be white.

The bones are the frame-work of the system. By their solidity and form, they retain every part in its proper shape, and afford a firm surface for the attachment of the muscles and ligaments. That a clear idea may be formed of the relative uses of the bones and muscles, we will quote a familiar comparison. "The bones are to the body what the masts and spars are to the ship, they give support and power of resistance. The muscles are to the bones what the ropes are to the masts and spars. The bones are the levers of the system; by the action of the muscles their relative positions are changed. As the masts and spars of a vessel must be sufficiently firm to sustain the action of the ropes, so the bones must possess the same quality to sustain the action of the muscles in the human body." By means of the bones, the human frame presents to the eye a wonderful piece of mechanism, uniting the most beautiful symmetry of form, with freedom of motion.

Some of the bones are exclusively for the protection of the organs which they enclose: as those of the *skull*, the *sockets of the eye*, and the *cavity of the nose*. Others, in addition to the protection they give to important organs, are useful in certain movements: as the bones of the *ribs*, and *spinal column* or *back bone*. Others are subservient to motion, as the bones of the upper and lower extremities.

The bones, like every other part of the system, require, to keep them in sound health, a proper supply of good blood and

free out-of-door exercise. To manufacture good nutritious blood requires good digestion; ample, wholesome food, the lungs healthy and well developed, with an abundant supply of light and pure air. On the other hand, those who live and sleep in damp, badly ventilated rooms, with little light, whose food is poor in quality and deficient in quantity, will have their bones more or less diseased.

The kind of exercise and labour should be adapted to the age, health, and development of the bones. The brittle bones of the aged, and the flexible bones of the child are not adapted by their organization, for protracted hard labour. Hence, the yielding bones of the child, are not fitted for long sitting, and standing in one position. Those who attempt to induce a child to stand or walk, when very young, cannot be aware of the serious injury that they may inflict on the system of the little helpless creature. At this period the lower limbs are imperfectly developed, and when the weight of the body is thrown upon them the bones bend.

The back bone and ribs are very soft and yielding in the child. This shows that the clothing should be loosely fitted to its body; and it should not be forgotten that a very small amount of pressure upon the soft, yielding ribs, will push them upon the lungs, heart, liver, stomach, and other important organs. Deformity may be produced if the child is carried much upon one arm. As the child advances in years, the bones bend less easily; the gelatin gives place to the earthy matter, which renders the bone firm to resist the action of more mature muscles, and the forces operating upon them. In middle age, the proportions of gelatin and earthy matter are more nearly balanced. At this period the bones are firm and elastic, and not so readily injured as in early life, or old age. In advanced life, if the bones are fractured, it will require a greater length of time to unite them than in middle age, as the

gelatin has diminished, and the salts of lime very much increased.

**THE JOINTS.**—The joints are composed of the extremities of the *bones, cartilages, synovial membrane, and ligaments*. The extremities of the bones are porous in texture, which renders them more elastic than if they were more compact. They are covered with a cushion of cartilage, which is a soft, smooth, elastic substance. The highly elastic and yielding character of these parts serves to diminish the jar which the organs of the system would otherwise receive. This cartilage is covered with a thin membrane which secretes a fluid. It is called the *synovial membrane*; and the fluid it secretes is named *synovia*, from the Greek *syn*, together, and *oon*, an egg, from its resemblance to the white of an egg. This lubricating fluid of the joints enable the surfaces of the bones and tendons to glide smoothly over each other, thus diminishing the friction consequent on their action. In this is manifested the skill and power of the Creator; for no machine of human invention supplies to itself, by its own operations, the necessary lubricating fluid. But in the animal frame, it is supplied in proper quantities, and applied in the proper place, and at the proper time.

The ligaments, from the Latin, *ligamentum*, to tie, or unite one thing or part to another, are composed of numerous straight fibres, collected together in short lands of various breadths, and so interwoven as to form a broad layer, which completely surrounds the extremities of the bones, and constitutes a *capsular ligament*. It is by the agency of the ligaments that the many small bones of the wrist and foot, as well as the large bones of the system are so securely bound together. Some of them are situated within the joints, like a central cord or pivot; some surround it like a hood, and contain the lubricating *synovial fluid*, and some in the form of bands. They bind the lower jaw to the temple bones, and the

head to the neck. They extend the whole length of the spinal column, in powerful bands, both on the outer surface, and within the spinal canal, and from one spinous process to another. They bind the ribs to the back bone, and the breast bone ; and this to the collar bone ; and this to the first rib ; and this to the shoulder blade ; and this to the bone of the arm ; and this to the two bones of the fore-arm at the elbow joints ; and these to the wrists ; and these to each other, and to the hands ; and these last to each other, and those of the fingers and thumb. In the same manner, also, they bind the bones of the pelvis together, and so on to the ankle, foot, toes, as in the hand. Thus the whole system of bones is united, so as to possess, in the most beautiful and wonderful degree, motion and firmness.

## CHAPTER V.

### THE MUSCLES.

The study of the muscular system involves an exposition of principles which should regulate exercise, and cannot fail to be of interest to those who are interested in the health and education of children.

The muscles are the moving organs of the animal frame, and their size and number constitutes the bulk of the body upon which they bestow form and symmetry. In the limbs they are situated around the bones, which they invest and defend; and to some of the joints they form their principal protection. In the trunk they are spread out to enclose cavities, and constitute a defensive wall, capable of yielding to pressure, and returning again to its original form.

The muscles are the flesh, their colour is red, and their form variously modified to execute the varied movements which they are required to effect. They are composed of a number of parallel fibres, placed side by side, supported and held together by a delicate web of cellular tissue. Towards the extremity of the organ the muscular fibre ceases, and the cellular structure becomes so modified as to constitute those cords called *tendons* by which the muscle is made fast to the surface of the bone. This union is so firm that the bone will sooner break under extreme violence than permit the tendons to separate from it.

The tendons are spread in the broad muscles, so as to form



an expansion. The arrangement of the fibres of the muscles present various modifications in their relation to tendons. Sometimes they are longitudinal, and terminate at each extremity in a tendon, the whole muscle being in the shape of a spindle. In other situations, they are in the form of a fan, converging to a tendinous point. In other parts, they are like the plumes of a quill to one side of a tendon, which runs the whole length of a muscle ; in others, they are on both sides of the tendon.

In structure, muscle is composed of bundles of fibres, of various sizes, enclosed in a sheath. Each bundle is composed of smaller bundles of single fibres, named *ultimate fibres*.

Every muscle and each muscular fibre is supplied with arteries, veins, absorbents, and both sentient and motive nerves.

The number of muscles in the human body is more than four hundred. The names of the different muscles are not given on account of their number. Indeed, the acquiring of their names, origin, and attachment, would not only be tedious, but of no *practical* utility to the principles we are advancing.

The most striking characteristic of the fibres of the muscles is *contractility*, or the power of shortening on the application of stimuli, and again relaxing when the stimulus is withdrawn. If we call into action the muscles that elevate the arm, by the influence of the will, the arm is raised ; withdraw the influence of the will, and the rigid muscles become relaxed, and yielding. The contractile power of the muscles may be seen in all the varied movements of the system—in the bending of the elbow for example. The tendon of one extremity of the muscles is attached to the shoulder bone, which acts as a fixed point ; the tendon of the other extremity is attached to one of the bones of the fore arm. When the belly of the muscle contracts, its two extremities approach nearer each other, which causes

the joint at the elbow to bend. On this principle all the joints of the system are moved. When the fibres of a muscle contract, the contracted part or belly becomes fuller and harder. It is by the contraction of the muscles that we are enabled to pursue different employments. By their action the farmer cultivates his field, the smith wields his hammer, the author his pen, the sportsman pursues his game, the orator gives utterance to his thoughts, the lady sweeps the keys of the piano, and the young are whirled in the mazy dance. Not only are the movements of the body dependent on the contractility of muscles, but every sign of life of which we are capable of making. The pulsation of the heart, the circulation of the blood, the action of the stomach and intestines, and, also, all the manifestations of the mind are dependent upon muscular contraction. This dependence of the mind upon the muscles is illustrated in the case of persons in a trance. Although conscious of what is going on around them, yet they could give no sign of life.

As the muscles bear so intimate a relation to the pleasures and employments of life, as well as to health and happiness, it must then be evident that a knowledge of the laws by which they are governed, and the conditions on which their health and efficiency depend, should be possessed by all ; but especially so by those who have the care and education of children.

It is a law of nature, that when a muscle is called into frequent use, its fibres increase in thickness and tone, within a certain limit, and become capable of acting with greater force ; while on the contrary, the muscle that is little used decreases in size and power. It is, therefore, important to bear in mind **THE FACT**, that every appendage of the dress of children, that any way prevents free motion of the muscles of the chest and spine, weakens the muscles thus restrained ; and not only prevents the proper expansion of the lungs, but by weakening the muscles which sustain the spine, induces curvature and

disease. All unyielding substances, such as whalebone, wood, and steel, should be banished from the dress of females, as the greatest enemies of the human frame.

Now, the reason why action increases the size of the muscles will be readily understood, when we recollect that arterial blood is supplied to every organ of the system in proportion to the extent of its action. While on the other hand, when an organ is not duly supplied with nutritive blood, it becomes enfeebled and gradually loses its power of action. Compare the arm of the smith, who daily works at the anvil, with the limb that has been supported in a sling; the arm of one will be found large and firm, while the other will be small and soft. In the one, the action of the vessels is vigorous and energetic; in the other, weak and sluggish.

Let inactive children, whether boys or girls, remember this, as well as inactive ladies and gentlemen, when complaining of want of strength, loss of appetite, and depressed spirits. And when they are seeking some sovereign remedy for their complaints, not to be unmindful that the Creator, in his infinite wisdom and benevolence, has adapted the bone and muscles for action.

The best kind of exercise is that which brings into action the greatest number of muscles; *but this exercise cannot be taken with safety by girls who wear their apparel tight round the lower part of the chest.* The compression of the muscles with tight apparel prevents the blood passing to those parts with freedom; consequently, they are not supplied with the material to renovate them, and promote their growth. Again, pressure stimulates the absorbent vessels to an undue state of action; by their increased activity, the muscles are diminished in bulk from one extremity to another; thus the muscles of the back are enfeebled, a common cause of projecting shoulders and curvature of the spine. Take, for example, a person with a

fractured limb, the muscles are not only enfeebled by inaction, but diminished in size by compression from dressing. Limbs enfeebled in this way will not recover their size, tone, and strength until the bandages have been removed, and a proper amount of exercise taken.

In the early part of February, 1858, I was invited by the principals of a ladies' boarding school, in Cheshire, to pay a professional visit to their establishment. On doing so, I found between sixty and seventy pupils, whose respective ages ranged from ten to twenty years. The first thing that arrested my attention in the pupils was the tightness of the dress of a large number of them. On a closer inspection, I found that a large proportion of them were deformed, by curvature of the spine, to which I called the attention of the conductors of the school. Tight lacing of the stays, slender waists, and deformity, was the ruling fashion with the pupils. Three of the pupils, however, were perfect exceptions to this foolish and sinful practice. They wore no stays, and all their garments fitted loosely upon their bodies, which allowed free action to every part without pressure upon the muscles, and the movements of the ribs and diaphragm unrestricted. The style of their dress was simple but elegant, and their beautiful, graceful, symmetrical figures appeared to advantage. I learned that they were three sisters, natives of Ireland, the daughters of a nobleman. Their relative ages were fifteen, seventeen, and nineteen years. They informed me that their parents would not allow them to wear stays, or anything that was in the least calculated to prevent the free action and development of their systems. If all parents would act on the same judicious principles with their daughters, as the parents of those young ladies had done, how much suffering and misery, from deformity and bad health, would be prevented, and good health and happiness promoted.

The principals of the school expressed to me a strong desire

that something should be done to induce the young ladies to abandon the sinful and dangerous habit of tight dressing, and invited me to give a lecture to the pupils on the subject. I never accepted an invitation to do anything with more thankfulness and heartfelt pleasure than I did this ; as I felt sure that I could induce the young ladies to give up the bad habit into which they had fallen, by clearly explaining to them the frightful consequences of stays and tight dressing.

In my lecture, I explained to them how wonderful they were made, and the infinite wisdom and skill displayed by the Creator in the construction and use of the various organs of their bodies. To render my remarks more clear and practical, I selected the three ladies before named for my models. I asked if any of my audience had seen the Greek Slave, by Power, and was informed that many of them had seen it. I then called attention to my three models, and the general exclamation was—“ How very like the figure of the Greek Slave they are, particularly the two eldest.” I then selected a number of those who were deformed, and placed them in contrast with my models. The difference was so great, and the deformities so visible, that several of the young ladies began to cry. I told them not to put themselves about, that I would show them how they could overcome their deformity. I requested my models to explain how they had acted with regard to their mode of dressing, and how they felt. Their explanations were so natural and truthful, that all present seemed fully convinced that tight dressing was not the way to make fine, healthy, beautiful women.

On taking leave of my young audience, I informed them that I should call in a few months and see how they went on. I did call, and I am happy to say that my efforts had been successful ; that the young ladies had practically acted upon my advice in allowing perfect freedom of action to their systems. The im-

provement had been so great that, now, only a few showed deformity, and that was so slight, that none but an experienced eye could have detected it.

Parents and teachers should particularly attend to attitude in the standing of children. If stooping be acquired in youth, we are certain of seeing the stooping shoulders in old age. The muscles of the back should therefore be duly exercised, for when they are properly developed children can stand erect. In this attitude the shoulders will be thrown back, and the chest will grow full and broad. But on the other hand, let children acquire the habit of inclining their heads and shoulders, and the chest becomes contracted, the muscles of the back enfeebled; and the deformity thus acquired will go on step by step as they advance in years.

Children should be trained to sit erect; as the position in which they sit conduces to a healthy or unhealthy condition of their systems. They should sit erect when employed at study or work, as it favors a healthy action of the various organs of their system, and conduces to beauty and symmetry of form.

The seats for children should be provided with backs. But children are more or less inclined to lean forward, and place the elbow on the desk or table; and this is often done when their seats are provided with backs. Now, if there is a disposition to curvature of the spine, no position is more productive of deformity than this, for it is usually continued in one direction, and the deformed position into which the body is placed induces a projection of the shoulders. If a girl (or boy) is so feeble that she cannot sit erect, let her stand, or recline on a couch; either is preferable to leaning forward upon the elbow.

In furnishing school rooms, not only the seats should be provided with appropriate backs, but the desks or tables should

be of such a height that the children can examine their books without leaning forward.

IT IS A NATURAL LAW OF THE MUSCULAR SYSTEM THAT REST MUST FOLLOW EXERCISE. The necessity of relaxation when the muscles are called into action may be seen in the restlessness and feverish excitement shown by persons gazing on troops during a review. The same is noted in public meetings. Indeed all employments that call into action the muscles that support the spinal column in an erect position cause langour and uneasiness in the muscles. Long-continued tension of a muscle enfeebles its action, and, by degrees, destroys its contractility. The small children in schools, after sitting a short time, become restless, showing that their position requires change. By changing their position, their imperfectly developed muscles will acquire tone, and again support the spinal column erect without pain. Compelling children to sit erect for a long time is bad, for it is a violation of the muscular law, and leads to serious results, by too frequently producing curvature of the spine, and projecting shoulders.

The necessity of intermissions in schools is founded on the organic law of muscular action, alternating with rest. The younger and more feeble the children are, the greater the necessity for frequent recesses. Exhaustion is the inevitable result of tension and contraction of the muscles. Hence, change of position and employment calls into action a different set of muscles, and relieves those which are exhausted; much more labour will be accomplished by taking time to relax the exhausted muscles, or by so changing the employment as to bring into play a new set of muscles. The adage that "change of labour is as good as a rest," is practically true, and founded on experience of the operation of the muscular law. We have before observed, that the muscles are of different sizes and forms, according to the situation and the force which it is

necessary to exert. Now, although the muscles are absolutely necessary for motion, yet they cannot move of themselves; they are excited to action by the agency of some part of the nervous system, named the voluntary and involuntary nerves of motion. Every fibre of each muscle is connected with the brain by these nerves, which are white cords, that pass from the base of the brain and the spinal cord. The nerves of involuntary motion stimulate and excite all the muscles that are independent of the will, all that are concerned in digestion, circulation, and respiration. These functions proceed incessantly from the very commencement of our animal existence to the last moments of life, whether we are asleep or awake, without our being conscious of it, and without being able to prevent it by an act of the will.

The nerves of voluntary motion all originate in the brain, and are under the control of the will. They are the messengers which convey to the muscles the decision of the mind, and are evidently mere instruments of communication between the brain and the muscles. Whatever the mind determines, the voluntary nerves receive an influence from the brain, and quick as lightning convey it to the appropriate muscles, which instantly contract and produce the action. Thus, if we wish to speak, the brain conveys, through the medium of the voluntary nerves, an influence to the muscles of the tongue, throat, lips, &c., and instantly they contract and produce the required sound.

The health, activity, size, and quality of the brain, spinal cord, and nerves, modify muscular action. If the brain be healthy, muscular action will be more efficient than if it were diseased. This is observed in the muscular prostration in typhus fever, inflammation of the brain, apoplexy, and intoxication. The cessation of muscular action, while the brain is inactive, shows the influence that the nervous system



exerts upon the muscles. If the spinal cord, or the nerves, distributed to any set of muscles, be destroyed, their contractility and sensibility will cease. Compression of the nerves, in any member of the system, destroys or impairs its sensibility or movements. The effects of the compression of the nerves is sometimes experienced in the diminished sensibility and strength of the lower limbs after sitting upon a hard bench ; this is caused by the sciatic nerve, distributed in the leg, being compressed.

It is common to see men of the same size manifest great difference in their muscular strength and activity. This depends upon the size, texture, and compactness of the fibres of the muscles, and the activity of the brain and nerves. The difference in the compactness and texture of the muscles is strikingly marked in the fine compact muscle of the race horse, from that of the draught horse. Hence, men of fine compact muscles, and active brains and nerves, will perform feats of strength and agility that other men of the same size, whose muscles are coarse and flabby, cannot effect. Those persons who perform feats, such as rope dancers and tumblers, are thus constituted. Persons with small muscles and a large active nervous system, may exhibit considerable muscular power, but it cannot be continued except the brain is functionally diseased, as in hysteria. But men of large muscles and small nerves can never perform feats of strength and agility ; yet, they have the power of endurance, and are better suited for continued labour. It is then obvious that we cannot judge of the ability of a person to make exertions and continue them by their stature alone. Strength, agility, and power of endurance are the result of the combination of fine, compact, well-developed muscles, large nerves, and a healthy active brain.

The physiological characteristics of M. Blondin, and his feats upon the rope, are striking illustrations of the muscular law.

When he visited Liverpool to exhibit his wonderful feats, I called upon him, at his hotel, and he kindly allowed me to make a phrenological and physiological examination of his head and general system.

Now, before a full and clear idea can be formed of his peculiar abilities, it will be necessary to take into account not only the size, quality, and configuration of his brain, but the build and texture of his whole physical system ; because it is the general cast of his organization that enables him to perform his wonderful feats—not that the brain does not do its part ; but no brain, without a physical system akin to his, could put forth and sustain such extraordinary effort as he has displayed. The structure and texture of his organization are in excellent keeping with the natural law which governs the fitness of things ; hence the phenomena he has manifested are in strict accordance with the physiological laws that regulate the manifestations of the mind and muscular action. The entire structure of his physical system shows a fine, compact, elastic organisation, giving great strength and power with little bulk in proportion.

The carriage of children is a matter of great importance in the healthy development of their physical systems. It is a well-known fact, that a person whose carriage is erect is able (all other conditions being equal) to stand longer, walk further, and perform more labour than one whose carriage is stooping.

This is in accordance with the natural law of the muscles, and arises from two causes. In the first instance, to maintain a muscle in a state of contraction, an influence is transmitted to it from the brain. The fewer muscles in a state of tension, the less the draught upon the nervous system, and the less its exhaustion. In the erect carriage the trunk and head are balanced upon the bones and cartilages of the spinal column.

When the body is slightly inclined forward, the muscles attached in the posterior side of the spine gently contract

and bring it erect, and even incline it backward. But this is immediately removed by a slight contraction of the muscles upon the anterior side of the spinal column. So that in the erect carriage there is constantly a slight movement of the body backwards and forwards. But in the stooping position the muscles on the posterior side of the spinal column are kept in a state of continued tension and contraction, to prevent the body from falling forward, which enfeebles the muscles of the back, and exhausts the nervous power; while the erect position favors their development and healthy tone, as contraction alternates with relaxation in the slight oscillation of the body backwards and forwards.

When a portion of the muscles are called into action, as in the legs in walking, and if the muscles in other parts of the system are in a comparative state of inaction, the influence of the nervous system will be more directed to those parts in the lower limbs in action, and they will not become so soon wearied as when the nervous influence is divided between a greater number of muscles. In speaking, reading, or singing, or in performing any kind of labour, the effort can be longer maintained in the erect position of the body and head, with less exhaustion, than in the stooping position.

In sitting, the same principle applies. Let a person incline forward, and the muscles of the back are brought into a state of tension, which exhausts and enfeebles the nervous system in a much greater degree, than if the erect attitude was adopted.

## CHAPTER VI.

### MUSCULAR EXERCISE.

IN laying down rules for the exercise of the muscles, it is of the first importance that the exercise recommended should always be in strict accordance with the physiological law of muscular action. Now, by keeping this principle in view, we shall have no difficulty in perceiving that to derive proper advantage from exercise, it should spring from, and be continued under the influence of an active mental stimulus; and should always involve as much variety of movement as possible, and be adapted to the age and strength of the constitution of the individual. The most favorable time of the day should be taken, and the kind of exercise selected should be calculated to ensure all the good effects which well-conducted exercise is capable of affording.

We have before remarked that the mind exerts great influence upon the tone and contractile energy of the muscular system in voluntary motion. The brain, or the organ of the mind, is the agent by which the will is conveyed through the nerves to the muscles, by whose contractile power motion is produced. The number and size of the nerves distributed to a muscle are not simply in proportion to its volume, but to the frequency, variety, and animation of the movements required from it. Some small muscles that are employed in many combinations, are supplied with a greater variety of nerves than others that are double their size, but whose offices are more

simple. Now, this increased endowment of nerves to a small muscle, compensates by the strength of stimulus for what it wants in bulk of fibre. This is observed in many birds, who require great muscular power to sustain them in long and rapid flights. The strong nervous stimulus imparted to moderate-sized muscles by large nerves, which add very little to their weight; if the greater power had been only obtainable from an augmentation of fleshy fibre, the addition of weight must have increased the difficulty in the birds raising and sustaining themselves in the air, which would counterbalance any advantage gained on the size of power. Fishes, on the other hand, float without effort in their own element, size being no inconvenience, as their strength depends more on the volume of the muscle than on its nervous endowment. The adaptation of the mode of life and wants of fishes, are in beautiful harmony with their structure, and in conformity with the law of the fitness of things. With regard to the mind's influence upon the tone of the muscular system, a person will be able to make exertion with less fatigue under a healthy mental stimulus, than he could without this incentive. This fact may be observed in the sportsman, who will for miles pursue his game without fatigue, while his attendant, not having mental stimulus, will become weary. But let even the sportsman spend hours in his pursuit without success, he becomes dispirited and a feeling of languor and fatigue creeps over him; but let him catch a glimpse of the game, and his languor and fatigue vanish, and with renewed energy and strength he presses onward.

This principle is strikingly illustrated in the retreat of the dispirited French army from Russia. When the enemy was not near, they had hardly strength to carry their arms; but no sooner did they hear the report of the Russian guns, than new life seemed to pervade them, and they wielded their

weapons with vigour, until the foe was repulsed ; then there was a relapse to weakness, and prostration followed. It is on this principle that when the invalid is riding for his health, that an anecdote or agreeable conversation excites his mental stimulus, and his debilitated person is benefitted from the ride.

It will require scarcely any additional evidence to make it clear that exercise should always spring from, and be continued under, harmonious nervous and mental stimulus ; but the principle is not sufficiently understood to be appreciated and acted upon. Now, the fact that the muscles are constructed for the purpose of fulfilling the commands of the will and the nervous system, must, of itself, lead to the inference that healthy mental stimulus is essential to render exercise beneficial. Who has not experienced the ease and pleasure of muscular action under the influence of mental excitement. "Where is the difference between the free exercise of youth, and the felon at his dull monotonous labour ? Is it not the mind in different conditions ? Contrast the buoyant joy, the laugh and the leap of children at play, with the sullen moroseness of the felon at the tread-wheel. He moves, it is true, but not in exercise. Is it not the novelty and beauty of the scene, the pleasant weather, or the freedom from customary labour, that gives spirit to the pedestrian's tour, as compared with the same sights, the same persons, the same things, and the same path from and to business ? Is it not the prospect of enjoyment, of gaiety, or pleasure, that makes the difference between the elastic step of the maiden enfranchised from present duties, and the same person in the pursuit of her necessity-impelled and ordinary office ? We need not ask which is the most calculated to be beneficial to health ; which to rouse the dormant functions of the skin ; to promote the removal of irritating elements from the blood ; to increase the

vigour of the frame ; purify the blood ; and enrich the beaming tincts of beauty. In mind lies the great secret of *beneficial exercise* ; and without it, exercise is a misnomer, and a fraud upon the constitution."

Facts, illustrative of the inutility of exercise, without calling into play the co-operation of the mind, are seen in the spiritless aspect of many of our boarding-school processions, when a walk is taken merely for exercise without having in view an attainable object. But present to the mind a botanical or a geological excursion, and the spiritless saunter will be exchanged for the buoyant elastic step ; the inanimate appearance, for the bright eye and glowing cheek. Now, this great difference is simply, that in the formal procession the muscles are obliged to work without that full mental and nervous stimulus so essential to their energetic action ; while in the botanical excursion the mental and nervous stimulus is in full and harmonious operation with the muscles.

It must not, however, be supposed that a walk simply for the sake of exercise can never be beneficial. Every one, unless prevented by disease, should consider it a moral and religious duty to take exercise daily in the open air. If it can be had in combination with harmonious exhilaration of the brain all the better ; if not, the walk should be made so brisk as to produce rapid respiration and circulation of the blood, in a dress that will not interfere with the free motion of the arms and free expansion of the chest.

The playful gambolling of all young animals (children not excepted) should teach us that activity of the feelings and affections, and sprightliness of mind are intended by nature for healthful, invigorating, muscular exercise. Hence the great importance of exercise for children of lively, inspiring, social games, which, by their joyousness and boisterous mirth, call forth the requisite nervous stimulus to invigorate the muscles

in their varied action. The bodily confinement and mental cultivation now so much in vogue, is calculated to inflict a lasting injury on all who are subject to its influence, whether in the school room or at home, as it is a direct violation of all physiological principles and conditions.

The comparative independence enjoyed by boys, when out of school, prevents them from suffering under it so much as girls do ; but the mischief done to both, when it does occur, might have been avoided. Those parents who allow such violations of the principles of physiology in the education of their children, cannot be at all aware of the serious consequence that follows such disregard of the laws of health. We cannot for a moment think that they would knowingly be guilty in setting at naught the laws of God, and inflict upon their children a life of suffering and misery. We trust, therefore, that mothers and fathers will see, that it is as much their duty to protect the health of their children in every possible way, as it is to protect them from being morally corrupted ; and that the neglect of either is a dereliction of parental duty much to be deplored.

When the muscles have been exhausted by severe and long-continued exercise, or the brain and nervous system by protracted mental effort, the muscles are unfitted to maintain the system erect in standing or sitting for a considerable time, as the nervous system, in its exhausted state, cannot supply a sufficient amount of its peculiar influence to maintain the muscles that support the body and head in a state of contraction. When children or adults are thus exhausted, they should not be compelled to stand or sit erect in one posture, but be permitted to vary the position frequently, as this change and rest recruits both the muscular and nervous system. Attention to this fact, and to the practice of bathing and friction to the limbs, when an undue amount of exercise has been taken,



(and particularly by those who are unaccustomed to such exertion) would prevent much stiffness and soreness in children.

The different intonations in reading, speaking, and singing, in a measure depend upon the education or training of the muscles. The rapid and varied execution in penmanship, and all mechanical employments, depend in a considerable degree upon the training of the muscles. It is by having full control over this part of the system, that efficiency is attained in any art. As muscular contraction is effected by a stimulus from the brain, through the agency of the nerves, to produce this steady and effective contraction of the fibres, the brain and nervous system should be healthy. In the first effort of muscular education, the contraction of the muscular fibres is irregular and feeble, as may be seen when a child begins to walk, or in the first efforts in drawing and penmanship; but repeated efforts render the muscular contraction obedient to the will.

Two things are necessary in writing, namely, to acquire the form of the letter, and the power to make it. The first is attained by inspection of the letter; the second is accomplished by calling into action the muscles that move the arm, hand, and fingers. To make letters of a given form, the muscles must be educated to contract and relax steadily and harmoniously.

To effect this, the muscles should not be rigid, but relaxed, so as to be at the command of the will. A violent and rigid contraction of the large muscles that bend and extend the arm, hand, and fingers, very much lessen, or entirely prevents the side movements of those parts, which are produced by the action of much smaller muscles.

Let any one call into vigorous action the muscles that bend and extend the hand, and he will find its side movements more

difficult and much restricted. Again, rigidly extend the fingers by a vigorous contraction of the muscles upon the lower part of the arm, and the side movements of the fingers seen in their separation, cannot be made. A similar restriction attends the oblique movements of these parts when the muscles are called into energetic action. The side and oblique movements are essential to ease in freedom and rapidity in writing. Hence the relaxed conditions of the muscles of the arm, hand, and fingers, is essential to learning the art of writing with elegance, freedom and rapidity.

To a defective knowledge of the movements of the arm, hand, and fingers, on the part of teachers and pupils in penmanship, is to be ascribed in a great measure, the great want of success in acquiring this art. The pen should be held loosely, but always in the proper position. When thus held, the pupil should make an effort to imitate some definite copy as nearly as possible. The movements of the fingers, hand, and arm, necessary to accomplish this, should be made with ease and rapidity, in a similar way as when a pupil writes with a pencil upon a slate. Now, in order to train or educate the muscles in singing, dancing, playing the piano, and learning the use of tools in mechanical and handicraft trades, or any thing else, the muscles of the parts called into action must be relaxed, so as to be under the control of the will. By judicious repetition the muscles will soon acquire the habit of acting readily and harmoniously in obedience to the mental influence.

We have before remarked, that for exercise to be really beneficial in the physical education of the young, it ought always to be taken in the open air; and to be of a nature to occupy the mind as well as the body. Lively, inspiring, social play, and active sports, such as cricket, bowls, archery, quoits, hide-and-seeek, the ball, and similar recreations. But perhaps no sport has a more beneficial effect on young females

than playing at shuttlecock with a battledoor in each hand ; striking the shuttlecock alternately with the battledoors, in every variety of way. Now, the sports and games strengthen and develop the bodily frame, and secure a straight spine and an erect, firm, but easy and graceful carriage. The absurd, unmeaning, formal walk is useless to many girls who would be delighted and benefitted by spending three or four hours a day in spirited exercise and useful employment, as gardening and hoeing.

Mothers, who are afraid to trust to nature for strengthening and developing the limbs and spines of their daughters, should attend to facts, and their fears will soon vanish. Some years ago, I visited a ladies' boarding school in the neighbourhood of Liverpool, which contained about forty pupils. On entering the school room, I was particularly struck with the pale, sickly, careworn faces of the inmates, and general laxity of their physical systems. I felt confident that no sound mental progress could be made by the pupils in such a state of health, and expressed my conviction to the principal of the school. On pointing out to her several of the pupils, I remarked that it was impossible for them, in their present condition, to make any mental progress ; when she informed me that herself and assistants did all in their power to get the pupils on with their studies, "*but from some cause, very little progress was made.*" I found on further enquiry, that a number of pupils were ill in bed. In fact, I did not find one pupil in the establishment in a fit condition for brain labour ; and advised the principal to allow all the pupils who were able to run wild on the north shore, and play at lively inspiring games and sports until their systems had gained that tone of health that would enable them to pursue their studies with profit. After considerable argument, and explanation of the natural laws that govern health and disease, I prevailed upon her to allow an experiment

to be tried upon twelve of the pupils, which I selected from the whole school.

The principal and I went with the chosen pupils into another room, and I explained to them what I wished them to do on the north shore, and in the fields and lanes. They looked at me, then at each other, and then at the principal in amazement. But when the principal told them that she hoped that they would all do as I had told them, the effect was magical—at once their faces beamed with joy, and they appeared transformed into new life.

The following week I called to see how they were going on with their change of occupation, and was delighted to find that it had produced a wonderful change for the better. The principal was so satisfied with the beneficial change, that I was soon able to induce her to try the experiment with the whole school; and I am happy to say that she entered into the spirit of it heart and soul. This was in the early part of March, and before the end of April every pupil was in robust health. The progress that they now made in their studies, was in every way satisfactory, and the principal and her assistants were fully convinced of the folly of attempting to cultivate the mind at the expense of the health and happiness of the children. At midsummer vacation, all the pupils returned to their homes in good health and spirits. Many of their parents wrote to the principal expressing their deep sense of gratitude for the great improvement of their daughters.

If it were needful, I could give numerous cases quite as remarkable as the one above, where I have found parents and teachers trying, by every means, to force the education of children, in defiance of nature and her laws. Need we then express surprise at the prevalence of females suffering from bad health.

## CHAPTER VII.

### DIGESTION AND ITS EDUCATION.

THE digestive organs comprise the *jaws*, the *mouth*, the *salivary glands*, the *pharynx*, the *oesophagus*, the *stomach*, the small and large intestines, the lacteals, the thoracic duct, the liver, the spleen, and the pancreas.

The abdomen, from the Latin *abdo*, I hide, is the cavity or region of the belly. It is bounded in front and at the sides by the lower ribs and the abdominal muscles; behind, by the spinal column and abdominal muscles; above, by the *diaphragm*; and below, by the pelvis. It contains the stomach, the intestines, the liver, the pancreas, the spleen, and the organs of excretion.

The mouth contains the instruments of mastication and the organs of taste. The salivary glands are six in number, three on each side the mouth. The two largest are called the parotid glands, and are situated in front of the external ears, and behind the angle of the jaws. The ducts from these glands open into the mouth, opposite the second molar teeth of the upper jaw. The two glands, named the *submaxillary*, are situated within the lower jaw; their excretory ducts open into the mouth by the side of the *frænum*, or bridle of the tongue. The other two glands are called the sublingual; they are elongated and flattened, and situated beneath the mucous membrane of the floor of the mouth.

The *pharynx*, from the Greek, *pharynx*, the swallow, is a

muscular membranous sac, situated upon the upper portion of the spinal column. It extends from the base of the skull to the top of the trachea, or windpipe; it is composed of muscles and mucous membranes, blood-vessels, and nerves. The posterior nares, or nostrils, open into the upper and front part of the pharynx. Beneath the posterior nostrils, partly veiled by the soft palate, is a large opening into the mouth, and beneath the root of the tongue, the opening into the larynx, an organ of the voice, situated on the top of the windpipe, and communicates with it. The pharynx, or swallow, terminates in the œsophagus.

The œsophagus, from the Greek, *oiein*, to carry; *phago*, I eat, is the gullet; the canal leading from the mouth to the stomach.

The *stomach* is situated in the left side, immediately below and in contact with the *diaphragm*. Its small extremity extends into the epigastric region, below the left lobe of the liver. It has two curvatures—the great and small; and two openings—one connected with the *œsophagus*, or gullet; the other connected with the duodenum, named the pylorus, or pyloric orifice—the first division of the small intestines. In shape, the stomach is curved like the Scotch bagpipe. It is composed of three coats, or membranes: the exterior coat, named the serous; the middle coat, named the muscular, is composed of two layers of muscular fibres, one set of which is arranged longitudinally, the other circularly. The interior coat is named mucous, and is arranged in folds. In this coat are seen follicles, or little bags, in which the mucous, that protects the coat, is secreted. The stomach is provided with a multitude of minute glands, in which is secreted the *gastric juice* or solvent.

The small intestines are about twenty-five feet in length, and are divided into three portions, namely, the *duodenum*, the *jejunum*, and the *ilium*.

The *duodenum*, from the Latin, *duodeni*, twelve. This portion of the small intestines has received its name from being in length about the breadth of twelve fingers. It commences at the pylorus, the lower orifice of the stomach, which enters into the bowels, and ascends obliquely backward to the under surface of the liver.

The second division of the intestines is named the *jejunum*, from the Latin, *jejunus*, empty; so termed, because when examined after death, it is generally found empty. It is thicker than the rest of the intestines, and has a pinkish tint. It commences in the *duodenum* and terminates in the *ilium*, named from the Latin, *iliacus*, relating to the lower bowels. It includes three-fifths of the small intestines. It is somewhat paler, smaller, and thinner in texture than the *jejunum*; there is no mark to distinguish the termination of the one or the commencement of the other. The *ilium* terminates in the right *iliac fossa*, or cavity, by opening into the *colon*, at an obtuse angle.

The small intestines have three membranes or coats: the outer or *serous coat*, the middle or *muscular coat*, and the internal or *mucous coat*. The last is thrown into *folds* or *valves*, named the *valvulae conniventes*. The folds are *semilunar*, or half-moon shaped. In consequence of this valvular arrangement, the *mucous membrane* is more extensive than the other two membranes, and gives a greater extent of surface, with which the aliment comes in contact.

Under the mucous membrane there are embedded a very large number of minute glands, named the glands of Peyer, and Brunner. There are, likewise, upon the mucous membrane an immense number of piles, like those upon velvet; hence its name, *villious coat*. There are also other minute vessels upon the mucous membrane, named *lacteals*, from the Latin, *lac*—milk. They are *absorbents*, and convey the milky

fluid termed *chyle* from the small intestines into the thoracic duct. This duct commences in the abdomen, and is equal in diameter to a goose-quill ; at its termination it is provided with a pair of valves, half-moon shaped, named semilunar valves, which prevent the admission of venous blood into its cylinder. The large intestine is divided into the cœcum, the part in which the small intestine, *ilium*, terminates. The colon is that part which intervenes between the cœcum and the rectum, or the straight gut, the last part of the intestines. The colon is divided into three parts : the *ascending*, the *transverse*, and the *descending*. The ascending colon passes upward on the right side of the bowels to the under surface of the liver ; it then bends inward, and crosses the upper part of the abdomen, below the liver to the left side, and descends to the *rectum*, which terminates the large intestines.

The large intestines, like the stomach and small intestines, have three coats : the external or serous coat, the middle or muscular coat, and the internal or mucous coat. The longitudinal fibres of the muscular coat are collected into three bands. These bands are nearly one half shorter than the intestine, and give a peculiar sack-like appearance to the *cœcum* and *colon*.

THE LIVER is situated in the right side, below the diaphragm or midriff ; it is the largest organ in the system, weighing about four pounds. It is appended to the alimentary canal, and retained in its place by several ligaments. Its upper surface is convex ; its under concave. It performs the double office of separating impurities from the venous blood, and secreting a fluid named the bile, necessary to chylification.

THE SPLEEN, so called because the ancients supposed it to be the seat of melancholy, is an oblong, flattened organ, situated in the left side, in contact with the diaphragm and large extremity. Its outer surface is convex. The inner is divided



by a groove, called the *fissure of the spleen*. It is of a dark bluish colour, and is abundantly supplied with blood. Its use is not determined.

THE PANCREAS, or *sweet-bread*, is a long flattened gland, analogous to the salivary gland. It is about six inches in length, and weighs three or four ounces, and is situated in the abdominal cavity, behind the stomach. Its secreted fluid is conveyed by an *excretory duct*, which opens into the duodenum.

THE OMENTUM, OR CAUL, from *omen*, because the soothsayers of ancient times prognosticated from an inspection of it.

The caul consists of four layers. It is the membranous viscus of the abdomen attached to the stomach, and laying on the anterior surface of the intestines. A quantity of adipose or fatty matter is deposited around its vessels, which ramify through its structure. It performs a double function in the animal economy. 1st.—It facilitates the movements of the intestines upon each other during their vermicular, or worm-like motion; and, secondly, it protects the intestines from cold. The digestive organs are supplied with arteries, veins, absorbents, and nerves from the ganglionic nervous system.

The substances which we eat for the purpose of nutrition, require to undergo a preparation called digestion. Those articles of food which are solid require to be reduced to a comparatively fine state by the action of the teeth upon them. While the food is in this process of mastication, a fluid called *saliva* is incorporated with it, which is furnished by the salivary glands of the mouth. The saliva moistens and softens the food, so that it can be carried with ease into the stomach.

Now, when the food is properly masticated, it not only stimulates the coats of the stomach to a contractile effort, but it excites an action in the glands of the stomach. These glands secrete a fluid of great solvent power, called the *gastric juices*. By the action of this fluid, and the contractile muscular energy

of the stomach, the various kinds of food are reduced to a pulpy consistence, which is called *chyme*, from the Greek *chymos*, juice. The bile has no agency in the change through which the food passes in the stomach. In a healthy condition of this organ, no bile is found in it. The common belief that the stomach has a redundancy of bile is not correct. The bile that is frequently ejected in vomiting, not only shows that the action of the stomach is inverted, but also that of the *duodenum*. In this way an emetic will generally bring bile from a healthy stomach. If this fact was more generally known, many a stomach might be saved from the evils of emetics too frequently administered on false impressions of their necessity, and continued from the corroboration of these false impressions by the appearance of bile, till derangement is the consequence, and perhaps permanent disease of the stomach.

The *chyme* is conveyed from the stomach through the pylorus into the *duodenum*, the upper portion of the small intestines. It excites an action in the liver, the duodenum, and pancreas. Bile is secreted by the liver, *pancreatic juice* by the pancreas, and *mucus* by the duodenum. The bile and pancreatic juice are conveyed into the duodenum, and mixed with the chyme. By the action of these fluids, a portion of the chyme is converted into a fluid of a whitish color, called *chyle*. The chyle and residual matter are then removed over the mucus surface of the small intestine, by the peristaltic action or worm-like movements of the muscular coat. As the chyle is carried along the tract of the intestines, it comes in contact with the lacteal, or absorbent vessels, which take up the chyle, and convey it through the mesenteric glands into the thoracic duct, through which it is conveyed into the large vein at the lower part of the neck, where the chyle is mixed with the venous blood. The residual, or waste matter, is con-

veyed into the *cæcum*, the first portion of the large intestine. The waste matter is the natural stimulant to produce healthy action of these organs. It is, therefore, evident, that food should not be too concentrated, or too rich, but contain a proper amount of waste materials. For this reason, bread made of coarse flour, is better for general use than bread made of fine flour, unless we take daily other food which contains waste matter.

The different changes in the process of digestion are, 1st.—The chewing and mixture of the saliva with the food; this process is called *mastication*. 2nd.—The change through which the food passes in the stomach by its muscular contraction and the gastric juice; this process is called *chymification*. 3rd.—The conversion of the chyme, by the agency of the bile and the pancreatic juice into chyle, is called *chyliification*. 4th.—The absorption of the chyle by the lacteals, and its conveyance through them and the thoracic duct into the *subclavain vein*, (from the Latin *sub*, and *clavis*, a key,) under the collar bone. 5th.—The separation and excretion of the waste matter.

It is a natural law of our physical system, that the healthy action of each organ is influenced by *its appropriate stimulus*. Thus, nutritive food is necessary to the wants of our system, and it imparts a healthy stimulation to the salivary glands during the process of mastication. The food that is well masticated, with a proper quantity of saliva mixed with it, will induce a healthy action of the stomach, as this is its proper stimulus. The natural stimulus of the duodenum, liver, and pancreas, is well-prepared *chyme*. The appropriate stimulus of the lacteal vessels is perfectly elaborated *chyle*. If then, the process of mastication be imperfect, all the following changes in the digestion of the food will be imperfect. If *chymification* and *chyliification* be imperfect, the changes of the food in the further digestive process will be faulty.

The perfection of the digestive process, and the health of the general system, require the observance of certain conditions.

1st.—The quantity of food to be taken.

2nd.—The nature and character of the food taken.

3rd.—The manner in which the food should be taken.

4th.—The condition of the system at the time when the food is taken.

1st.—**THE QUANTITY OF FOOD TO BE TAKEN.**—The quantity of food necessary for the system is regulated by two circumstances: *the rapidity of growth, and the amount of waste matter removed from the system in a given time.* The boy that grows fast, and takes plenty of exercise, will require food in proportion to the growth of his bones and muscles, as well as to repair the waste of his system. Those who have the care of children, have no doubt noticed the keen appetite and vigorous digestion of the healthy, growing child, and its frequent calls for food. But when the system is matured, there is less demand for food, and the quantity required is only sufficient to supply the loss attendant on the action of the skin and other organs. In every department of nature, waste or loss of substance follows action. The boy or girl who is active, requires more nourishment than one that is indolent, as the waste of the one system exceeds that of the other. Children who have been accustomed to free exercise in the open air, on leaving it to pursue an employment, as the learning a sedentary trade, or a profession, attending school or college, or engaging as a clerk, require less nutriment, as the waste of their system will be diminished in a similar proportion as the free exercise is lessened. If the same amount of food be taken after the diminution of the exercise, as before, a diseased condition of the system will be produced. Hence, mothers should, by all means, strongly impress their children with the importance of strictly observing this suggestion.

2nd.—**THE NATURE AND CHARACTER OF THE FOOD TAKEN.**—

The quality of the food should be adapted to the distensible character of the stomach and intestines. The stomach may be full if it only contains half a pint; but it may be so distended as to contain a quart. The same is true of the intestines. If the food, however, taken, contains in small bulk the proper quantity of nutriment that the system requires, it will not afford to the stomach and intestines the necessary stimulation and friction produced by the introduction of waste material; because, if the food be deficient in waste material, the tendency is to produce an inactive and diseased condition of the digestive organs; hence, the nutritive food should have blended with it innutritious waste material. Bread made of coarse flour contains more waste material than bread made of fine flour; it is on that account better for general use. It is therefore of more importance that this condition should be observed by those whose occupation is sedentary, and whose organs of digestion are weak, than those of active habits in the open air, and whose health is good. For example: feed a dog with pure sugar, or oil, or any article that contains no innutritious material, for several weeks, and the evil effects will be manifested. At first, the dog will take his food readily, and seem to thrive upon it; but soon his desire for food will diminish, his body emaciate, his eyes become ulcerated, and in a few weeks he will die. But mix bran or saw-dust with the sugar or oil, and the health and vigour of the animal will be maintained for months. It is the same with horses; if grain only be given to a horse, without hay, straw, or materials of a like character, it will soon die.

The process of digestion in the stomach has been rendered more accurate and extensive, owing to a fortunate accident which befell a Canadian, Alexis St. Martain, by name, who had a large hole in his stomach, caused by the discharge of a gun. The wound healed, but the opening remained, and this

opening was used by Dr. Beaumont for observation and experiment, to ascertain the time required for the digestion of different kinds of food. The following are the results :—

**A T A B L E ,**  
**SHOWING THE MEAN TIME FOR THE DIGESTION OF DIFFERENT ARTICLES**  
**OF DIET.**

ARTICLES OF DIET.	MODE OF PREPARATION.	TIME REQUIRED FOR DIGESTION.	
		H.	M.
Rice .....	Boiled .....	1	0
Pig's Feet, soured .....	Boiled .....	1	0
Tripe, soured .....	Boiled .....	1	0
Eggs, whipped .....	Raw .....	1	30
Trout and Salmon, fresh .....	Boiled .....	1	30
Soup, barley .....	Boiled .....	1	30
Apples, sweet and mellow .....	Raw .....	1	30
Venison Steak .....	Broiled .....	1	35
Brains .....	Boiled .....	1	45
Sago .....	Boiled .....	1	45
Taploco .....	Boiled .....	2	0
Barley .....	Boiled .....	2	0
Milk .....	Boiled .....	2	0
Beef's Liver, fresh .....	Broiled .....	2	0
Eggs, fresh .....	Raw .....	2	0
Codfish, cured, dry .....	Boiled .....	2	0
Eggs, fresh .....	Roasted .....	2	15
Apples, sour and mellow .....	Raw .....	2	0
Cabbage, with vinegar .....	Raw .....	2	0
Turkey, wild .....	Roasted .....	2	18
" domestic .....	Boiled .....	2	25
Milk .....	Raw .....	2	15
Gelatin .....	Boiled .....	2	30
Turkey and Goose, domestic .....	Roasted .....	2	30
Pig, sucking .....	Roasted .....	2	30
Lamb, fresh .....	Broiled .....	2	30
Hash, meat and vegetables .....	Warmed .....	2	30
Beans, pod .....	Boiled .....	2	30
Cakes, sponge .....	Baked .....	2	30
Parsnips .....	Boiled .....	2	30
Potatoes, Irish .....	Roasted .....	2	30
" .....	Baked .....	2	30
Cabbage, head .....	Raw .....	2	30
Spinal Marrow .....	Boiled .....	2	40
Chicken, full grown .....	Fricassee .....	2	45
Custard .....	Baked .....	2	45
Beef, with salt only .....	Boiled .....	2	45
Apples, sour and hard .....	Raw .....	2	50
Oysters, fresh .....	Raw .....	2	55
Eggs, fresh .....	Soft Boiled .....	3	0

A TABLE—*continued.*

ARTICLES OF DIET.	MODE OF PREPARATION.	TIME REQUIRED FOR DIGESTION.	
		H.	M.
Beef, striped, fresh .....	Broiled .....	3	0
" fresh, rare and lean .....	Roasted .....	3	0
Pork, recently salted .....	Raw .....	3	0
" .....	Stewed .....	3	0
Beef and Mutton .....	Broiled .....	3	0
Mutton, fresh .....	Broiled .....	3	0
Soups, bean and chicken .....	Broiled .....	3	0
Aponerosis .....	Broiled .....	3	0
Cake, corn .....	Baked .....	3	0
Dumpling, apples .....	Boiled .....	3	0
Oysters, fresh .....	Roasted .....	3	15
Pork Steak .....	Boiled .....	3	15
" recently salted .....	Broiled .....	3	15
Mutton, fresh .....	Roasted .....	3	15
Bread, corn .....	Baked .....	3	15
Carrot, orange .....	Boiled .....	3	15
Sausage, fresh .....	Broiled .....	3	20
Flounders, fresh .....	Fried .....	3	30
Catfish, fresh .....	Fried .....	3	30
Oysters, fresh .....	Stewed .....	3	30
Beef, fresh, dry .....	Roasted .....	3	30
" with mustard, &c. ....	Boiled .....	3	30
Butter .....	Melted .....	3	30
Cheese, old and strong .....	Raw .....	3	30
Soups, mutton and oysters .....	Boiled .....	3	30
Bread, wheat, fresh .....	Baked .....	3	30
Turnips, flat .....	Boiled .....	3	30
Potatoes, Irish .....	Boiled .....	3	0
Eggs, fresh .....	Hard Boiled .....	3	0
" .....	Fried .....	3	0
Corn, Beets, and Beans, green .....	Boiled .....	3	45
Salmon, salted .....	Boiled .....	4	0
Beef, fresh and lean .....	Fried .....	4	0
Veal, fresh .....	Broiled .....	4	0
Fowls, domestic .....	Boiled .....	4	0
" .....	Roasted .....	4	0
Ducks .....	Roasted .....	4	0
Soup, beef, vegetables, and bread .....	Boiled .....	4	0
Heart, animal .....	Fried .....	4	0
Beef, old, hard, and salted .....	Boiled .....	4	15
Pork, recently salted .....	Fried .....	4	15
Soup, marrow bones .....	Boiled .....	4	15
Cartilage .....	Boiled .....	4	15
Pork, recently salted .....	Boiled .....	4	15
Veal, fresh .....	Fried .....	4	30
Duck, wild .....	Roasted .....	4	30
Suet, mutton .....	Boiled .....	4	30
Cabbage and Vinegar .....	Boiled .....	4	30
Suet, beef, fresh .....	Boiled .....	5	3
Pork, fat and lean .....	Roasted .....	5	15
Tendon .....	Boiled .....	5	30

Now, in looking over the preceding table, the question may be suggested, is that article of food most wholesome which is most readily digested? To this it may be replied, that the stomach is subject to the same laws as the muscles and other organs; that exercise, within certain limits, strengthens it. Hence, if those articles most easily digested are always eaten, the digestive organs would be weakened; if, on the other hand, they are overworked, they will be exhausted. Therefore, the quantity and quality of food, in this respect, should be adapted to the maintenance of the digestive organs, and to their gradual invigoration when debilitated.

3rd.—THE MANNER IN WHICH THE FOOD SHOULD BE TAKEN.—  
The food should be taken at stated periods, and the interval between meals should be regulated by the character of the food, the age, health, exercise, and habits of the individual. The digestive process is more energetic and rapid in the young, active, and vigorous, than in the aged, indolent, and feeble; food should, therefore, be taken more frequently by the former than the latter class. In some young and vigorous persons, food may be digested in one hour; while in other persons it may require four hours or more to digest the same quantity and quality of food. In most instances, from two to four hours will be required to digest an ordinary meal. In all instances, the stomach will require from one to three hours to recruit its exhausted powers, after the labour of digesting a meal, before it will again be able to enter upon the vigorous performance of its functions. It is, therefore, important to strongly impress the minds of children with the facts, that if food be taken before the stomach has regained its tone and energy by repose, the secretion of the gastric juice, and the contraction of the muscular fibres of the stomach will be imperfect; that if food be taken before the digestion of the preceding meal has been completed, the effect will be worse, as the food partially digested becomes



mixed with that last taken. Hence, the interval between each meal should be long enough for the whole quantity to be digested, as well as sufficient time for the repose of the stomach, to recruit its exhausted energies. The more feeble the individual, and the more debilitated the stomach, the more important to observe these directions.

In feeding and nursing infants, as well as supplying food to older children, it should always be regarded. The rapidity of the digestive process is less in children that are engaged in sedentary mental employment in the way of study, than in the lively boy or girl not so engaged. Children should be trained to take food in a proper manner, and to masticate all that is solid till it is reduced to a comparative state of fineness, before it is swallowed, so that the gastric juice, the fluid secretion of the stomach, will readily blend with it, and act more vigorously in reducing it into chyme. The practice of swallowing the food, slightly masticated, or bolting it, tends to derange the digestive process, and impair the nutrition of the system. The mastication should not be rapid, but moderate, so that the salivary glands may be duly excited to action in chewing, as time is required before they can secrete saliva in sufficient quantities to moisten the food. If the food is not supplied with saliva, in proper quantity, digestion is retarded; hence, rapid or fast eating has a tendency to induce disease.

It is now obvious, that the salivary glands supply fluid to moisten the dry food; hence, water, or any other fluid, is not demanded by nature's laws, while taking a meal. The objection to washing down food with drinks is, that the food is moistened with the drink, and not with the saliva. This tends to induce disease, not only in the salivary glands, by leaving them in a state of comparative inactivity, but in the stomach, by the deficiency of salivary stimulus. Then, again, the large quantity of fluid used as drinks, gives undue distension to the stomach, and lessens the energy of the gastric juice.

A moderate amount of drink, after eating, may aid in the digestion of the food, but is not absolutely necessary.

The practice of taking hot food or drink is a fruitful cause of spongy gums, decayed teeth, sore mouth, and indigestion. The hot food, or drink, unduly stimulates for a short time the vessels of the mucous membrane of the gums, mouth, and stomach, and this is followed by reaction, attended with a loss of tone and debility of the mucous membrane.

If a considerable quantity of cold drink is taken into the stomach, during a meal, or immediately after it, the health will be endangered, and the tone of the system will be impaired (and that more so, if the food be cold,) from the sudden abstraction of heat from the coats of the stomach and surrounding organs, to impart warmth to the cold food or drink. Food and drink should, therefore, be taken neither very hot nor very cold, but moderately so, as this is adapted to the natural condition of the digestive organs.

4th.—THE CONDITION OF THE SYSTEM AT THE TIME THE FOOD IS TAKEN.—Food should not be taken immediately after severe exertion, either mental or physical, as all organs require, in a state of action, more blood and nervous fluid than when at rest. This is the case with the brain and limbs, when exercised, and the same is true of the stomach and intestines during digestion of food. Now, the increased amount of blood and nervous fluid supplied to any organ, during extra functional action, are drawn from the other organs of the system. The parts that supply the extra quantity of blood and nervous fluid to the active organs are enfeebled and prostrate. When any organ has been in a high state of action, for several hours, it requires some time to abate the increased action, and for the redistribution of fluids to other organs to re-establish an equilibrium of action in the system.

In walking or running, the muscles are called into vigorous

action, and draw blood and nervous power to them. While the muscles are in this state, the digestive organs will be in a state of comparative inactivity, and unfit to digest food. It will then be evident that severe exercise should not be taken immediately after a full meal. The vocal organs should not be called into active exercise in singing or declaiming ; nor the brain be employed in continued thought, for an hour at least, before or after a full meal ; but agreeable, cheerful conversation, and a hearty laugh, are of advantage to digestion. This principle may be demonstrated in the following way :—Feed two dogs upon similar food ; let one dog be sent in the pursuit of game, and the other lie down quietly. At the expiration of one hour have them killed. The stomach of the one that had remained quiet will be nearly empty, while the food in the other will be found nearly unaltered. In the one, the energies of the system have been concentrated upon the stomach ; in the other, they have been exhausted on the organs of motion. If, then, the muscles and brain of a human being are intensely called into play, soon after eating, the stimulus will be drawn from the stomach that is necessary to carry on digestion.

It is a well-known fact that the mind has great influence upon the digestive process. A person sitting down to dinner with a keen appetite, receives intelligence of the loss of property or a friend ; the unexpected news at once takes away the appetite, because the excited brain withholds its stimulus.

Food should not be taken for at least three hours before retiring for sleep. If persons retire to sleep, immediately after having eaten heartily, they may be disturbed by unpleasant dreams, or roused from slumber by colic pains. In such cases the brain becomes dormant, and the nervous influence required by the digestive organs is withheld ; the nervous stimulus not being sufficient to carry on digestion, the food remains in the stomach unchanged, causing irritation to this organ.

The popular adage, that "food never does harm when there is a desire for it," is false, and if practically adopted may be injurious and destructive of life. When an individual is deprived of food for a long period, the digestive organs and general system are debilitated, as in cases of shipwrecked and famished mariners, or a patient recovering from disease. In such cases, a small quantity of food should be given at a time, and that of a nature to be easily digested. The reason for this is, that a stomach weakened by want of food, is as unfitted for digesting food that requires a long time, as the muscles are under like circumstances for walking.

The condition of the skin has an important influence on the digestive organs. If free perspiration be checked, either from uncleanliness or from chills, the functional action of the stomach will be diminished, as well as its associated organs. This is one of the fruitful causes of stomach and liver complaints, among the half-clothed and filthy population of crowded districts of large cities and towns.

Digestion is impaired by restricting the free movements of the ribs and the diaphragm. It not only prevents the proper oxydation of the blood in the lungs, but by impeding the action of abdominal organs, induced by the elevation and depression of the diaphragm. At each inspiration the ribs are elevated, and the central portion of the diaphragm is depressed from one to two inches. This depression is accompanied by a relaxation of the anterior abdominal muscles. At each act of respiration the relaxed abdominal muscles contract; the ribs are depressed, the diaphragm relaxes, and the central parts ascend. The movements of the diaphragm cause the elevation and depression of the stomach, liver, and other abdominal organs. Now, those persons who restrain the free movements of the ribs and abdominal muscles by tight dresses, cannot be aware, that the tone and vigour of the digestive

organs are diminished by it, or they never would be guilty of such sin and folly. The restricted action of the ribs and abdominal muscles will not admit of a full and deep inspiration, so essential to health, which soon enfeebles and destroys the functions of the system.

The position, when standing or sitting, exercises an influence upon the digestive organs. If a person lean, or stoop forward, the distance between the pelvic bones and the diaphragm is diminished; this prevents the depression of the diaphragm, while the stomach, liver, pancreas, and other abdominal organs suffer compression, which induces many severe diseases of these organs. As healthy and well-developed muscles keep the spinal column in an erect position, which conduces to the health of the organs of digestion, children should be taught to avoid all positions *but the erect*, while studying or walking. This position, combined with a free action of the ribs and abdominal muscles, will do much to remove that too prevalent disease, dyspepsia.

Impure air has great influence in diminishing the desire for food, and enfeebling the digestive organs. Those persons who sleep in small, badly ventilated rooms, have little or no appetite in the morning, and the mouth and throat are dry and disagreeable.

In warm weather, the vessels of the skin are more active than in cold; this is attended by a comparatively enfeebled state of the stomach, and an increased irritability of the intestines. This condition of the system points to the necessity of diminishing the quantity of food taken, and also of its being less stimulating in character, in warm than in cold weather. By observing this, and clothing and bathing the system properly, diseases of the intestines would be much prevented.

## CHAPTER VIII.

### RESPIRATION.

**RESPIRATION**, or breathing, consists in inhaling air into the lungs, and expelling it from them. What are termed the organs of respiration are the *larynx*, the *wind-pipe*, and the *lungs*; but the diaphragm, the ribs, and abdominal muscles are subservient to the respiratory process.

The **THORAX**, or chest, contains the lungs; the natural form of it is a truncated cone. The form of the *lungs* is conical, which are situated on each side of the chest, embracing the heart, and separated from each other by a membranous partition, called the *mediastinum*. The color of the lungs is a pinkish grey, mottled, and variously marked with black. Each lung is divided into lobes, a long fissure, which extends from the posterior surface of the upper part of the organ, downward and forward, nearly to the anterior base. In the right lung, the upper lobe is subdivided by a second fissure. This lung is larger and shorter than the left; it has three lobes, while the left has only two.

Each lung is enclosed and its structure maintained by a serous membrane, called the *pleura*, which invests it as far as the root, and lines the *parietes* or *walls of the chest*. The lungs are composed of the ramification of the bronchial tubes, which terminate in the *bronchial* or *air cells* of the division of the *pulmonary artery* and *veins*, the *bronchial arteries* and *veins*, the *lymphatics*, and *nerves*. These are all held together by

*cellular tissue*, which constitutes the *parenchyma*, the proper tissue of the glandular organs.

Each lung is retained in its place by its roots, which is formed of the pulmonary artery, pulmonary veins, and bronchial tubes, together with the bronchial vessels, and pulmonary *plexus*, or *net-work* of nerves.

The LARYNX, from the Greek, *larngx*, a whistle, is situated at the anterior part of the neck, between the wind-pipe and the base of the tongue. The wind-pipe extends from the *larynx* to two-thirds of the *dorsal vertebra*, where it divides into two parts, called *bronchi*, which proceed to their corresponding lungs. Upon entering the lungs they divide into two branches, and each branch divides and subdivides, and ultimately terminates in small sacs, of various sizes, from the twentieth to the hundredth of an inch in diameter. So numerous are the bronchial, or air cells, that the aggregate extent of their lining membrane in man has been computed to exceed a surface of twenty thousand square inches. The small bronchial tubes and air cells compose the largest portions of the lungs. These, when once inflated, contain air, under all circumstances, which renders their specific gravity much less than water; hence, the term *lights*, for these organs. The wind-pipe, bronchi, and air cells are lined with mucus membrane. Like other portions of the system the lungs are supplied with nutritive arteries, veins, absorbents, and nervous filaments, from the ganglionic or nutritive nervous system.

At each act of inhaling air into the lungs, the *respiratory* muscles elevate the ribs, while the central portion of the diaphragm is depressed by the contraction of its muscular portion, and the increase of the diameter of the chest. The abdominal muscles relax, and the abdomen becomes more protruded, simultaneously with the elevation of the ribs and the depression of the diaphragm. The movement of the ribs and diaphragm

enlarges the thoracic cavity, and causes a comparative vacuum in the lungs ; the equilibrium is restored by the air which is forced by the atmospheric pressure into the bronchial tubes and cells.

In expiration, the ribs are depressed by the contraction of the abdominal muscles, the diaphragm relaxes, and its central portion is forced upwards. This contracts the cavity of the chest, and diminishes the volume of the lungs, causing the expulsion of the air contained in the air cells.

The impure, or venous blood, is conveyed into the lungs from the right side of the heart, through the *pulmonary artery*. This artery divides and subdivides, until the vessels become so small as to resemble hairs in size ; hence, they are called *capillary*, or hair-like vessels. These small vessels ramify over the thin walls of the air cells. Here the blood, which is impelled from the heart into these minute tubes, is separated from the air by the thin walls of the air cells, and coats of the capillary vessels. At this point, the air in the cells acting upon the blood in the capillary vessels, changes the dark venous blood to a bright red. It is then returned through another set of vessels, called pulmonary veins, to the left side of the heart. All the tubes or canals that convey blood *from* the heart are called arteries ; those that convey blood *to* the heart are called veins. The names, artery and vein, have no reference to the color of the blood which flows through them. The arteries were so named, from the ancients believing that they were air vessels.

As the inhaled air is the effective agent in converting venous blood into arterial, its chemical analysis is of interest. On examination, it is found to consist of two gases—oxygen and nitrogen. They are mixed, in the atmospheric air, in the proportion of one-fifth of oxygen, and four-fifths of nitrogen ; a small portion of carbonic acid.



The three following points all physiologists agree upon. *First.*—That the blood contains carbon. *Second.*—The carbon is changed into carbonic acid gas, and is in this state when it is removed from the system through the lungs and skin. *Third.*—The separation of carbon from the blood—and it may be, the union of oxygen with other elements of this fluid—changes it from a dark color to a vermillion red.

Two theories have been adopted to explain the formation of the carbonic acid gas eliminated from the system. One theory is, that carbon is converted into carbonic gas, *in the lungs*, by a union of oxygen with it from the inspired air. The other is, that in the lungs, the oxygen separates from the nitrogen, and unites with the blood, and in the general circulation a chemical union of the carbon and oxygen is effected, by which the carbonic acid gas eliminated from the system, through the lungs and skin, is formed. The latter view is more generally adopted by physiologists.

The following experiment will show, that water will pass through a membrane more readily than alcohol. Put a mixture of water and alcohol into a bottle, and leave it uncorked. Both the water and the alcohol have a greater affinity for air than for each other. Alcohol has the greatest affinity for the air, and will be diffused through it more readily than water, when there is no intervening obstacle. But tie a piece of bladder over the mouth of the bottle and let it stand a few days: the water will leave the alcohol, and pass through the bladder. By the aid of this experiment we shall endeavour to explain the interchange of fluids in the lungs.

The walls of the *air-vesicles*, (or little bladders, which are portions of the cuticle separated from the skin,) and coats of the blood-vessels are similar, in their mechanical arrangement, to the bladder tied over the mouth of the bottle, in the above experiment. The oxygen of the air has greater affinity for

blood than for nitrogen, and permeates the membranes that intervene between the air and blood, more readily than the nitrogen. The carbonic acid gas has a greater affinity for air than for blood. It will also pass through the wall of the blood vessels and air cells more readily than the blood.

The venous blood contains carbonic acid gas, which gives it a blackish red color. When this impure blood passes over the air vessels, a portion of the oxygen in the air cells permeates their walls and the coats of the minute blood vessels, and unites with the venous blood. At the same time, carbonic acid gas leaves the venous blood, passes through the coats of the blood vessels and air cells, and mixes with air. This interchange of product alters the color and character of the blood.

The lungs require to be supplied with pure air in proportion to the amount of carbonic acid gas eliminated from the system. This is regulated by the exercise and quantity of food taken. The man of active habits requires more air than one whose habits are sedentary; and the gormandizer more than a person who is abstemious.

The quantity of carbonic acid gas actually eliminated from the system depends on the *volume* of the *lungs*, the *movements* of the *ribs*, and the *purity* of the *air*.

“As the quantity of air inhaled is modified by the capacity of the respiratory organs, *the necessity of ample volume* of lungs will be elucidated by the following experiment:—Suppose a gill of alcohol, mixed with a gill of water, be put into a vessel having a square foot of surface, and over the vessel a membrane be tied, and that the water will evaporate in twenty-four hours. If the surface had only been six inches square, only one-fourth of the water would have evaporated through the membrane in the given time. If the surface had been extended to two square feet, the water would have evaporated in

twelve hours. Apply this principle to the lungs : suppose that there are two hundred cubic feet of carbonic acid gas to be carried out of the system every twenty-four hours. This gas, in time, will pass through a membrane of vesicular surface of two thousand square feet. If the lungs were diminished in size so that there would be only one thousand square feet of the vesicular membrane, this amount of gas could, and would not, be eliminated from the system. Under such circumstances the blood would not be purified. Again : suppose the two thousand square feet of membrane would transmit two hundred feet of oxygen into the system, every twenty-four hours ; if it should be diminished one half, this amount of oxygen would not pass into the blood." From the above illustrations some idea may be formed of the importance of well-developed chest and voluminous lungs, for by increasing the size of the lungs, the oxygen is more abundantly supplied to the blood, which more perfectly deprives it of its carbonic acid gas.

The chest, when properly formed, either of a child or an adult, may be contracted by compression, and the size of the lungs reduced. This may be effected by *moderate* and constant pressure of the apparel over the yielding cartilages and ribs, and this particularly so in infancy. Owing to the want of physiological knowledge of the pliant character of the cartilages and ribs in infants, too many mothers, unintentionally, contract their chests, and thus sow the seeds of disease by the close dressing of their offspring. Now, if this slight but steady pressure be continued from day to day, the ribs will continue to yield more and more, and in the course of a few months the chest will become diminished in size. This will be effected without any suffering of a marked character, but the general health and strength will most certainly be impaired. Let it then be remembered, that it is not the violent and temporary pressure, but the moderate and protracted that produces the contracted "genteel chest and waist."

We have before spoken of the baneful influence of tight dressing, as the prolific cause of bad health and deformity. The style of the dress of females of the present day is not so bad as it was formerly, yet, it is anything but what it ought to be for the free and full development of the chest and the important organs it contains. The fashions are copied from the "fashion plates" of the periodicals so widely circulated. The "latest fashions from Paris," contained in these plates, exercise an influence almost omnipotent over the minds of females.

Now, in every instance where the contracted, deformed, and as it is called "lady-like waist" is portrayed and put forth as "the fashion for the season," the Board of Health should be empowered to bring to account the publishers and venders of all such "fashion plates." If the plates which corrupt the morals are excluded by civil legislation, why not, with the same propriety, suppress those plates that have a tendency so adverse to health.

Let all mothers, who have *any real motherly regard* for the *health of their daughters*, make a bold stand against every thing that is any way calculated to produce that horrid, contracted, deformed, "*neat, lady-like waist*," as it is called. This horrid phrase, I am sorry to say, haunts girls of every class of society through years which should be devoted to sound physical education, and leaves them at last the prey of deformity and disease.

We have met with many ladies who defended the use of stays, and contended that the stays give a roundness to the waist that could not otherwise be attained. This we readily admit. But it should be understood that the natural waist is not round; it is broader from side to side, than from the front to the back. The Creator has made it so. What right, then, have we to dispute the work of God, and set up for ourselves

a standard for the human form, as we would with the fashionable shape of a bonnet or a coat? If we, as adults, think proper to persist in a right to mortify ourselves, let not our children be made sufferers of our sin. Whatever may be said, the round waist is a distortion of the natural shape.

One prevalent error among women, which leads to very mischievous consequences, is, that because the stays are not tightly laced, they cannot be hurtful. Now, to understand the true relation of stays to the health of the body, we must go back to the period when they were first used, and that is, to the period of childhood, when the growth and expansion of the chest was prevented by gentle but continuous and daily-repeated resistance, maintaining the chest and waist at the dimensions of childhood, while the rest of the body grows and enlarges into womanhood. Thus, in childhood, a girdle is made to encircle the heart, the lungs, the liver, and the stomach, which forces these important organs to seek accommodation in their narrow cell by mutual displacement. The adoption of stays by the adult would be found a process too torturing to endure; we have, therefore, no anxiety on that point. What we desire to see abandoned is, the detestable refinement of cruelty that begins in childhood, before the chest is sufficiently developed to resist this cruel infringement of woman's health and happiness.

We boast of our advanced state of civilisation, and profess to pity the deplorable heathen darkness of the Chinese, for preventing the feet of their females from growing. Mr. Trodescant Lay, in his work entitled "On the Chinese as they are," gives an account of the method of making fashionable female feet. Mr. Lay observes, that "at five years old, the rich man's daughter has her feet so firmly bound, that in the native phrase, the whole is killed. The foot, below the instep, is pressed into a line with the leg, to add to the height of the little sufferer, while two of the toes are bent under the sole,

that its breadth may be only of the least dimensions. The agony of such a process it would be hard to estimate ; but it is said to last about six weeks, when, I suppose, the wasting of the parts, and the cessation of many of their functions, have rendered the whole insensible to pain." We fancy that we hear the sentimental votaries of tight lacing and dressing, exclaiming with indignation, " what unfeeling wretches the Chinese are." But we beg to remind those who condemn this brutal practice upon the feet of young females, *that*, it is *innocent*, in comparison to the detestable system of girdling the heart, the lungs, the liver, and stomach of a young girl with stays and tight dresses.

Happily, however, that a change has taken place in the right direction ; and that the well-informed in this country, look down upon those females who practice tight lacing, as a sure sign of low breeding or defective education. We, therefore, most sincerely hope, that the days are numbered, for the foolish and sinful practice of tight dressing.

It should be remembered that the chest is not only most expanded at its lower part, but the portion of the lungs that occupies this space of its cavity contains the greater part of the air cells. Hence, from the lower part of two-thirds of the lungs, the greatest amount of carbonic acid gas is abstracted from the blood, and the greatest amount of oxygen is conveyed into the blood. For this reason, contracting the ribs at the lower part of the chest is far more injurious to the health than diminishing the size of the upper part of the chest.

It may be asked, can the size of the chest and the volume of the lungs be increased when they have been injudiciously compressed, or have inherited this unnatural form. In answer, we beg to say that such can be effected ; and the means for attaining this end are, a judicious exercise of the lungs by walking in the open air, reading aloud, singing, sitting erect,

and fully inflating the lungs at each act of inspiration. If the exercise be properly managed and persevered in, it will expand the chest and give tone and health to the important organs contained in it. But if the exercise be ill-timed, or carried to excess, the beneficial results sought will not be attained.

The quantity of air inhaled in the lungs, of ample size, at each unimpeded inspiration, is from twenty to forty cubic inches; but if the movement of the ribs and diaphragm be restricted, the blood will not be purified. If the elevation of the ribs and depression of the diaphragm are so restrained, that the quantity of air conveyed into the lungs be reduced to ten cubic inches, when twenty are needed, the results will be that only one-half of the carbonic acid will be eliminated from the system, and the blood receive but one-half as much oxygen as it requires. The blood, then, will be imperfectly oxydated, and partially freed of its impurities. This impure blood will be returned to the left side of the heart, and the whole system will suffer from the infringement of the organic laws.

We have before referred to the action of the ribs and diaphragm in breathing; but as their position and movements are not generally understood, and as this is attended with injurious effects in the application of clothing, we are wishful to place the subject in a clear and practical light, so that mothers may be able to turn it to account in the physical education of their children.

We may then observe, that the ribs are attached to the bodies of the vertebræ, or back bone, and that they pass obliquely around the chest, and make their attachments much lower at the front than at the back extremity, and also, that the central curved portion of the ribs are lower than the front extremity. As such is the relation of the ribs to the back bone, and the sternum or breast bone, the latter cannot be elevated while the back bone is stationary, without elevating

the front extremity of the ribs, which elevation enlarges the thoracic, or cavity of the chest. The lower boundary of the cavity of the chest is formed by the diaphragm. This is attached at its margins to the lower extremity of the breast bone, the cartilages and extremities of the seven lower ribs, and to that part of the back bone at the loins, called the *lumber vertebræ*. The diaphragm is convex, on its upper surface, and extends into the cavity of the chest.

The extension of the diameter of the lower part of the chest, by the elevation of the ribs and breast bone, depresses the convexity of the diaphragm, and this depression is still further increased by the action of its muscular margin, which contract simultaneously with the muscles that elevate the ribs and breast bone. The simultaneous action of these muscles and the diaphragm result from their being supplied with nerves from the same nervous system. While the central portion of the diaphragm is depressed, the abdominal muscles are relaxed, and the abdominal organs are depressed, which produces an increased projection of the abdominal walls and organs.

If, then, a band be drawn closely round the lower part of the chest or the abdomen, below the ribs, it operates in restricting the movement of the ribs. When any article of dress encircles either the chest or abdomen, so as to prevent an increase of its circumference, it has an injurious tendency, as it prevents the introduction of air sufficient to purify the blood. It is then obvious, that if any part of the dress restrict these movements, it is a violation of the organic laws, and nature will, sooner or later, sum up her account.

Now, to determine whether the apparel is worn too tightly, inflate the lungs, and if no pressure is felt, no injurious effects need be apprehended from this cause. In testing the closeness of the dress, some persons will contract to the utmost the abdominal muscles, and thus diminish the size of the chest by



depressing the ribs, and will then exclaim, "How loose my dress is." This is both deceptive and ridiculous. The proper test, is *a full inflation of the lungs*.

Respiration is greatly influenced by the different conditions of the brain. When it is tormented by anxiety, depressed by grief, or absorbed in abstract thought, the contractile energy of the diaphragm and muscles that elevate the ribs is much diminished, and the lungs are not fully inflated; the frequency of respiration is also less. By the influence of these causes, the blood is but partially purified, and the whole system becomes enfeebled. This is not unfrequently followed by the deposition of tuberculous matter in different parts of the system, and the individual eventually dies of scrofula, or consumption. This is exemplified in those persons who have met with reverses of fortune. Indeed, hundreds die yearly from the effect of depressed spirits. A remarkable instance is related by Loennec, of a religious establishment in France, where great austerities were practiced, and the mind absorbed in contemplating the terrible truths of religion, and in mortifying the flesh. The whole of the establishment, in the space of ten years, was several times depopulated, with the exception of the persons employed at the gate, in the kitchen and garden, with that fatal disease, consumption. The institution was suppressed by order of the French government.

Respiration is more frequent in females and children than in men. In disease, particularly that of the lungs, it is more increased in frequency than the action of the heart. In a state of rest, the number of respirations in a healthy man are fourteen to eighteen every minute. Usually, the heart beats four times to every respiration.

If a person respire eighteen times every minute, and inhales each time twenty cubic inches of air, there would be needed to supply his wants, 518,400 cubic inches of air, or 800 cubic feet, every twenty-four hours.

The inhaled air should contain one-fifth part of oxygen. At every inhalation, a portion of the oxygen permeates the vascular membrane and unites with the blood, which, at the same time, emits a certain amount of carbonic acid gas, *which unfit the air to be respired a second time.*

This may be elucidated by a simple experiment. Breathe into a vessel containing lime water, and in a short time a white film will be seen on the surface of the water. This is called the carbonate of lime; and this alkaline salt is formed by the carbonic acid gas, from the exhaled air, uniting with the lime.

It is a well-known fact, that a taper will not burn where carbonic acid alone exists; another proof that exhaled air contains carbonic acid gas, as the following experiment demonstrates:—Take a glass receiver to which a stop-tap is attached, and sink it into water until it displaces the air by filling the receiver. Then gradually raise it and breathe into it, avoiding as much as possible the ingress of the atmospheric air; then inhale the same air, and sink the vessel into the water. Repeat this several times, and then fill the receiver with the air that has been inhaled, several times; then turn the stop-tap and slide under the receiver a plate, upon which a sheet of paper is placed, while the open mouth of the receiver is kept below the water. By keeping the plate filled with water, and the stop-tap turned, no atmospheric air will pass into the receiver. After a taper is lighted, raise and invert the jar suddenly, being careful to keep the mouth of the jar covered with the paper; then raise the paper and pass the burning taper into it; the flame will be immediately extinguished for want of oxygen to support combustion, and in consequence of the presence of carbonic acid gas. It is then obvious, that to sustain a healthy tone of the physical system, the air that we breathe must be pure. What, then, must be thought of those females whom we daily meet in the public streets of our large

towns and cities with their faces covered with veils, and particularly in the heat of summer! They may well have pale, sickly faces, and complain of head-aches. The veils prevent them inhaling pure air, and they inhale and exhale the poison (carbonic acid gas) over and over again. If anything shows the unsoundness of female education, it is things like this. If they were taught, as they ought to be, the physiology of health, such practical sin and folly would soon be unknown.

Let it then be instilled into the minds of all children, that transgressions of the laws of health, *are violations of the laws of God*, and are therefore sinful; and that punishment in the way of disease will most assuredly follow, *sooner or later*.

In crowded rooms, which are not properly ventilated, the air is soon vitiated by the abstraction of oxygen, and the deposition of carbonic acid gas by the audience. The lights, under such circumstances, burn dimly: let the oxygen gas be more and more expended, and the lights will burn more feebly until almost extinguished. Air, in which lights will not burn with brilliancy, is unfitted for respiration. For this reason, before entering wells or subterranean passages, a lighted taper should be passed into them, and if the flame be extinguished, it shows the presence of carbonic acid gas; and if such places are entered before this deleterious gas is removed, instant death will follow. We may further observe, that in addition to the above-mentioned causes, which render the air unfit for respiration a second time, there is passing from the lungs and skin more than two pounds of waste matter every twenty-four hours. This impure air is diffused through the room, and if not removed, it will be inhaled into the lungs.

If the air becomes vitiated, whether from abstraction of oxygen, an excess of carbonic acid gas, or the exhalation from the lungs and skin, it will have a deleterious effect on the system, by rendering the blood impure; hence, pure air should

be freely admitted into, and the impure and vitiated as freely escape from, all public rooms, workshops, churches, chapels, and dwelling-houses. This is of more importance than warming the places, as an extra garment or an increased quantity of food will, in a great measure, compensate for that; but neither *extra garments*, nor *food*, will compensate for pure air.

If the school-room be not properly ventilated, the brains of the pupils will be supplied with impure blood, and the proper functions of the brain cannot be performed; hence, the pupils will manifest inability to study, defective memories, and headaches, caused by a want of pure oxygenated blood, and an excess of carbonic acid gas.

Above all, the sleeping rooms should be so ventilated that the air in the morning will be as pure as when retiring to rest in the evening. It would prevent the morning head-aches, and want of appetite so common among the feeble. Every room should be so constructed that pure air can be admitted freely, as impure air tends to weaken and destroy the system. The impure air of sleeping rooms is probably more ruinous to health than intemperance. Look around the country, and those who live in huts but little superior to the sheds that shelter cattle, are found robust and healthy. For the last thirty years we have slept with the window and door of our bed-room open, both winter and summer; indeed, we could not now, without much inconvenience, sleep with them shut. Those who spend their days and nights in rooms, in which the sashes are calked, to prevent the keen but healthy air from entering their apartments, need not be surprised at disease and suffering being their constant companions.

The proper ventilation of rooms has been sadly neglected; but it is now commanding the attention of many able minds. If due attention were paid to the ventilation of houses, much

bad health and suffering would have been prevented. Air should be introduced into our apartments *pure*; and ample provision should be made for the escape of the *vitiating air*. This can be done by constructing a ventilating flue in the chimney: this should be in contact with the flues for the escape of smoke, but separated from them by a thin brick partition. The heat of the current of air in the smoke flues will warm the separating brick partition, and rarefy the air in the ventilating flue. Communication to every room in the house should be had to such flues. The draught of air can be regulated by well-adjusted registers.

We will now direct our attention to the bad effects of impure blood upon the general system. The blood may be rendered impure by each of the influences before described, or by all combined. As one condition of health, the bones require pure blood, and if not supplied with it, their vitality will be impaired, they become soft and brittle, and disease will be the result. The four hundred muscles receive another portion of the blood: these, are attached to, and act upon the bones. Upon the health and contractile energy of the muscles depend the ability to move about and labour. Give these organs of motion impure blood, and they will become enfeebled; the step will lose its elasticity, the movements will be inefficient, and every muscle will be incapacitated to perform its usual office. The stomach, and all the other organs subservient to digestion of the food, are supplied with this impure blood. This impairs the digestive process, causing a faintness of the stomach, loss of appetite, a deranged state of the intestines, and all the symptoms of dyspepsia. This impure blood goes also to the lungs, in the *nutrient arteries*. The delicate structure of these organs need the requisite amount of pure blood to give them vigour and health; the blood not being of that character, the lungs lose their tone, and have not power to change the impure

quality of the blood. This dark, impure blood passes to the skin and destroys its health and beauty. The surface of the skin becomes covered with pimples and blotches. Drinks, made of various kinds of herbs, and pills and powders, are taken for this disease ; but these will never have any good effect while the cause of impurity exists.

This impure blood is sent to the brain, which produces nervous headache, bilious headache, and all kinds of aches ; confusion of ideas, loss of memory, impaired intellect, dimness of vision, dullness of hearing, and in process of time the brain becomes disorganized, and the thread of life broken.

A common cause of scrofula, is the want of an abundant supply of pure air, and free out-of-door exercise. A few years ago, some remarkable facts came under my own observation, strikingly corroborative of this. The medical attendant of the Roman Catholic Orphan Asylum for Females, Faulkner Street, Liverpool, invited me to go with him, to look at the girls in the institution. I gladly embraced the opportunity, and we proceeded there. As we approached the place, I could not help being struck with the dull, disagreeable, external appearance of the building, and its small windows. Indeed, everything external was ominous of disease within. On being admitted into the institution, the doctor led the way to the school-room, where we found a large number of girls of various ages. The ventilation of the room was very bad, and the stench of the atmosphere was most loathsome and sickening. The girls were dirty, pale, sickly and emaciated, and all more or less afflicted with scrofula ; some of them were in a dreadful state, and we learned that they had been the longest time in the institution. But how could it be otherwise with such a poisoned atmosphere. Indeed, the state of the atmosphere was so bad, that we could not bear in the room for any length of time. We then proceeded to the sleeping apartments,

which we found gloomy and close, and as badly ventilated as the school-room; and no doubt but the atmosphere at night would be quite as bad. The arrangement for producing disease was most scientific. Indeed, a more scientific arrangement for producing and developing *scrofula* and *consumption* could not have been devised. We met the matron, after inspecting this department, and remarked to her that we were very sorry to see the children in such a diseased state, and recommended that they should be allowed plenty of free out-of-door exercise, and the school-room and sleeping apartments be properly ventilated, and their skins kept clean. But to our astonishment we were informed that the free exercise recommended could not be allowed. "It is a religious institution;" she remarked, "the play you recommend would make them wild and rude, and detract their minds from their religious duties." But all our efforts were in vain to make her understand, that the way the poor miserable girls were treated was a *violation of the laws of GOD*; and that the *disease* with which they were afflicted was the *direct consequence*. But such was her ignorance of the laws of health, that she appeared incapable of understanding that they were violating the laws of God.

When we told her that things were very differently managed at the Protestant Orphan Asylum, she coolly remarked that "they have plenty of money there; we are very poor here, and cannot do like them." But we showed her that it was not a question of money, but of health. Finding that it was impossible for her mind to receive a single ray of scientific light, we left her in the glory of her ignorance.

But the matter did not rest here. The doctor brought the affair under the notice of the proper authorities of the institution, and a committee of inquiry was appointed to investigate the condition of the establishment. This committee ~~did~~ make an investigation, and reported that no fault could be

found with the mode of treating the orphans in the institution. The doctor was so disgusted with the report, that he at once resigned being the physician to the institution.

Now, what can be thought of such a committee, and their report, in this age of science. We were informed that the committee was just as well enlightened in the science of health, as we found the matron of the institution, which is fully corroborated by their report.

Here we have poor, helpless, orphan girls, placed at the mercy of a number of persons, totally ignorant of the proper means to keep them in health, and who reject all advice for that purpose.

We cannot say how the children are managed, at the present time, in the institution; but it ought to be inspected by competent persons and reported upon. If no improvement has taken place, we beg most respectfully to call the attention of the authorities of the institution to the following remarks. We wish it to be understood, that we have no sectarian feeling in the matter; it is purely a scientific investigation into the laws of health, which does not recognise any sect or creed.

It is well known to physiologists, that orphan children inherit constitutions from their parents more or less weakly, and it is found by long practical experience that, even in the best regulated Orphan Asylums, it is difficult to keep the children in average health. It therefore requires very little knowledge, to enable us to comprehend, that children who have inherited weakly physical systems, require every possible care and attention to the laws of health; and not to be disregarded, and set at nought, as they were in the Faulkner Street Orphan Asylum.

We left this asylum and made direct to the Protestant Orphan Asylum for Girls, in Myrtle Street. On entering this asylum we were particularly struck with the very remarkable



difference from the one we had so recently left. We found the rooms lofty, light, clean, and well ventilated, and all the children clean and neatly dressed. Now, with all these superior advantages over the Faulkner Street Asylum, we learned from the matron that it required every possible care to keep the children in health. On going through the yard, the doctor directed the attention of the matron to the bad smell from the sewer. "I am extremely obliged to you, sir," she remarked, "it shall be attended to at once." We found her a practical, common-sense woman, who seemed wishful to do all in her power to promote the health and comfort of the children under her charge.

What a different state of things in two institutions within so short a distance of each other, yet, both were established expressly for the protection, education, and training of poor orphan children. In one we found them wishful to avail themselves of every means to promote the health and happiness of the orphans; whilst, in the other, they indignantly repudiated all advice.

We have before observed, that an abundant supply of pure air, and free movements of the ribs and diaphragm, are of the utmost importance to the feeble and scrofulous individuals. The scrofula, so prevalent in the low, densely populated sections of our large towns, is commonly caused by the inhalation of vitiated air. Due renovation of the air we breathe, is really influential in protecting us against the inroads of disease. A constant circulation of pure air is one of the most effectual means of preventing contagion from fever. It is no unusual practice with some people, when a person is sick of an acute disease, to prevent the ingress of pure air, simply from the apprehension that the patient will take a cold. There is also another prevalent custom of a number of individuals sitting in the sick room, which tends to vitiate the air, and, as

a natural consequence, increase the suffering and danger of the sick person. In fevers, or inflammatory diseases of any kind, let the patient have pure air to breathe, for be it remembered, that purer the blood, the greater the power of the system to remove disease, and less liability to contract colds.

## CHAPTER IX.

### THE CIRCULATION OF THE BLOOD.

THE circulation of the blood is carried to and from different parts of the system with the agency of the *heart, arteries, veins,* and capillaries.

The heart is placed obliquely in the left cavity of the chest, the base being directed backwards, towards the right shoulder, while its apex points forward to the left, about three inches from the sternum or breast bone, to the space between the fifth and sixth ribs. Its under side rests upon the tendinous portion of the diaphragm. It is surrounded by a sac, called the *pericordium* or *heart case*. The interior surface of the membrane secretes a fluid that lubricates the exterior of the heart, and obviates friction between it and the pericordium. In health, there is usually about a teaspoonful of this fluid; in disease, it sometimes amounts to several ounces, causing what is called dropsy of the heart.

The heart weighs from eight to ten ounces; it is composed of muscular fibres, that traverse it in different directions, some longitudinally, but most of them in a spiral direction. The human heart, like that of the sheep, is a double organ; or it is divided into two parts or sides, the right and the left. The compartments of the two sides are separated by a partition.

The right side of the heart is divided into two parts, named the *auricle* and *ventricle*. The auricle, from the Latin *auricula*, an ear. It is very uneven in the inside, but smoother on the outside, and terminates in a narrow, flat, indented edge,

representing a cock's comb, or in some measure the ear of a dog—hence its name. It is called by butchers the deaf ear. The ventricles, from the Latin, *venter*, the belly, have upon their internal surface pillars of flesh, called *columnæ carneæ*. The columns can be seen upon the interior of the heart in domestic animals. The wall of the left ventricle in the heart in human beings is much thicker than those of the right; and the same is true of domestic animals. From the right ventricle, the venous blood passes through the pulmonary artery to the lungs. At the commencement of this artery there are placed three valves, called sigmoid, or semi-lunar valves of the pulmonary arteries. Between the auricle and ventricle of the left side of the heart there are two triangular valves, which guard the orifice of their communication, called mitral, from the Greek, *mitra*, a mitre. They are as much thicker and stronger than the tricuspid valves, as the contractile power of the thick walls of the left ventricles exceeds that of the right ventricle. To the free margins of these valves are attached small, tendinous cords, that connect them with the fleshy pillars upon the interior of the ventricle.

From the left ventricle proceeds the large artery, called the AORTA, from the Greek, *airo*, I raise or suspend; because it is suspended from the heart. It is the main trunk of the arterial system, through which the arterial blood passes to the whole system.

The capacity of the ventricles of the heart is nearly the same; yet, the walls of the left side are thicker than those of the right, and their contractile energy varies to a considerable degree. The thinner wall of the right side possesses, in health, power sufficient to impel the blood into the delicate and yielding lungs. The left side, from the greater thickness of their walls, is adapted to force the blood into the more dense structure of the general circulatory system.

The heart is supplied with arteries and veins, which ramify between its muscular fibres, through which the blood passes. It has a few absorbents, and many small nervous filaments from the great sympathetic nervous system.

The ARTERIES are elastic, cylindrical tubes, which convey the blood from the heart to every part of the system. They are dense in structure, and preserve, for the most part, the cylindrical form when emptied of their blood, which is their condition after death. They were considered by the ancients as air vessels for the transmission of vital spirits; hence named arteries, signifying to contain air. They are composed of three coats. The external coat is firm and strong; the middle, or fibrous coat, is composed of yellowish fibres. This coat is elastic, fragile, and thicker than the external coat; its elasticity enables the vessel to accommodate itself to the quantity of blood it may contain. The internal coat is a thin, serous membrane, which lines the interior of the artery, and gives the smooth surface which it presents. It is continuous with the lining membrane of the heart.

The arteries do not terminate directly in veins, but in an intermediate system of vessels, which, from their very minute size, are called capillaries. Communications between arteries are free and numerous; they increase in frequency with diminution in the size of the branches, so that through the medium of the minute ramification, the entire body may be considered as one united circle or inosculation. In their distribution through the body they are enclosed in a loose, cellular investment, called a sheath, which separates them from the surrounding tissues. The sheath contains their accompanying veins, and sometimes nerves. The coats of the arteries are supplied with blood, like other organs of the body; they are also provided with ganglionic or nutritive nerves.

The PULMONARY ARTERY, from the Latin, *pulmo*, the lungs,

has its origin at the base of the right ventricle, in form of the organ of the aorta. It ascends obliquely to the under surface of the arch of the aorta, where it divides into two branches, one which passes to the right lung, the other to the left lung. These divide and subdivide in the structure of the lungs, and terminate in capillary vessels, which form a net-work around the bronchial cells, and become continuous with the minute branches of the pulmonary veins. This artery conveys the impure blood to the lungs, and with its corresponding veins, establishes the pulmonic or lesser circulation. The pure, or arterial blood, is contained in the left ventricle of the heart. The *aorta* proceeds from this ventricle, and gives off branches which divide and subdivide to their ultimate ramifications, constituting the great arterial tree, which pervades, by its minute subdivisions, every part of the organization. This great artery and its divisions, with their returning veins, constitute the systematic or greater circulation. The aorta ascends, at first to the right, then curves backwards to the left, and descends on the left side of the spinal column, behind the heart. It is divided into the ascending and descending aorta. In the thorax, or chest, it is called the *thoracic aorta*; in the abdomen, the *abdominal aorta*.

The brain is supplied with blood, which enters it by four different passages—two in front, called right and left carotid arteries; and two in the back of the head, called the right and left vertebral arteries. It is curious to observe the contrivance which prevents the blood from entering the delicate mass of the brain too suddenly and forcibly. Before the arteries are permitted to enter the skull, they are made to traverse several winding and almost retrograde passages, and encounter several obstructions that serve to check the force of the current. The blood then enters the skull through four different arteries, and all unite at the base of the brain to form one great depôt,

which, though not exactly in the form of a circle, is denominated the circle of Willis, and it is from this circle that the blood finally takes its departure to enter the substances of the brain.

Although the blood enters the brain by four different channels, it is returned through one great vein, called the longitudinal sinus, which is situated in the medium line, between the hemispheres of the brain. It commences near the organ of individuality, and follows the skull over to the lower part of philoprogenitiveness; it then divides into two branches, one passing to the right, and the other to the left, which leaves the skull near combativeness. The course of this great sinus may be traced on the inner surface of the skull, by the deep impression it makes in the bone, particularly in the back part, where it is much larger than in the front, in consequence of the numerous veins which enter into it.

The stomach is supplied with blood not only from its own *coronary* arteries, but from the arteries that pass to it from the liver and spleen. A peculiarity of these arteries is that, though arising from three sources, they inosculate, or unite with each other. The arteries that go to the different parts of the intestines, also present the same arrangement. This arrangement is the same with the arteries that supply the brain with blood. The nutrition of the system, the continuance of the digestive functions, the varied offices of the muscles, and the functions of the brain depend on a continuous flow, and full supply of blood. If an artery becomes obliterated by pressure or disease, a circumstance by no means unfrequent, the organs are still supplied with blood, from the inosculating or united arrangement of the arteries. When an arterial trunk is ligated or rendered impervious to blood, the minute, anastomosing arteries, that perform a particular office, become enlarged, so that the nutrition of the organ is not impaired.

The **VEINS** are the vessels which return the blood to the auricles of the heart, after it has been circulated by the arteries through the various tissues of the body. They are thinner in structure than the arteries, so that when emptied of their blood, they become flattened and collapsed. The veins of the systematic circulation convey the dark, impure, venous blood to the right auricle of the heart; they are found, after death, more or less distended with blood. The veins of the pulmonic circulation resemble the arteries of the systematic circulation; containing, during life, pure or arterial blood, which they transmit from the capillaries of the lungs to the left auricle.

The veins commence by minute radicles in the capillaries, which are every where distributed through the texture of the body, and converge to constitute larger and larger branches, till they terminate in large trunks which convey the venous blood directly to the heart. In diameter they are much larger than the arteries, and like those vessels, their combined area would constitute an imaginary cone, the apex of which is placed at the heart, and the base at the surface of the body. The communications between the veins are more frequent than those of the arteries, and take place between the larger as well as among the smaller vessels. The office of these unions, or inosculations, is very apparent, as tending to obviate the obstructions to which the veins are peculiarly liable, from the thinness of their coats, and from inability to overcome great impediments by the force of their current.

Veins, like arteries, are supplied with nutrient vessels; and it is to be presumed, that nervous filaments from the ganglionic nerves are distributed to their coats.

The veins are composed of three coats: external, middle, and internal. The external coat is dense and firm, resembling the cellular tunic of the arteries. The middle coat is fibrous, like that of the arteries, but extremely thin. The internal



coat is serous, and also similar to the arteries. It is continuous with the lining membrane of the heart at one extremity, and with the lining membrane of the capillaries at the other. At certain intervals, the internal coat forms folds or duplicates, which constitute valves. They are generally composed of two semi-lunar folds, one on each side of the vessel. The free extremity of the valvular folds is concave, and directed forward, so that while the current of blood sets towards the heart, they present no impediment to its free passage ; but let the current become retrograde, and it is impeded by their distention. The valves are the most numerous in the veins of the extremities, particularly the deeper veins situated between the muscles ; but in some of the smaller veins, no valves exist.

The **CAPILLARIES** constitute a microscopic net-work, which is distributed through every part of the body, so as to render it impossible to introduce the smallest needle beneath the skin without wounding several of these fine vessels. It is through the medium of the capillaries that the operations of nutrition and secretion are performed. They are remarkable for the uniformity of diameter, and for the constant divisions and communications which take place between them. They inosculate with the terminal extremity of the arteries, and with the commencement of the veins. The important operation of converting the nutritive materials of the blood into bone, muscle, &c., is performed in this part of the circulatory system. When the matter deposited by these vessels exceeds that removed by the absorbents, the individual increases in bulk.

The walls of all the cavities of the heart are composed of muscular fibres, which, like other parts of the muscular system, are endowed with the property of contracting and relaxing. The contraction and relaxation of the muscles of the heart, produces a diminution and enlargement of both the auricular

and ventricular cavities. These occur at every beat or pulsation of the heart.

We have before observed that the blood is carried to and from the heart by the agency of the *arteries*, *veins*, and *capillaries*, which are found in every tissue of the system. Indeed, they are necessary to the proper distribution of the blood. The blood is carried from the heart in the arteries; 1st, by the contraction of the muscular walls of the heart. The energy of the contraction of the heart varies in different individuals. It is likewise modified by the health and tone of the general system. It is difficult to estimate the muscular power of the heart: but, comparing it with other muscles, and judging from the force with which the blood is ejected from a severed artery, it must be great. 2nd.—The contractile and elastic middle coat of the arteries renders important aid to the heart in impelling the blood to the minute vessels throughout the system. 3rd.—The peculiar action of the minute capillary vessels is considered by some physiologists to be of much importance as a motive power in the arterial circulation.

The blood is returned to the heart through the veins by the contraction of the venous coat, and the propulsive power of the heart, arteries, and capillary vessels; this is shown by the immediate arrestment of the blood, which follows, when these forces are suspended. There are concurrent causes which are supposed to have some influence upon the venous circulation. One is the suction power attributed to the heart in drawing blood towards it. Another important agency has been found, by physiologists, in the inspiratory movements which are supposed to draw the blood of the veins in the chest, in order to supply the vacuum which is created there by the elevation of the ribs and the descent of the diaphragm. But one of the most powerful causes which influence the venous circulation, is the frequently-recurring action of the muscles upon the

venous trunks. When the muscles are contracted they compress that portion of the veins which lie beneath their contracted bellies, and thus force the blood from one valve to the other towards the heart. When they are relaxed, the veins refill, and are compressed by the recurring action of the muscles.

The muscles exercise an agency in maintaining the venous circulation at a point above what the heart could perform. As the pulsations are diminished by rest, so they are accelerated by exercise, and very much quickened by violent effort. There can be little doubt that the increased rapidity of the return of blood through the veins, is of itself a sufficient cause for the accelerated movements of the heart during active exercise. When a large number of muscles are called into action after repose, as when we rise from a recumbent or sitting posture, the blood is driven to the heart with a very strong impetus. If that organ should be diseased, it may arrive there in larger quantity than can be disposed of, and death may be the result; hence, the necessity for the avoidance of all sudden and violent movements, by those who have either functional or structural disease of the heart.

The blood is composed of two parts: a watery fluid, called *serum*, and a solid portion called the *coagulum*, or *clot*. The coagulum contains *albumen*, a white substance which forms on the upper surface, called *fibrine*. The color of the red is owing to the presence of iron, though some physiologists think that it depends on an animal substance of a gelatinous character.

The blood is not necessarily red. It may be white, as in fishes; transparent, as in the insect; or yellowish, as in reptiles. There is no animal in which the blood is red in all parts of the body. The ligaments and tendons in human beings are not supplied with red, but with white blood.

Ordinarily, a complete revolution of the blood is effected

every *three minutes*. The ventricles contract, or the pulse beats, seventy-five times in a minute in an adult, one hundred and forty in an infant, and in old age about sixty. The blood constitutes about one-fifth part of the weight of the whole system. As about two ounces are expelled at each contraction of the ventricles, thirty-five pounds, on an average, must pass through the heart every three minutes, seven hundred pounds every hour, and sixteen thousand pounds, or *eight tons*, every twenty-four hours.

If any part of the system be deprived of blood, its vitality will cease; but if the blood be diminished in quantity to a limited extent, only the vigour and health of the parts will be impaired. But if the constituent elements of the blood be changed, or, in other words, if the blood becomes impure, the functional action of the different organs of the system will be deranged, and active disease may be induced.

Now to favor a free and regular supply of blood to every part of the system, the following conditions should be observed :

1st.—Wear the clothing loosely on *every part of the system*, as compression of any kind impedes the passage of blood through the vessels of the compressed parts. The observance of this condition is particularly important in respect to the chest, as this cavity contains the lungs, heart, large arteries and veins. The blood that passes to and from the brain, traverses the vessels of the neck. If the dressing of this part be tight, the circulation will be impeded, and the functions of the brain will be impaired. This remark is particularly important to scholars, public speakers, and those disposed to apoplexy and other diseases of the brain.

As many of the large veins lie immediately beneath the skin, through which the blood returns from the lower extremities, if the garters used to keep up the stockings, or belts to any other article of apparel, in proper position, should be tight and

inelastic, the passage of blood through these vessels would be obstructed, producing, by their distention, the varicose or enlarged veins. Hence *elastic bands* should always be used for these purposes.

2nd.—The temperature of all parts of the system should be as equal as possible, as a chill on one portion of the body diminishes the size of its blood vessels, and the blood which should distend and stimulate the chilled part will accumulate in other organs. The deficiency of blood in the chilled parts produces weakness, while the superabundance of blood may cause disease in another part of the system.

The skin should be kept not only of an equal temperature, but the warmth of it should be so maintained, by adequate clothing, that no chill shall produce a contraction of the circulating vessels. If the skin be not kept warm, the blood will recede from the surface of the body, and accumulate in the internal organs. Cleanliness of the skin and clothing are likewise demanded, for these conditions favour the free action of the cutaneous vessels.

3rd.—The action of the muscles is one of the important forces which impel the blood through the arteries and veins; hence, daily and regular exercise of the muscular system is required, to sustain a vigorous circulation in the extremities and skin, and also to maintain a healthy condition of the system. The best stimulants to improve the sluggish circulation of an indolent person, whose skin is pale and whose feet and hands are cold, are the union of muscular exercise, agreeable mental action, and the systematic application to the skin of friction and bathing in cold water.

4th.—When a considerable number of muscles are called into energetic action, a greater quantity of blood will be propelled to the lungs and heart in a given time, than when the muscles are in a state of comparative inaction. The flow of

blood to the lungs and large veins, before the range and frequency of the movements of the respiratory organs are increased in a degree corresponding to the accumulation of blood in the lungs, is attended by a painful sensation of fulness and oppression in the chest, with violent and irregular action of the heart. This condition of the organs within the cavity of the chest, called congestion, may be followed by cough, inflammation of the lungs, asthma, and structural disease of the heart. To avoid such sensations and results, when we feel necessitated to walk or run a considerable distance in a short time, commence the movements in a moderate manner, increasing the speed as the respiratory movements become more frequent, and their range more extensive, so that a sufficient amount of air may be received into the lungs to purify the increased quantity of blood forced upon them. The same principles should be observed when commencing labour, and driving horses and other animals.

It cannot be too strongly impressed upon all minds, that it is of the greatest importance in the economy of health to maintain the blood of the system in a state of purity, and this can be done by proper attention to the skin, the muscles, digestion and respiration.

1st.—If the blood has become impure, it cannot be purified by taking large doses of patent pills, powders, and drops. The blood may become impure by retention of the waste matter which should have been removed from the system by the agency of the vessels of the skin, which have become inactive. This inactivity may be produced by improper and inadequate clothing, or by want of cleanliness, as explained in the chapter on the skin. Now, the only successful method to be pursued for purifying the blood in such cases is to observe the directions given relative to bathing and clothing. See pages 42 and 48.

2nd.—The blood may be made impure by the chyle being deficient in quantity or defective in quality. This state of the chyle may be produced by the food being improper in quantity or quality, or by being taken in an improper manner, at an improper time, when the system is not prepared for it. The remedy for impure blood produced in any of these ways, is to correct the injudicious method of using food, and practically attend to the conditions for the perfection of the digestive process. See page 95.

3rd.—The blood may be rendered impure by not supplying it with oxygen in the lungs ; and by carbon not being removed from the system through this channel. When impurities of blood are produced in this manner, it will be well to reduce to practice directions in the chapter on *Respiration*.

## CHAPTER X.

### THE VOICE : ITS USE AND EDUCATION.

THE voice consists in the production of a particular sound, which the air, when driven from the lungs, produces. It is chiefly formed in that portion of the respiratory organs called *larynx*. Incidentally, the other portions of the respiratory organs are subservient to sound : the tongue, nasal passages, muscles of the fauces, and face.

The larynx is a kind of cartilaginous tube, which, taken as a whole, has the general form of a hollow reversed cone, with its base upward toward the tongue, in the shape of an expanded triangle. It opens into the pharynx, or swallow, and unites to the windpipe. The walls of the larynx are chiefly formed by the union of five cartilages. These are bound together by ligaments, and moved by muscles. The vocal cords, or ligaments, are formed by elastic parallel fibres, enclosed in a fold of mucous membrane. They are about two lines in width, and pass from the anterior of the thyroid cartilage to the two arytenoid cartilages. The one is called the superior, and the other the inferior, vocal ligament. The cavity of depression between the superior and inferior ligaments, is called the ventricle of the larynx. The aperture or opening between the vocal cords, is the *glottis*, or *chink of the glottis* : it is about three-fourths of an inch in length, and one-fourth of an inch in diameter, the opening being widest at the back part. This opening is enlarged and contracted by the agency of the



different muscles of the larynx. The cartilages of the larynx have attached to them, and are acted upon, by eight pairs of small muscles.

The larynx is connected by muscles with the sternum or breast bone, the cesophagus or gullet, the base of the skull, the hoyid bone, between the base of the tongue and the larynx, the lower jaw and the tongue. In addition to the parts described, the larynx is supplied with a large number of blood vessels, nerves from the ganglionic system, and two large nerves from the eight pair. The numbers and size of the nervous filaments distributed to the mucous membrane of the larynx, render it more sensitive than any other portion of the respiratory passage.

In the formation of voice, each of the portions, before described, perform an important part. The cartilages give form and stability to the organs; and by their movements vary the width of the glottis. When the glottis is erect, the chink is open, as in inspiration; when depressed, as in swallowing food and drink, it covers and closes this aperture. This prevents the introduction of articles into the air-passages, and probably modifies the sounds as they issue from the glottis.

The muscles of the neck elevate and depress the larynx; the muscles of the larynx increase and diminish the width of the glottis; at the same time the vocal cords, which vary the vocal sounds, are relaxed or lightened, while the muscles of the face open and close the mouth. It is now a well-established fact, that the vocal cords are the principal agents in the formation of the voice. The tongue, which many have supposed to be the most important organ in speaking, is not so essential to sound; as in some cases of the removal of the tongue, the person thus mutilated could speak with fluency.

Sound depends on the forcible ejection of air from the chest, through the chink of the glottis. The velocity of the

expelled current of air, and the tension of the vocal ligaments, are the principal circumstances that modify the character of sound. The size of the larynx, the volume and health of the lungs, the conditions of the fauces and nasal passages, the elevation of the chin and tongue, the development and freedom of action of the muscles which connect the larynx with the sternum, hyoid bone, lower jaw, tongue, and the opening of the mouth, contribute to the modulation of sound.

The larynx is much more developed and prominent in men than in women. In men the anterior angle of the thyroïd cartilage is acute, while in women it is rounded, and the central slope of the superior border is less deep, and the epiglottis smaller and less prominent than in men. In infancy the formation of the larynx shows less difference in the male than the female, but at a later period it is more developed in the male than the female. It is very remarkable that this increase is not progressive, like that of other organs ; but, on the contrary, develops itself at once at the period of puberty.

Common observation shows that the voice can be changed and modified. Those who are engaged in noisy occupations exert their vocal organs more strongly than those of more quiet pursuits. Sailors, and drill-sergeants of the army, acquire peculiar power and force in speaking, which not only affects the structure of the vocal organs, but varies their intonations. The voice is strong in proportion to the development of the larynx, and the capacity of the chest. This shows the importance of properly educating the larynx, the lungs, and upper part of the abdomen, by duly exercising them.

The attitude affects the modulation of the voice. When we stand erect, the movement of the whole respiratory organs are most free and effective. The larynx is brought forward by the erect position of the head and the elevation of the chin. These operations are effected by the tension of the muscles

that connect the larynx with the lower jaw and breast bone. The muscles of the larynx are then brought to a proper relation for action, by which a tension of the vocal cords is produced, that favors a clear and harmonious enunciation; hence, children should be trained to stand erect in speaking, reading and singing. If they read or sing sitting, the position should be erect; for this position favors the free and effective action of the respiratory organs.

Easy, melodious speaking or singing requires atmospheric elasticity; and, as pure air is more elastic than impure, so school-rooms and singing-halls should be well ventilated. The imperfect ventilation of churches is a most fruitful cause of the loss of voice among clergymen.

The sound of the voice is modified, and enunciation rendered more or less distinct, in proportion as the jaws are separated in speaking, and the fauces and nasal passages are free from obstruction. For this reason children should be taught to open their mouths when speaking, reading, or singing, that the sounds formed in the larynx, and modified in the fauces, may have an unobstructed egress. If the fauces are obstructed by enlarged tonsils, a condition by no means uncommon in children, they should be removed by a surgical operation, which is not only effective, but safe, and not painful. These tonsils are situated on each side of the root of the tongue, and when enlarged they obstruct the passage through which the air-passes to and from the lungs, which renders the respiration both difficult and distressing.

The muscles of the neck and larynx should not be compressed with a cravat, or other close dressing, as it would impede their movements, and diminish the power of making sounds. Hence, the clothing of the neck of public speakers and singers should be loose. But the clothing should not be thick when the vocal organs are used, as a thick dress would

be too warm and cause a flow of blood to these parts, which will be attended by subsequent debility. The warm and close dress of the neck, while speaking, is a common cause of loss of voice, improperly called *bronchitis*, a disease very prevalent among public speakers. The affection is not of the *bronchi* but of the larynx.

The varied tones in speaking and singing are caused by different degrees of tension in the vocal cords, and different conditions of the auxiliary organs. The different conditions of the vocal apparatus are produced by various degrees of contraction of the muscles of the larynx and neck. To induce a state of these muscles suited to produce a certain sound in speaking or singing, requires practice ; or, properly speaking, education of the muscles. The successful mode of training the vocal organs is similar to that adopted in learning to play the piano, or dancing. When a child learns to dance, in making different steps, he calls into action certain muscles. At the commencement, these steps are made in a stiff, ungraceful manner ; much effort is also required to assume the different positions. By repeated contraction of the muscles, the movements become more ready and graceful, while the labour and effort of dancing are diminished. The same is true in learning to play any musical instrument.

To produce a proper state of the vocal organs, let an effort be made to produce a particular sound. Let this effort be repeated again and again for a short period. After relaxing or resting the organs, call them again into action. Let there be repetition until all the parts of the vocal apparatus can be called into ready and harmonious action. This repetition is as necessary in learning to read as in singing. Practice a child a long time in pronouncing syllables and words before you begin to teach it to read sentences ; there is nothing gained in the attempt to instruct a child to pronounce the letters of

the alphabet, before the vocal organs are so developed, that distinct utterance can be given to the proper sound.

No part of the vocal organs is wanting with those who stammer. Some parts may be more developed than others ; but generally, some parts are but imperfectly under the control of the will. Such portions of the vocal organs will assume an irregular and rapid movement ; while other parts, the movements of which are essential, remain comparatively inactive. This can be seen by comparing the movements of the lips, tongue, and larynx, while attempting to speak, in a person who stammers, with the corresponding parts, while speaking, in a person who does not stammer. In the young and middle aged this defect can be removed by patient and judicious training. Let such sounds be made and such words be uttered as can be made and uttered with distinctness. Let there be repetition, until the words can be spoken at any time with readiness ; then take for a lesson other words more difficult, and pursue a similar process of training and repetition, until each portion of the vocal organs can be called into a ready and harmonious action in giving utterance to any word in common use.

“ The organs of the voice, in common with all other parts of the bodily frame, require the vigour and pliancy of muscles, and the elasticity and animation of mind which result from good health, in order to perform their appropriate functions with energy and effect ; but these indispensable conditions to the exercise of the vocal organs are, in the case of most learners, very imperfectly supplied. A sedentary mode of life, the want of invigorating exercise, close and long-continued application of mind, and, perhaps, an impaired state of health or a feeble constitution, prevents, in many instances, the free and forcible use of those muscles on which voice is dependant. Hence, arises the necessity of students of elocution practising physical exercises, adapted to promote the general muscular vigour, as

a means of attaining energy in speaking ; the power of any class of muscles being dependant on the vigour of the whole system.

“ The art of cultivating the voice, however, has, in addition to the various forms of corporeal exercise practised for the general purpose of promoting health, its own specific prescription of securing the vigour of the vocal organs, and modes of exercise adapted to the training of each class of organs separately.

“ The results of such practice are of indefinite extent ; they are limited only by the energy and perseverance of the student, excepting, perhaps, in some instances of imperfect organisation. A few weeks diligent cultivation are usually sufficient to produce such an effect on the vocal organs, that persons who commence with a feeble and ineffective utterance, attain, in a short period, the full command of clear, forcible, and varied tone.

“ Gymnastic and calisthenic exercise are invaluable aids to the culture and development of the voice, and should be steadily practised. But physical exercise in any form, adapted to the expansion of the chest, and to the freedom and force of the circulation of the blood, will serve to impart energy and glow to the muscular apparatus of voice, and clearness to its sound. There is, therefore, a great advantage in always practising some preliminary muscular action as an immediate preparation of vocal exercise.”

## CHAPTER XI.

### THE BRAIN, AND ITS ORGANIC CONDITIONS, IN RELATION TO THE GENERAL ORGANISATION.

THE brain has always been a subject of much learned discussion ; but until the time of Dr. Gall, the little that was known concerning it was of no practical use, and only tended to distract the minds of those medical students who endeavoured to understand it.

Different opinions were entertained by the ancients regarding the use of the brain. Some believed, or rather suspected, that the brain was the seat of the mind ; others, with Plato, considered the heart the seat of the passions, and the brain the habitation of the higher and nobler sentiments. Hippocrates regarded the human brain as a sponge, which imbibed the moisture of the body. Aristotle, on the contrary, viewed it as a humid mass, intended to temper the heat of the body. Descartes believed that the pineal gland, a part about the size of a pea, at the centre of the brain, was the habitation of the mind. Some, again, pretended to think that the brain was merely intended to balance the face, and prevent it from inclining too much forward, and that the mind resided in every part of the body.

Although the fundamental principle, that the brain was the organ of the mind, was fully established by scientific men, before the time of Gall, yet, to this great man is due the credit of having demonstrated that the brain is composed of a number

of organs with different functions. The brain and spinal cord are in two equal and symmetrical halves, called hemispheres, one of which is contained in the right side of the skull, and the other in the left. Every essential part that is found upon one hemisphere is found in a corresponding place on the opposite. Thus phrenologists have discovered about forty organs of mind in one hemisphere, and a corresponding number of organs on the other side ; thus upwards of forty nerves proceed from one hemisphere of the brain and spinal cord to different parts of the body, and an equal number proceed from the other hemisphere in a similar manner. This explains why nervous diseases sometimes affect one side of the face and body and not the other.

The division of the great organs of the mind into hemispheres, corresponds with the fact, that all the organs of the body that obey the mind are double ; so are also the organs of the senses that carry information to the mind. Thus we have two hands, two feet, two eyes, &c. The body, and particularly the face, may therefore be said to be divided into right and left hemispheres ; and in this is a good illustration of the manner in which the brain is divided. The line which divides the right from the left hemisphere is called the *medium line*. The commissures of the brain are parts that extend across from one hemisphere of the brain to the other, and are evidently intended to produce unity of action between them ; so that although the great organ of the mind is double, the operations of the mind are single ; and notwithstanding the organs of the senses are double, the sensations are single. One side of the head cannot be angry while the other is pleased ; one side cannot delight in music while the other is averse to it ; but both hemispheres act together as if they were one, which could not possibly be the case, if they were not intimately united by means of commissures.



Phrenology was not discovered by dissection of the brain ; but by observing the agreement between the dispositions of men and the lower animals, and the forms of their heads. The brain was afterwards dissected, and its structure examined with great care, in the hope that it would shed some new light upon the subject. Anatomy has been of little use to phrenology ; we are indebted, however, to phrenology for much useful knowledge concerning the anatomy of the brain. So far as the anatomy of the brain is understood, it is in beautiful harmony with phrenology ; but it is a great mistake to suppose that phrenology is dependant upon anatomy for evidence by which to establish its truth. Those who object to phrenology because it cannot be proved by dissection, evince an unpardonable ignorance of the subject. Most people cannot understand why so many medical men, who are supposed to know the nature of the brain, disbelieve in phrenology ; the truth is, they are not on that account better able to judge concerning the truth of phrenology than those who are entirely ignorant upon the subject. Any man, who is capable of perceiving the forms and sizes which the head assumes in different individuals, and of comparing their development with their conduct, can judge of the truth of phrenology as well as the most eminent medical professor.

For a fuller description of the brain, see "*Phrenology Made Practical.*"

PHRENOLOGY teaches that the brain is the material agent of the mind : *not that the brain is itself the mind.* We take for granted that mind is a spirit, complete as a unit in itself ; but this spirit, as we all see, makes known its thoughts and feelings by means of the brain as an instrument to come into union with the external world.

The mind being the innermost spring of our nature, none of our faculties are capable of perceiving its incorporeal existence.

As a matter of sequence, what our faculties cannot perceive, they cannot directly act upon. Therefore, when people talk of improving the mind, it must be the physical instrument or agent of the mind to which their language refers. The spirit is only under Him who breathed into dust the breath of life, creating thereby a living soul. To improve, implies superiority ; but no one will arrogate the power to improve souls. Education needs not so deep an influence. All that man can do is to improve the agent, to render more fit the earthly tabernacle of the soul ; and this we may do, and do well. No one regards the eye itself as sight : we all know that it is the agent of sight.

The constant relation between mental and moral power, and development of brain, explains why capacities and dispositions are so different ; and shows, incontrovertibly, that the cultivation and improvement of the moral and intellectual faculties can be successfully carried on *only*, by acting in obedience to the laws which govern organisation, and associating together those faculties, the organs of which are simultaneously progressive in their growth. In infancy, the intellectual powers are feeble and inactive. This arises solely from the inaptitude of a still, imperfect brain ; but in proportion as the brain advances in development and vigour, by cultivation, the mental faculties also become vigorous and active.

The brain holds an important relation to all the other organs of the system. To the muscular system it imparts an influence which induces contraction of the fibres ; by this relation, they are brought under the control of the will. The digestive, respiratory, and circulatory apparatus is enabled to perform its functions by the influence imparted to it by the cerebral organs of the nervous system.

Now, as the different organs of the system are dependant on the brain and spinal cord for efficient functional action, and as

the mind and brain are closely associated during life, the mind can only act in strict obedience to the organic laws which regulate the brain. It becomes, then, an object of primary importance in education to discover what these laws are, that we may yield them willing obedience, and escape the numerous evils consequent on their violation.

The brain is subject to the same general laws as all the other organs of the system, and that a sound original constitution is the *first* condition of its healthy action. If the brain from birth be free from all hereditary taints and imperfections, and has acquired no unusual susceptibility from injudicious treatment in infancy, it will resist a great deal in after life before its health will yield. But if, on the other hand, it has inherited deficiencies, or early mismanagement has fixed upon it an unusual proneness to morbid action, it will yield under circumstances which would otherwise have been perfectly harmless. It may, then, be truly said, that the most powerful of all causes which *predispose* to nervous and mental disease, is the transmission of hereditary tendencies from parents to children, thereby rendering an unusual liability to the maladies under which parents have laboured.

Even where the defect in the parent is merely some peculiarity of disposition or temper, amounting, perhaps, to eccentricity, it is astonishing how clearly its influence on some one or other of the progeny may be traced, and how completely a constitutional bias of this description may interfere with a man's happiness or success in life. We have seen instances in which it pervaded every member of a family, and others in which it affected only one or two. When the original eccentricity is on the mother's side, and she is gifted with much force of character, the evil extends more widely among the children, than when it is on the father's side. Where both parents are descended from tainted families, the progeny is,

of course, more deeply affected than when one of them is of a pure stock. Seemingly, for this reason, hereditary predisposition is a more usual cause of nervous disease in the higher classes, who intermarry much with each other, than in the lower classes, who have a wider range of choice. Indeed, that all constitutional qualities are transmitted from parents to their children, admits of no doubt. Apparent exceptions are only apparent, not real. Are the parents perfectly sound and vigorous in body? so are their children, when they are born. Is the reverse true? Are the children born of parents constitutionally unsound and debilitated, strong, vigorous, and healthy? The evil descends more or less to their children.

Unhappily, it is not merely as a cause of disease, that hereditary predisposition is to be dreaded. The obstacles which it throws in the way of permanent recovery, are even more formidable, and can never be removed. Safety is to be found only in avoiding the perpetuation of the mischief. Therefore, if two persons, each naturally excitable, and delicate nervous temperaments, choose to marry, they have only themselves to blame for the concentrated influence of similar tendencies in destroying the health of their offspring, and subjecting them to all the miseries of nervous disease, madness, or melancholy.

As respects the intellect, is the same as true? According as it is weak or strong, sound or unsound, or peculiar, in the parents, so is its character and condition in the children. We of course speak in general terms, and refer only to general results, as we have no desire to be entangled in the difficulties of abnormal cases. And thus far all testimony concurs in sustaining the views we have advanced.

The descendants of a community sound, vigorous, and hardy, in body and mind, will be themselves a community of the same description, unless they are changed by adventitious causes. To this neither does history contain, nor can observation adduce a single exception.

This principle, as it relates to the standing and welfare of the human race, is much more extensively and powerfully operative than is generally supposed. It is the reason why children born at different periods of the lives of their parents, and under the influence of different circumstances, especially different degrees of parental health and vigour, are often so unlike each other. It is also the most probable source of the very frequent and strong resemblance of twins, which receive the impress of the same parental condition. Children partake, however, of the constitutional qualities of their parents for the time being. Years and circumstances alter those qualities, and the offspring produced under the influence of them thus modified, are correspondingly altered. Even the present predominance of any particular faculty of the mind in the parent, would seem to transmit that faculty to the child in greater vigour than it would be transmitted under the predominance of any other faculty. This is shown in the first-born children of parents who marry when very young, who are rarely if ever equal, in either body or intellect, to those born at a subsequent period, provided the parents continue healthy. Hence, the younger sons of noblemen in this country so generally surpass, in all the higher attributes of our race, their elder brothers, whose only pre-eminence depends on the privilege attached to primogeniture. Attempts have been made to explain this on different grounds—that of education, expectancy, and habit; but the attempts have failed. The difference is too great to be thus accounted for. It frequently occurs, however, when the causes just referred to are wanting. The following explanation is believed to be the true one :—

Very young parents, observes Dr. Caldwell, in his “Thoughts on Physical Education,” are, in constitution, immature and comparatively feeble; and their constitutional imperfections descend to their early offspring. As years pass on, their

physical systems become more perfectly developed and vigorous, and their strength increases. As a natural consequence of this, the constitutions of their children become more strong and vigorous. It was a knowledge of this, derived from observation, that induced the Spartans to prohibit marriage until the parties had attained entire maturity: the females at the age of twenty-two or twenty-five, and the males that of twenty-seven or thirty. We need scarcely add, that they were personally the hardiest and most powerful people in Greece, and as a community the most warlike.

For reasons well known to phrenologists, those organs or propensities that we have in common with the lower animals, predominate during early life. Parents, therefore, who marry at that period, transmit in a higher degree to their first children the same unfortunate predominance, which renders them less intellectual and moral, and more sensual; less capable, as well as less ambitious, of pre-eminence in knowledge and virtue, and more inclined to animal indulgence. History and observation sustain this view of the subject, and philosophy expounds it.

It is a current belief that the sons of military leaders, born during periods of war and peril, are constitutionally brave. A coward has rarely been issued into the world under such circumstances. The reason is plain. Those organs and faculties in the parents pertaining to war, are excited to a high state of action by scenes congenial to them, and bravery becomes the inheritance of their sons. The phrase "soldier's daughter," means a heroic woman.

During the warlike ages of this country, children were born fighters. The cause is obvious. In the whole population, which was composed of warriors, the organs and faculties suited for the occasion bore sway, and gave to the constitution of the offspring of the community a corresponding character.

But many persons endeavour to explain all such things on the ground of education ; but their efforts are in vain ; they are worse than in vain—they inculcate error. That education can do much is not denied ; but it cannot do everything.

Who does not observe in daily life, distinct orders of mind phenomena? Do we find all men equal in their intellectual faculties? Do they all show the same aptitude in the cultivation of science and art? Are all equally able to discover, invent, and apply; to reason, to compose, and to infer; to take cognizance of facts and phenomena, and remember them; to express ideas in words? In fact, to attempt to establish the proposition, that men differ very widely in the amount of their mental abilities, would be as absurd as to attempt to prove a truism. The difference is universally recognised, and we have no commoner phrases in the language, than those used to denote the difference of men in this respect. Not only do they in the aggregate amount of their mental faculties, but they differ greatly in the power of particular faculties; and grown-up persons scarcely differ in this respect more than children. This shows that the difference is not entirely acquired, but is innate.

Do we not daily observe that one boy displays an aptitude for the acquisition of languages, another for mathematics, a third for drawing, a fourth for painting, a fifth for music, a sixth for history, a seventh for geography, an eighth for the composition of verses, a ninth for the construction of machinery, a tenth for the discovery of new relations between the things and the phenomena he observes, and an eleventh for the fluent verbal expression of his ideas. They grow up into men, and we have the intellectual world peopled with philosophers, logicians, statesmen, mathematicians, geographers, astronomers, mechanics, engineers, architects, grammarians, orators, poets, historians, and artists, and these in every degree of power and excellence.

As these varieties of mental power admit of no dispute, we may ask, is it not a fact equally true, that men differ in the manifestations of the moral feelings? Do we find all equally kindly disposed to each other, and to relieve the wants of those in distress, and show the same prompt desire to act justly? It may, however, be said that if children are endowed with various degrees of intellectual abilities, they are all equally endowed with the moral feelings; and the difference afterwards manifested is due to the comparative influence of the various agencies, favourable or unfavourable, to which each individual has been subject in early life. We readily admit the vast influence of these agencies, for it cannot be disputed that, "as the twig is bent the tree's inclined." But, *is this all*. Is there *no difference* in the *original quality*, and *innate property* of the *twig*? Ask parents whether they do not find a great original difference in their children. Do they find it equally easy to instil into their young minds the love of truth, ready obedience to order, the virtue of self-denial, the forgiveness of offences, the same degree of filial affection, equal kindness towards their brothers and sisters, playmates and pets? Is there in all the same degree of calm, placid temper, and sweetness of disposition? Can they teach them all equally to govern their passions? Do they not find some much more revengeful, disobedient, avaricious, cunning, impetuous, wilful, proud, vain, sensual, and gluttonous than the rest? Are not these differences of character manifested before they can be the result of external influence? Are we not satisfied by common experience, that these differences are inherent in the very constitution of the children, and are also quite independent of their intellectual abilities? How often do we find children gifted with the brightest intellect, mean, cunning, vicious, and wilful? How often it happens that the one who shines the least in mental ability, is rewarded by the compensating gift of



a sweet temper and amiable disposition ; and grows up, with no more advantage of care and education than the rest, to be the comfort of his parents, perhaps much in need of it from the reckless follies of the one whose intellectual endowment apparently fitted him to be their pride and ornament. If these differences exist in children before external influences can have produced them, they must, then, be considered inherent qualities, which have a tendency to do certain acts, and which become more conspicuous as their sphere of action extends.

The influence of parentage over the constitutional qualities of children, mental and physical, is a conclusion established by the universal *fact*, that the products of all individual things throughout the vast range of nature take after their parentage. Do we not observe that every animal is similar to its parent ? No department of nature is left to chance. Everything throughout nature, even to its minutiae, is governed by invariable laws. Hence, the law operates in producing "*each after its kind.*" If this operation of nature had been left to chance, our children might have been born brutes. But this law renders them like their parents, and thereby preserves the unity of our own species, and that of every other.

The great law which governs the fitness of things, fully proves that progeny *inherits* the constitutional natures of parents.

It being, then, a law of nature, that the constitutional qualities of parents are transmitted to their children, it is obvious, that as a means towards the improvement of our race, soundness of the constitutions of parents is indispensable. Now, before parties marry they should be at a proper age, and their constitutions and education, physically, morally, and mentally matured ; hence, the importance of the *prohibition* or *voluntary abandonment* of *too early marriages*. They will not only transmit to their offspring a better organisation, but be themselves, from the knowledge and experience they have

attained, better prepared to improve it by cultivation ; *for we shall endeavour to show that cultivation can improve it.* When a skilful stock-breeder wishes to improve the breed of his cattle, he does not employ for that purpose the most imperfect of his stock ; on the contrary, he carefully prevents their intercourse. Experience has taught us not to expect fruit of the best quality from imperfect fruit trees and vines. The product of such crudeness is always defective. In like manner, marriages between boarding-school girls and striplings, in or just out of college, ought to be prohibited. In such cases, prohibition is a duty, no less to themselves than to their offspring and society. Marriages of this kind are rarely productive of anything desirable ; mischief and unhappiness, of some sort, are their natural fruit. Patriotism, philanthropy, and every feeling of kindness to human nature, call for their prevention. What then must be thought of those parents, of the very highest ranks of society, who totally disregard and set at nought the laws that govern the transmission of constitutional qualities, by marrying their sons and daughters whilst they are comparatively mere children. Objections may be justly urged against young women marrying men far advanced in years. Old men should in no case contract marriages likely to prove fruitful ; age has impaired the constitutional qualities, which, descending to their offspring, tends to deteriorate our race.

In the investigation of this, as well as all other subjects, facts alone are worthy of our attention. A single fact, that may be here adduced, is preferable to all the theories that can be framed ; it confirms fully what we are contending for, and that opposition to it is futile.

In Persia and Turkey, men of rank and wealth marry none but well-formed beautiful women. They procure many of their wives from Georgia and Circassia, the Asiatic paradise of

female beauty. Such has been their practice for ages. The result is what all enlightened individuals are prepared to expect. As regards their persons, the Persians and Turks, of the higher castes, are amongst the finest people on earth. When compared to the lower orders of their countrymen, who marry without such selection, and for whose personal improvement no provision is made, the superiority, in points of elegance, is as striking as that of the fine-bred hunter, contrasted with the low-bred cart horse. Throughout the world, a similar custom would produce a similar result. It is to be lamented, however, that the practice in Turkey and Persia, of so secluding females as to prevent them from taking a proper amount of exercise, operates as a barrier to the improvement of mankind. We need scarcely add that it does this by debilitating the female constitution, and entailing comparative feebleness on the offspring. We wish it to be understood, that in speaking of the fine forms of the Persians and Turks, we allude only to their limbs and trunks. The formation and development of their brains are inferior to the Europeans.

This subject may be further illustrated by the practice of skilful agriculturalists. When they wish to improve their stock of domestic animals, they select the largest and strongest as breeders. Do they wish to improve the vegetable productions, whether propagated by seed, roots or cuttings, they select the largest and best-looking and best-conditioned as the parent race. The practice is founded on experience; and the end aimed at by it, except prevented by incidental causes, is always attained. The practice of Frederick II., of Prussia, on this point, is well known. He was particularly fond of a gigantic stature in his grenadiers. In forming this corps, he selected the largest men in his kingdom. Nor did his solicitude on the subject suffer him to stop here. That the race might not degenerate, he also selected as wives for his grenadiers the

largest women in his kingdom. The consequence is, that Potsdam and its neighbourhood, where Frederick's grenadier corps were stationed, furnish even now a greater number of persons of gigantic size than any other place of the same amount of population in Europe—perhaps in the world.

The formation and texture of the brains of some persons are of such a nature, and who have been reared in virtuous society, under the influence of good example, yet they possess uncontrollable propensities to vices, such as lying, treachery, theft, robbery, and even murder; and instances of this description are much more numerous than they are thought to be. Now, in case of marriage of such individuals, it is more than probable that their progeny will inherit their constitutional infirmity. Indeed, their issue can scarcely be otherwise, unless it be prevented by a better organisation in the other parent, or counteracted by education, of which influence in amending mankind we shall speak hereafter. For such persons to refrain from marriage would be a redeeming virtue. Persons of dwarfish stature should also refrain from marriage. All such acts of self-denial would be praiseworthy in them, as they would tend to ameliorate the condition of man.

There is one source that has a baneful influence on human deterioration, and that is, a long series of family intermarriages, Be the *cause* what it may, both history and observation testify to the *fact*, that the issue of marriages between parties related by blood always degenerate. They become, in time, enfeebled both in body and mind. This foolish and sinful practice, chiefly fostered by the false pride of rank, has reduced, almost to dwarfishness and imbecility, the nobility of several nations, especially Spain and Portugal. It has likewise aided not only a little in deteriorating, but nearly extinguishing, many of the royal families of Europe. This case is strengthened and rendered more expressive by the fact, that the ancestors of those families

were the real *natural nobles* of the land: men peculiarly distinguished in their day, as well for corporeal stature, strength, and comeliness, as for mental excellence. Still, we repeat that a long line of family intermarriages has contributed much to reduce below the average of mankind, the descendants of those ancient nobles, whose high qualities alone gave them station and influence. In this the human race are analogous to domestic animals, which are deteriorated by breeding constantly from the same stock. Even among the people of certain religious sects, much mischief is done by the continued intermarriages of the members with each other. The condition of the Jews and Quakers affords proof of this. Those two societies are more afflicted with some form of mental derangement, in proportion to their numbers, than any others. This is no doubt attributable, in no small degree, to their so seldom marrying out of their own sects.

*The command of God not to marry within certain degrees of consanguinity, is in accordance with the organic laws of the brain, and the wisdom of the prohibition is confirmed by correct observation; but the marriages by the indigent, who are destitute of a proper supply of wholesome food, for themselves and children, is a fearful source of the degeneracy of human beings. Common experience tells us, that we cannot construct a sound powerful machine out of scanty damaged materials: and reason and observation unite their testimony. A glance at the indigent of all nations furnish incontestible proofs of the fact. Monuments of far-gone degeneracy everywhere present themselves. Look to the large manufacturing towns. Stinted and unwholesome fare acts on mankind as it does on other forms of living matter. It injures organisation and checks development. Both the vegetables of a barren soil, and the animals scantily nourished by them, are diminutive and feeble, as well as unsightly; so is man when pinched and dispirited by poverty and its concomitants.*

Such are a few of the prominent and fruitful sources of human degeneracy. The remedy for this evil is abstinence from marriage in the case referred to ; but we cannot look for the speedy adoption of this preventive measure. Persons will marry and have issue, whether their figures and developments be good or bad ; whether they are poor or rich, akin or aliens in blood, and whether their constitutions are sound or otherwise. The only practical remedy, therefore, is in removing as far as possible the evils of improper parentage and other causes, by a *system of education judiciously adapted in its principles and administration to the human constitution.*

We may further observe, that debased criminals or drunken parents cannot transmit a healthy organisation to their offspring, and the brain and nervous system inherited will be the chief participators in the degeneration. By their organisations the children of such people are prone to the same vices.

This fact involves one of the most important considerations to which the attention of society can be directed. Though vice and insanity may be two very distinct things, they have relations to each other which it is exceedingly important not to overlook. The mind can only act in any direction through the body ; and every act of the mind exerts a direct influence upon the physical condition of the brain. Thus, no long-continued series of mental operations can be carried on, no propensity can be cultivated by long habit of any kind, no habitual vice contracted, without an alteration being produced in the structure of the brain or nervous system. An altered structure, brought about in this manner, in the brain or nervous system of the parent, is what he or she transmits as the original constitution of the child. This is the reason why we see the same virtues, or the same vices, pervading a whole race down through generation after generation.

In a lecture, in Edinburgh, Dr. Laycock said, that drunken-

ness had been descending in one family, from father to son, through five generations; and what is true of drunkenness—the propensity to which is inherited through a peculiar structure having been induced in the brain, and permanently established in the son—applies also to other vices and other mental peculiarities. Voluntary vice in the parent begets an organic tendency to the same vice in the child; in other words, the alteration in the structure and quality of the brain, produced by vicious and responsible indulgence in the ancestor, becomes the original and normal conformation of the descendant. Thus an involuntary, an irresistible proneness to vice is, in this way, inherited in the physical conformation by the offspring of such parents.

This is one *great source* of our criminal population. We do not by any means say, that it is the only one; and on no account do we wish to be misunderstood, by any one supposing that this account of criminality necessarily implies a vicious parentage. What we wish to be understood is, that long-continued habits of depravity confer a viciated cerebral or nervous organisation upon the succeeding generations, which is manifested either in an irresistible tendency to the same vice, or a generally diseased condition of the organs of the mind. It is a well-known fact, that drunkards have idiot children in a far larger proportion than sober people. Such facts as these cannot be either too generally known, or too strongly impressed upon the public mind. They show the tremendous amount of responsibility which attaches to the thoughtless votary of sensual or wicked pleasure.

But we frequently hear it stated, as a kind of excuse, by persons pursuing such a course, that they only injure themselves; that they were their own greatest enemies. Now, such people are woefully deceiving themselves. The consequences of their misdeeds may be transmitted through future

generations, and doom posterity for ages to come to all the miseries of insanity, or all the terrible consequences of uncontrollable propensities to crime.

The law of the fitness of things, as we have before stated, operates throughout nature, and determines the constitutional qualities of every herb, tree, and animal, in shape, texture, and aptitude. This same law governs man, as well as brutes and herbs, and by virtue of its own inherent power determines whether its products shall be herbs, or trees, or brutes, or human beings; and what shall be their anatomical structure and physiological constitution, their strength or feebleness of body and brain, their predisposition for virtue or hankering after vice: in fact, all that goes to constitute the sum total of their natural character.

This law is "EACH AFTER ITS KIND"—"Like parents like children." "In their own image beget" they them. In what other way can they? How can a "corrupt tree bring forth good fruit?" How can excessively indulged animal propensities in parents generate other than depraved children? It is not merely "each after its kind," but "after *its* kind" at the time the being received its existence; that is, the state or condition physically, mentally, and morally of the parents at the time when they stamp their own image upon their progeny, so will be the constitutions of their offsprings. True, education may modify, direct, increase or diminish; but to remodel what is constitutional, it never can. Though,

"Just as the twig is bent the tree's inclined;"

yet, thorns cannot be trained to bear delicious grapes, nor the thistle figs. Education *can do much*, but *parentage does more*, because it "*Dyes in the wool*," and thereby exerts an influence on character almost more powerful than all other conditions put together, and to which may be justly ascribed most of that



depravity of children over which parents mourn, as well as most of the sinfulness and consequent suffering of mankind. This is the great sower of humanity. If we sow tears, humanity reaps sorrow. But good seed bears fruit a hundred-fold, to the glory of God, in the highest happiness and perfection of his creatures, here and hereafter; for parentage greatly determines the character in this life, as well as in the life to come. It is then to parents that we must look for real reform. They alone can lay the axe to the root of the upas of all sin, and replant again those trees of Eden which shall bring forth good fruit. Those corrupt and bitter streams of human depravity and woe, now bearing on their dark waters the imperfections, sinfulness, and sufferings of our race, can only be effectually purified at the fountain head. Morality may weep in anguish; christianity may preach and pray; education may teach; and philanthropy may labor; but it will all be comparatively in vain, till parents take upon themselves the responsible task of human reformation.

**THE BRAIN REQUIRES A DUE SUPPLY OF PROPERLY OXYGENATED BLOOD TO KEEP IT IN HEALTH.** The effects of slight differences in the quality of the blood are not easily recognised, but when they exist in an extreme degree, the effects are too obvious to be overlooked. If the stimulus of the arterial blood be altogether withdrawn, the brain ceases to act, and sensibility and consciousness become extinct. If the blood circulating through the lungs does not undergo that process of oxygenation which is essential to life, it is unfit to support the action of the brain; the functions become impaired and death closes the scene. If, on the other hand, the blood be highly oxygenated, as by breathing oxygen gas instead of common air, the brain is too much stimulated, and an intensity of action bordering on inflammation takes place, which also soon terminates in death,

Such are the consequences of the two extremes; but the slighter variations in the state of the blood, have equally sure though less palpable, effects. If its vitality be impaired by breathing an atmosphere so vitiated as to be insufficient to produce the proper degree of oxygenation, the blood then affords an imperfect stimulus to the brain. As a necessary consequence, langour and inactivity of the mental and nervous functions ensue, and a tendency to headache, fainting or hysteria, makes its appearance. This is every day seen in the listlessness and apathy prevalent in crowded and ill-ventilated *school-rooms*, and in the headaches and liability to fainting which are sure to attack persons of a delicate habit, in the contaminating atmosphere of crowded theatres, churches and assemblies. In these instances, the operation of the principle cannot be disputed; for the langour and nervous debility consequent in ill-ventilated apartments, or in air vitiated by the breath of many people, are neither more nor less than minor degrees of the same process of poisoning to which we have before alluded in the chapters on *Digestion* and *Respiration*. It is not real debility which produces them, for egress to the open air almost instantly restores activity to both the mind and body, unless the exposure has been very long, in which case more or less time is required to re-establish the exhausted power of the brain. Long experience and observation has convinced us, that the transmission of imperfectly oxygenated blood to the brain, is much more influential in the production of *nervous diseases*, and in delicacy of constitution, than is commonly imagined.

ANOTHER CONDITION OF HEALTH IN THE BRAIN AND NERVOUS SYSTEM IS THE REGULAR EXERCISE OF THEIR RESPECTIVE FUNCTIONS.

The brain being an organized part, is subject, so far as regards exercise, to the same laws as the other organs of the

body. If it be doomed to inactivity, its health will decay, and the mental operations and feelings, as a necessary consequence, will become dull, feeble, and slow. If it be duly exercised after regular intervals of repose, the mind will acquire readiness and strength. If the brain be overtaken, either in the force or the duration of its activity, its functions will become impaired, and irritability and disease will take the place of health and vigour.

We have seen that by disease the muscles become emaciated, the bones soften, and that the blood vessels are obliterated. The brain is not an exception to this general law. It is impaired by permanent inactivity, and becomes less fit to manifest the faculties of the mind with readiness and energy. Nor will this surprise any reflective person, who considers that the brain, as a part of the same animal system, is nourished by the same blood, and regulated by the same vital laws as the muscles, bones, and arteries.

It is the wasting and depressing effect which is induced by the absence of the stimulus necessary for healthy exercise of the brain, that renders solitary confinement so severe a punishment, even to the most daring minds. Keeping the above principle in view, we shall not be surprised to find that *non-exercise* of the brain and nervous system, or, in other words, inactivity of intellect and feeling, is a very frequent predisposing cause of every form of nervous disease. For demonstrative evidence of this position, we have only to look at the numerous victims to be found among females of the middle and higher ranks, who have no cause to exertion in gaining the means of subsistence, and no object of interest on which to exercise the mental faculties, and who, consequently, sink into a state of mental sloth and nervousness, which not only deprives them of much enjoyment, but subjects them to suffering, both of body and mind, from the slightest cause.

But let the situations of such persons be changed ; bring them from the listlessness of retirement into active daily life ; give them a variety of imperative employments ; and so place them in society as to supply the organs of their brain with that extent of exercise which gives health and vivacity of action ; and in a few months, the change produced will be surprising—health, animation, and energy, will take the place of former insipidity and dulness. Many distressing diseases will be found in men of mature age, who have devoted their lives to the toils of business, and whose hours of leisure have been short. They retire from business to the country in search of repose ; but having no pursuits to occupy their attention and keep up an active exercise of the mental organs of the brain, the health of the brain is gradually lost, and the inevitable result is weariness of life, despondency, or some other variety of nervous disease.

One great evil attending the absence of some imperative employment or object of interest, to exercise the mind and brain, is the tendency which it generates to waste the mental energies on every trifling occurrence which presents itself, and to seek relief in the momentary excitement of any sensation, however unworthy. The best remedy for these evils is to create occupation to interest the mind, and give that wholesome exercise to the brain which its constitution requires.

The evils arising from *excessive* or ill-timed exercise of the brain, or any of its parts, are numerous, and equally at variance with the laws of health. When the eye is used too long, or in too bright a light, it becomes blood-shot ; the increased action of its vessels and nerves gives rise to a sensation of fatigue and pain. If the eye be relieved, the irritation gradually subsides, and the healthy state returns ; but to continue to look intently, or resume employment, before the eye has regained its natural state of repose, the irritation at last becomes permanent ; and

disease, followed by weakness of vision, or even blindness may ensue.

When the brain is kept in a long state of excessive activity, the effects are precisely analagous with the eye. The only difference is, that we can always see what happens in the eye, but rarely what takes place in the brain ; occasionally, however, cases of fracture of the skull occur, in which, part of the bone being removed, we can see the quickened circulation in the vessels of the brain as easily as those of the eye. Sir Astley Cooper had a young man brought to him who had lost a portion of his skull, just above the eyebrow. "On examining the head," observes Sir Astley, "I distinctly saw that the pulsation of the brain was regular and slow ; but at the time, he was agitated by some opposition to his wishes, and directly the blood was sent with increased force to the brain, and the pulsation became frequent and violent." Indeed, in many instances, the increased circulation of blood in the brain, attendant on high mental excitement, reveals itself when least expected, and leaves traces after death which are very perceptible. When the eye is tasked beyond its strength it becomes insensible to light, and no longer conveys any impressions to the mind. In like manner, the brain, when much exhausted, becomes incapable of thought, and consciousness is almost lost in a feeling of utter confusion.

At any time of life, excessive and continued mental exertion is hurtful ; but in infancy and youth, when the structure of the brain is still immature and delicate, permanent mischief is more easily produced by injudicious treatment than at any subsequent period. In this respect, the analogy is complete between the brain and other parts of the body, as that exemplified in the injurious effects of premature exercise of the bones and muscles. Scrofulous and rickety children are the most usual sufferers in this way. They are generally remark-

able for large heads, great precocity of understanding, and small, delicate bodies ; but in such instances, the great size of the brain and acuteness of the mind are the result of morbid growth. Even with the best management, the child passes the early years of its life constantly on the brink of active disease. Instead, however, of trying to repress its mental activity, the fond but misled parents, by the early promise of genius, too often excite it still further by unceasing cultivation and the never-failing stimulus of praise. Finding its progress for a time equal to their wishes, they look forward with ecstasy to the day when its talents will break forth and shed lustre on its name. But in exact proportion, as the picture becomes brighter to their fancy, the probability of its being realized becomes less ; for the brain, worn out by premature exertion, either becomes diseased or loses its tone, leaving the mental powers imbecile and depressed for the remainder of life. The expected prodigy is thus easily outstripped in the race of life by many whose dull outset promised him an easy victory.

Taking for our guide the necessities of the constitution, it will be obvious that the mode of treatment commonly resorted to ought to be reversed. Instead of straining to the utmost the already irritable brain of the precocious child, and leaving his dull competitor to ripen at leisure, a systematic attempt ought to be made, from early infancy, to rouse to action the languid brain of the latter ; while no pains ought to be spared to moderate and give tone to the activity of the former. But instead of this, the too general practice is, the prematurely intelligent child is sent to school and tasked with lessons at an unusually early age, while the healthy, but more backward boy, who requires to be stimulated, is kept at home in idleness perhaps for two or three years longer, merely on account of his backwardness. A double error is here committed. The consequences to the precocious boy are, too frequently, the

permanent loss of health, and of his envied superiority of intellect.

In youth, too, much mischief is done by the long, daily attendance at school, and the continued application of the mind which the ordinary system of education requires. Now, the law of exercise, that long-sustained action exhausts the vital powers of the organs, applies as well to the mind as to the muscles; hence, the necessity of varying the occupations of the young, and allowing frequent intervals of exercise in the open air, instead of enforcing the continued action of the brain now so common.

In early and middle life, fever, with an unusual degree of cerebral disorder, is a common consequence of the excessive and continued excitement of the brain. This unhappy result is brought on by unremitting mental exertion, anxiety, and watching. Nervous disease, from excessive mental labour and intensity of the feelings, sometimes shows itself in another form. From the want of proper intervals of rest, the vascular excitement of the brain, which always accompanies activity of the mind, has not time to subside. A restless irritability of temper and disposition comes on, attended with sleeplessness and anxiety for which no external cause can be assigned. The symptoms gradually become aggravated, the digestive functions give way, nutrition is impaired and a sense of wretchedness is constantly present, which frequently leads to attempts at suicide.

THE SPINAL CORD, AND SPINAL NERVES, possess motor, and sensitive tracts and filaments. In those parts that require sensation for their safety and the performance of their functions, there is an abundant supply of sensitive nervous filaments. The muscular fibres, that possess the property of shortening, are supplied with motor nervous filaments, by the agency of which contractility is induced. The nerves of sensation are

mostly distributed upon the skin. Few filaments ramify upon the mucous membranes. The functions of the muscular nerves are different from those of the sensitive nerves. The muscular nerves are provided for the purpose of motion, and not of feeling; hence, the muscles may be cut and the pain will be slight compared with the cutting of the skin. Weariness is a sensation recognized by one set of muscular nerves. So uniformly is a separate instrument provided for every additional function, that there is strong reason to regard the muscular nerves, although running in one sheath, as in reality double, and performing distinct functions. Sir Charles Bell, in his work on the "Nervous System," endeavours to show, that one set called motor nerves convey from the brain to the muscles the nervous stimulus necessary to produce the desired contraction and motion; while the other, the nerves of the sense of mechanical resistance, gives the mind and brain information as to the state of the muscle whose contraction is desired; thus enabling the brain to send to it the exact amount of nervous stimulus necessary for accomplishing the desired end. This is obviously an indispensable piece of information to the mind in regulating the movements of the body. "The muscles have two nerves," observes Sir Charles, "which fact has not hitherto been noticed, because they are commonly bound up together; but whenever the nerves, as about the head, go in a separate course, we find that there are a sensitive and a motor nerve distributed to the muscular fibre; and we have reason to conclude, that those branches of the spinal nerves which go to the muscles, consist of a motor and sensitive filament.

"It has been supposed hitherto, that the office of a muscular nerve is only to carry out the mandate of the will, and to excite the muscle to action. But this betrays a very inaccurate knowledge of the action of the muscular system if it can be controlled under the influence of the will; there must be a consciousness of knowledge of the condition of the muscle.



“ When we admit that the various conditions of the muscle must be estimated or perceived, in order to be under the due control of the will, the question naturally arises—Is that nerve which carries out the mandate of the will, capable of conveying, at the same moment, an impression retrograde to the course of that influence which is going from the brain to the muscles? If we had no facts in anatomy to proceed upon, still reason would declare to us, the same filament of a nerve could not convey a motion, of whatever nature that motion may be, whether vibration or motion of spirits, in opposite directions at the same time.

“ I find that to the full operation of the muscular power, two distinct filaments of nerves are necessary, and that a circle is established between the sensorium and the muscles. One filament or single nerve carries the influence of the will towards the muscles, which nerve has no power to convey an impression backward to the brain. Another nerve connects the muscles with the brain, and acting as a sentient nerve, conveys the impression of the condition of the muscle to the mind, but has no operation in a direction outward from the brain toward the muscle, and does not therefore excite the muscle, however irritated.

“ In chewing our food, in turning the eyes towards an object, in raising the hand to the mouth, and in fact, in every variety of muscular movement which we perform, we are guided by the muscular sense in proportioning the effort to the resistance to be overcome. When this harmony is destroyed by disease, the extent of the service rendered us becomes more apparent. The shake of the hand which we see in drunkards, and their consequent incapability of carrying the morsel directly to the mouth, are examples of what would be of daily occurrence unless we were directed and assisted by a muscular sense.

“ The proper performance of the functions of the spinal

nerves require an observance of the conditions suggested in the physiology of the brain and the muscular system."

**THE GANGLIONIC NERVOUS SYSTEM.**—This is the sympathetic nervous system, which consists of a series of *ganglia*, extending each side of the spinal column, from the head to the lowest part of the spine. It communicates with all the other nerves in the body, and distributes branches to all the internal organs, with the exception of the neck, as there is a ganglion for each intervertebral space, both of the true vertebrae and sacrum. The ganglia are composed, like the brain, of cineritious and medullory matter, and are supposed to be the centres of peculiar nervous power.

They are called ganglionic nerves, from the constant disposition they evince to form small knots, or ganglia. Each ganglion may be considered a distinct centre, giving off branches in four directions: namely, the superior, or ascending, to communicate with the ganglion above; the inferior, or descending, to communicate with the ganglion below; the external, to communicate with the spinal cord; and the internal, to communicate with the sympathetic filaments, to be directed to the internal organs.

The branches of distribution accompany the arteries which supply the different organs, and form communications around them, which are called *flexuses*, and take the name of the artery with which they are associated. Thus we have the mesenteric flexus, hepatic flexus, splenic flexus, &c. All the internal organs of the head, neck, and trunk are supplied with branches from the sympathetic, and some of them exclusively, hence, it is considered a nerver of organic life. These organic nerves spread out in countless numbers upon the great trunks of the arteries, so as to give them a complete envelope; they never quit the arteries, but accompany them in all their ramifications, and the fibril of the nerve is ultimately lost upon the

capillary termination of the artery. It is by these organic nerves that the stomach is enabled to perform its functions, which, for the reason assigned, is placed beyond volition, and is without consciousness. By the nerves derived from the sentient system, which mingle with the organic, the functions of nutrition are brought into relation with the percipient mind, and is made part of our sentient system. By the commixture of these two sets of nerves, derived from these two portions of the nervous system, though we have no direct consciousness of the digestive process, consciousness ceasing precisely at the point where the agency of volition stops, yet, pleasurable sensations result from the due performance of the function; hence, the feeling of buoyancy, exhilaration, and vigour, the pleasurable consciousness to which we give the name health, when the action of the stomach is sound. On the other hand, the depression, listlessness, and debility, the painful consciousness which we call disease, when the action of the stomach is unsound.

The stomach is enveloped, especially underneath, with a thickly meshed network of the organic nerves, from which, after infinite subdivision, innumerable branches proceed into the substance of the stomach, and endue its inner or mucous membrane with organic sensibility and the power of secretion. Intertwined with this network are nerves from the spinal cord and brain, whose office is supposed to be the conveyance of sympathy of animal sensation to and from those organs and the stomach. The irritation and debility of this nervous network about the stomach is called nervous indigestion or nervous dyspepsia; and those nerves which point to the lining membrane of the stomach, mucous dyspepsia. Such a distinction unquestionably exists. The same nerves of the ganglionic network which supply the stomach, also supply the liver; and the same mucous membrane which lines the stomach extends

to line the duodenum, the common gall duct, and all the numberless ramifications of it in the liver; terminating, after infinite subdivisions, in the minutest points, where the great work of biliary secretion goes on. In the liver, as in the stomach, there are two kinds of derangement going on when the nervous supply is disordered. One is mucous irritation, the other debility of the organic nerves. The brain and the liver have great sympathy, and a fit of passion is a common cause of a bilious attack. Indeed, the influence of the brain over the organic process is very great, and is strikingly marked by the rapidity and perfection with which the stomach works, when the mind is happy, in contrast to the slowness and imperfection with which the stomach works when the mind is harassed with care, struggling against adverse circumstances; or is in sorrow without hope; when the friend that sat by our side, and with whom we were wont to take sweet counsel, is gone; and therefore, gone, that which made it life to live.

There is good reason to believe, that the peculiar vitality of every organ in the body directly depends on the sympathetic nerves. Some physiologists believe that they preside over the involuntary functions, as absorption, secretion, nutrition, &c. Others suppose, the office of the ganglions is to render organs which are supplied with nerves, from them, independent of the will. Every part of the body must, to a certain extent, be under their influence, as filaments from this system of nerves accompany the blood vessels throughout their course.

The most important use of the sympathetic nervous system is to form a communication of one part of the system with another, so that one organ takes cognizance of the condition of every other and act accordingly. If disease sieze the brain, for example, the stomach, by its sympathetic connection, is influenced; and as food would only add to the disease, it refuses to receive it, and perhaps throws off what has already been

taken. Loss of appetite, in sickness, is thus a kind provision of nature, to prevent our taking food when it would be injurious ; and following this intimation, we, as a general rule, should abstain from food till the appetite returns.

THE FIVE SENSES are *touch, taste, smell, hearing, and vision*. Touch is the sense which reveals to us the contact of foreign bodies with our organs, and informs us of the nature of their surface, whether rough or smooth, their movements, consistence and temperature. In human beings, the hand is the special organ of touch, and its structure is admirably adapted to the exercise of this sense. The firmness of the skin, its great sensibility, the species of cushion formed by the subcutaneous fat at the extremity of the fingers, the length and flexibility of these organs and the capability of opposing the thumb to the fingers, like a pair of forceps, are so many conditions essentially favourable to the delicacy of this sense, and enable us to appreciate with exactitude the qualities of the bodies we may feel.

A distinction is made by physiologists between tact and touch. With some few exceptions, *tact* is generally diffused through all the organs, but more particularly the skin. This exists in all animals, while touch exists chiefly in the fingers of man, in the antennae of insects, and in the noses of certain quadrupeds.

“In the exercise of these functions tact is considered passive, as when any part of the system comes into contact with any other body, a sensation of its presence is given without the exercise of volition. On the contrary, touch is active, and is exercised voluntarily, for the purpose of conveying to the mind a knowledge of the qualities or properties of the surface of bodies ; as when we feel a piece of cloth, to ascertain its qualities, or a polished face, to prove its smoothness. The nerves in which this sense is situated, proceed from the anterior half of the spinal cord.”

The chief organ of taste is the upper surface of the tongue ; though the lips, the palate, the internal surface of the cheeks, and the upper part of the œsophagus, participate in the function.

TASTE is the sense which makes us acquainted with the savour of substances. When fluids are taken into the mouth, the papillæ dilate and erect themselves, and the sense of taste is conveyed to the brain through filaments of the gustatory nerve. If dry food be taken, the tongue carries it to the back side of the mouth, where it receives secretions from the salivary glands ; the saliva becomes impregnated with its flavor, flows over the sides of the tongue, and gives to the papillæ a perception of savoury juice ; this sensation is then communicated to the brain.

It is supposed that salts, which enter into the composition of the saliva, are very efficient agents in reducing substances to a proper state for making impressions on the nerves of taste. In this way we can account for the fact, that metals impart a peculiar taste, although they are insoluble in water.

The primary use of taste is, to guide animals in the selection of their food, and warn them against the introduction of noxious articles into the stomach. In all the inferior animals we see that the original design of taste is still answered. But in human beings, this sense has been so abused and perverted by the use of stimulants, and the endless admixture of different articles of food, that the simple of this part seems to have been superseded almost entirely by acquired taste.

THE SENSE OF SMELL is located in the air-passages of the nose. During the act of inspiration, the air rushes through these passages. The odourant particles contained in the atmosphere are brought in contact with the filaments of the nerves of this sense, which are the first and fifth pair of nerves. The impression made upon these nerves are transmitted to the

brain. Acuteness of smell requires that the brain and nerves be in a state of health, and that the mucous membrane, lining the cavities of the nose, be thin and moistened with mucus. Snuff, and other irritants, render the sense of smell obtuse, by diminishing the sensitiveness of the nerves, and by thickening and otherwise altering the structure of the mucous membrane.

The sense of smell, like that of touch, may be improved by education. It likewise varies in different persons. In some animals this sense is remarkably acute. In the bloodhound it is so acute, that it can not only track the hare or fox with unerring certainty, long after their footsteps have been impressed, but will even trace the progress of its master through thickly crowded streets, distinguishing his footsteps from those of thousands of others, and amidst the odorous particles emanating from a thousand sources.

**THE SENSE OF VISION.**—The apparatus of this sense consists of the second pair or *optic* nerves, the eyeballs, and their appendages.

The optic nerve arises by two roots, one from a part of the brain called the *thalami optici*, and the other from a part named the *corpora quadrigemina*. The two nerves approach each other, as well as they proceed forward; and a portion of the fibres of each cross to the nerve on the opposite side. They then diverge and enter the globe of the right eye, through the posterior part of the sclerotic and choroid coats, and then expand and form a soft, whitish membrane, called retina.

The eye-ball is of the form of a sphere, of about one inch in diameter. It has the segment of a smaller sphere ingrafted upon its anterior surface, which increases its anterior posterior diameter. The axes of the eyeball are parallel to each other, but do not correspond to the axes of the orbits, which are

directed outwards. The optic nerves follow the direction of the orbits, and enter the eyeballs at their nasal side.

The globe of the eye is composed of *tunics*, or *coats*, and a refracting *medium*, named *humors*. The tunics are three in number :

1st, the *sclerotic* and *cornea*.

2nd, the *choroid*, *iris*, and *ciliary*.

3rd, the *retina* and *zonula ciliaris*.

The *sclerotic coat* is a dense, fibrous membrane, and invests about four-fifths of the globe of the eye. This gives the form to the eye-ball. Its anterior surface is covered with a thin, tendinous layer, derived from the expansion of the tendons of the four recti muscle. This coat is covered, for a part of its extent, by the mucous membrane (*conjunctiva*) of the front of the eye, and the brilliancy of its whiteness leads to the common expression, "the white of the eye." Anteriorly, the sclerotic coat presents a bevelled edge, which receives the cornea in the same way that a watch-glass is received by the grove in its case.

The *cornea* is a transparent layer, that forms the fifth of the anterior globe of the eye. In form it is circular convex-concave, and resembles a watch-glass. It is received by its edge which is sharp and thin, with the bevelled border of the sclerotic, to which it is firmly attached.

The *choroid* is a vascular membrane, of a rich chocolate color upon its external surface, and a deep black within. It is connected, externally, to the sclerotic by an extremely fine cellular tissue, and by the passage of nerves and vessels ; internally, it is in contact with the retina. The choroid membrane is composed of three layers. 1. The external coat consists principally of veins, arranged in a peculiar manner. 2. The middle coat is formed principally by the ramification of minute arteries. It secretes upon its surface the *pigmentum*



*nigrum*, or black paint, and is reflected inwards at its junction with the ciliary ligament, so as to form the ciliary processes. 8. The internal layer is a delicate membrane, called the *pigmentum nigrum*.

The *ciliary ligament*, or circle, is the bond of union between the external and middle coats of the eye, and serves to connect the cornea and sclerotic, at their junction with the iris, and external layer of the choroid.

The *iris* is so named from its variety of color in different persons. It forms a partition between the anterior and the posterior chambers of the eye, and is pierced by a circular opening which is called the pupil. It is composed of two layers. 1. The anterior or muscular, which consists of radiating fibres ; these converge from the circumference towards the centre. Through the action of these radiating fibres the pupil is dilated. 2. The circular fibres which surround the pupil, by their action, produce contraction of its area. The posterior layer is a deep purple tint, and is called *uvea*, from its resemblance in color to a ripe grape.

The *ciliary processes* consist of a number of triangular folds, apparently, by the plaiting of the internal layers of the choroid coat. They are about sixty in number. Their external border is connected with the ciliary ligament, and is continuous with the internal of the choroid. The central border is free, and rests against the circumference of the crystalline lens. These processes are covered by a layer of the *pigmentum nigrum*.

The third tunic of the eye is the *retina*, which is prolonged forward to the lens. The retina is composed of three layers : the external, middle or nervous, and the internal or vascular. The external membrane is extremely thin, and is seen as a flacculent film when the eye is suspended in water. It is called Jacob's membrane. The nervous membrane is the expansion of the optic nerve, and forms a thin semi-transparent,

bluish-white layer. The vascular membrane consists of the ramification of a minute artery and its accompanying vein. The vascular layer forms distinct sheaths for the nervous papillæ, which constitutes the inner surface of the retina.

The *humors* of the eye are three in number : the aqueous, crystalline, and vitreous. The aqueous humor is situated in the anterior and posterior chambers of the eye. It is an albuminous fluid, having an alkaline reaction. Its specific gravity is a very little greater than distilled water. The anterior chamber is the space intervening between the cornea, in front, and the iris and pupil behind. The posterior chamber is the narrow space, less than half a line in depth, bounded by the posterior surface of the iris and pupil in front, and by the ciliary processes and lens behind. The two chambers are lined by a thin layer, the secreting membrane of the aqueous humor.

The crystalline humor, or lens, is situated immediately behind the pupil. It is surrounded by the ciliary processes, is more convex on the posterior than on the anterior surface, and in different portions of the surface of each, the convexity varies from their oval character. It is imbedded in the anterior part of the vitreous humor, from which it is separated by the *hyaloid membrane*, and is invested by a transparent, elastic membrane, called the capsule of the lens. The lens consists of concentric layers, disposed like the coats of an onion. The external layers are soft, the next firmer, and the central form a hardened nucleus. These layers are best demonstrated by boiling, or by immersion in alcohol, when they separate easily from each other.

The *vitreous humor* forms the principal bulk of the globe of the eye. It is an albuminous fluid, resembling the aqueous humor, but is more dense, and differs from the aqueous in this important particular, that it has not the power of re-producing itself; so that if by accident it is discharged, the eye is irre-

coverably lost ; while the aqueous humor may be let out and will again be restored. It is enclosed in a delicate membrane called the hyaloid, which sends processes into the interior of the globe of the eye, forming cells in which the humor is retained.

The sclerotic membrane gives form to the body of the eye, and protection to the interior and more delicate parts. The choroid coats seems to be chiefly composed of a tissue of nerves and minute blood-vessels, which give nourishment to the different parts of the eye. The pigmentum nigrum, or black paint, which lines its inner surface, is of great importance in the function of vision ; by it all luminous rays not necessary for vision are absorbed.

In albinos, where there is an absence of pigmentum nigrum, the rays of light traverse the iris, and even the sclerotic, and so overwhelm the eye with light, that their vision is quite imperfect, except in the dimness of the evening or at night. In the manufacture of optical instruments, care is taken to color their interior with black, for the same object, that is, the absorption of scattered rays of light.

The iris, by means of its power of expansion and contraction, regulates the quantity of light admitted through the pupil. If the iris be thin, and the rays of light pass through its substance, they are immediately absorbed by the uvea, and if that layer be insufficient, they are taken up by the black pigment.

The lamellated cornea, the aqueous, crystalline, and vitreous humors are transparent ; so that rays of light traverses these parts of the eye, and fall upon the retina. The office of these humors and the cornea is, to refract the rays of light in such proportion as to direct the image in the most favorable manner upon the retina.

The refractory power of any transparent medium is modified by different degrees of density. On examination it is found

that the cornea, the vitreous, crystalline, and aqueous humors, have each various degrees of density. The density of the crystalline lens, at its circumference, varies from its centre. These circumstances modify the direction of the refraction of the rays of light in their passage from the cornea to the retina.

The refracting powers of the plane, convex, concave, plana-convex, plana-concave, and conva-convex medium, are different. The cornea and aqueous humors are convex-concave; the vitreous humor is concava-convex; while the crystalline humor is a convex-concava medium. The different degrees of convexity or concavity, also modify the refracting character of transparent medium. The crystalline lens is of different degrees of convexity on its two sides. The convex surface of the aqueous and vitreous humors are segments of circles, of different diameters, from their concave surface. All these circumstances still further influence the refracting character of the visual organs. The Achromatic arrangement of the transparent refracting medium of the eye, remedies the aberration of refraction in the different portions of the eye. The refracting power of lenses is modified by their convexity or concavity. The more convex a lens is, the shorter the distance from the refracting medium, when the different refracted rays converge to a focus. To adapt the eye to view objects at different distances, requires a change in the refracting power of some of the transparent medium of the eye. Both surfaces of the crystalline lens are oval, not spherical, and the refraction of the rays of light is mainly effected in this portion of the eye. Change the inclination of this lens, so that different portions of its anterior surface shall be directly behind the pupil, and its refracting power is increased or diminished, as the surface presented is more or less convex.

To view two objects at a distance, a more convex lens is needed than in examining very near the eye. The eye has

the power of adaptation to different distances. The action of the crystalline lens, which modifies the refraction of rays of light proceeding from objects to which the eye is directed. Without this or some other adapting power, a picture of objects at different distances would not be formed upon the retina, and the vision of every person would be defective, except in reference to objects at certain definite distances from the eye.

The refracting character of different lenses is illustrated in the works on "Optics," to which we refer the reader. Where the refracting medium is too great, as in over convexity of the cornea and lens, the image falls short of the retina, producing near-sightedness; and where it is too little, the image is thrown beyond the nervous membrane or retina, producing far-sightedness. The conditions are rectified by the use of spectacles, which provide a differently refracting medium, externally, by the picture of an object painted at the back part of the globe of the eye, or on the retina; and the optic nerve is the medium of communication between the eye and the brain.

Action or use, alternated with rest, should be observed in relation to the eye as well as other organs. If the eye be kept fixed intently, for a long time, on an object, it will become exhausted, and the power of sight diminished. The observation of this should be particularly attended to by those whose eyes are weak, and predisposed to inflammation.

We have before observed that the iris dilates and contracts, as the light that falls upon the eye is faint or strong, but this dilatation or contraction is not instantaneous, as is shown in the imperfect vision in passing from a strong to a dim light, and the overwhelming sensation experienced on emerging from a dimly-lighted room to the bright light of the meridian sun. Hence, sudden transitions should be avoided, as they tend to induce disease, and paralysis of the retina. Using the eyes a long time, in a very intense light, is one of the most common causes of *amaurosis*, or paralysis of the retina.

If the eye be turned obliquely, in viewing objects, it may produce an unnatural contraction of the muscles called into play. This contraction of the muscle is termed *strabismus*, or cross-eye. The practice of imitating a person that squints, is very injudicious, as the imitation, designed to be temporary, may become permanent; for the same reason, a child should not be permitted to examine objects by turning its eyes obliquely.

Any action, unnatural to the muscles, if frequently repeated, will modify the character and action of the parts so operated upon. If a limb be kept bent for a long time, one set of muscles will be relaxed and elongated, and another will be shortened, and its contractile power will be increased. The same principle is true of the eye. In viewing objects very near the eye, the ciliary processes are called into action to produce a proper inclination of the crystalline lens, so that the rays of light may be properly refracted to form a perfect image on the retina. In looking at objects at a great distance, the ciliary processes are called into action to produce a different inclination of the lens. Let either of these actions be repeated again and again, for weeks and months, and they will become natural, and the acquired inclination will be permanent; hence, a person becomes near or long-sighted, as the objects to which the eye is usually directed are near or remote. This is the reason why scholars, watchmakers, and artisans, who bring minute objects near the eye, to examine them, are near-sighted; and why hunters and sailors, who are habituated to view objects at a distance, are long-sighted. Children should be trained to use the eye upon different distances, so that the vision may be corrected when objects at various distances are viewed.

THE SENSE OF HEARING.—In hearing, a certain influence, not well understood, called sound, operating generally through the medium of the air, which compared to waves or vibrations,

is collected by the external ear and conducted into the *meatus auditorius*. This strikes upon and puts in vibration or motion the *membrana tympani*, or *drum of the ear*. The vibration of the drum is communicated to the malleus that lies in contact with it. The vibration is conveyed from the drum of the ear to the fossa of the internal ear, by the chain of bones and the air in the middle ear. The vibration which is communicated to the fluid of the labyrinth, is thus impressed upon the delicate expansion of the auditory nerve, which transmits it to the brain. If the meatus or passage to the ear be closed, hearing will be destroyed. If the drum is thickened with viscid wax, its vibrations will be diminished and hearing impaired. If the bones are removed, impaired hearing follows, as sound is not communicated freely from the *membrana tympani* to the vestibule of the internal. If the Eustachian tube be obliterated by inflammation of the throat, the vibration of air in the inner ear will be diminished, and defective hearing follow. Disease, or destruction of the labyrinth, deafness may result from any or all of these causes.

Like all our senses, hearing is capable of very great improvement by cultivation ; and, acute hearing requires perfection in the structure and functions of the different parts of the ear, and that portion of the brain from which the auditory nerve proceeds. Defective hearing is by no means unfrequent. To some of the common causes of imperfect hearing we invite attention.

1st.—The structure or functional action of the brain may be deranged by inflammation, by compression, or by debility. The first is seen during inflammatory affection of the brain, and in fevers ; the second is seen in accidental injuries of the head ; the third is seen in old age, and severe diseases of the head and fevers. In these cases applications to, and operations upon the ear do no good ; the only remedy is to remove, if possible, the diseased condition of the brain.

2nd.—Imperfect hearing may be produced by the destruction of the drum, or removal of the *ossicula audita*, or of parts within the labyrinth. In these instances, medical treatment is of no avail, as destroyed parts cannot be restored.

3rd.—Hearing may be rendered defective by a diminution of the vibratory character of the drum. This may result from an increased thickness of the membrane of the drum, or from accumulation of wax upon its outer surface. The increased thickness is usually the result of inflammation, either acute or chronic. The proper treatment is such as is sufficient to remove inflammatory action. The introduction of the heads of pins into the ear, is a frequent cause of chronic inflammation of the membrane of the drum. Hence, this practice should never be adopted, and if acquired, should be abandoned. The accumulation of wax may be softened by dropping a little olive oil into the ear, and then removing it by injecting warm soap suds into the ear, a few hours after using the oil.

In concluding our remarks on the five senses, we may observe that phrenologists regard these senses as sentinals, placed by an all-wise Creator to intimate to man all objects in the external world. But they act as mutual agents; for, it is through the instrumentality of the innate faculties of the mind that we have consciousness of the existence of all the things in the material creation. The senses can only passively receive impressions; they do not form ideas of things seen or felt, or mark the kind or degree of sound, &c.; but they convey all such impressions to the perceptive organs of the brain, and it is these which take cognizance of those impressions, and through which we have separate ideas of the existence of external objects, and the condition and qualities of things, and their relation and order.

Now, if it were true, as some philosophers have stated, that all our ideas are formed by the senses, many animals would



excel us in intellectual pursuits, because there are many birds and quadrupeds whose vision, smell, and hearing, are much more acute and intense, and consequently more perfect in their receptive capacities, than is to be found in the most intelligent among mankind. A few examples will suffice to demonstrate the correctness of our views, and negative the latter proposition ; or, at least, they will show the fallacy of attributing to the perfection of the external senses the rank man holds as an intellectual being.

The eagle can see objects on the surface of the earth when it rises in the air to a height as to be invisible to us. If, then, the ideas of the form, size, color, distance, &c., were dependant on vision, the eagle should excel man in a capacity for painting and modelling, and all other ideas attributable to the eye.

The hearing of some animals is also very acute, as for instance, the hare ; and yet it shows no predilections for melody or harmony. But if this quality depended on a vivid perception of sound, the contrary might be expected ; for in man the sense of hearing is less perfect, yet there exists within him an innate love of music.

The sense of smell is much more acute in the vulture and the dog, than it is in man. Nor can tact, in the mechanical art, be dependant on the sense of touch ; for there are many animals which possess a feeling more exquisitely sensitive than man, as for instance the cuttle-fish, the lobster, and the elephant. But who ever heard of these animals inventing a machine ? whilst it is an indisputable truth, that it is possible for man, without hands, to make a machine, and to accurately describe its parts and use.

If, then, we had no other faculties than the five senses, it is obvious that all impressions made upon them must be evanescent, and could not be retained when the external objects which produced them were removed. But we are endowed with

faculties which preserve all impressions, derived through the agency of the five senses. We can recall the picture of scenes, after many years have elapsed, and concentrate a vast number of objects and circumstances before the mind. We seem to see the landscape, and distinguish the colours of the trees and flowers—smell their perfumed exhalations—taste the flavor of the fruit—and hear delightful music. Before any of these reminiscences could take place, it is true that the *senses* must have been impressed with the various objects to which they refer. But without other faculties to take cognizance of objects and their qualities, all our ideas would have been shadowy nothings, impalpable and fleeting; a picture would have been a nonentity, for the next thing presented to the eye must have obliterated it. Place a machine before you: it is represented on the *retina* with accuracy. Let this be removed and another occupy its position: there will then be a new picture, whilst the other one is effaced; in the same manner as we see the reflected objects change places in the magic lantern. But being endowed with perceptive faculties super-added to this most perfect, but passive optical instrument, the eye, we are enabled to remember the objects we see, and to recall them into fancied existence, either in combination or in separate parts, and to describe things once seen as correctly as if they were still before us.

We, therefore, reject the theory which regards the intellectual faculties as resulting simply from the external senses; but at the same time we admit, that these organs are essential to us in forming a correct knowledge of the glorious works of creation. But they are neutral agents, through which impressions of external things are conveyed to the perceptive faculties, which take especial care to register all the knowledge thus procured.

## CHAPTER XII.

### THE PHYSICAL EDUCATION OF THE BRAIN.

In the foregoing chapters we have shown, that the skin requires to be educated by one mode of discipline; the bones by another; the muscles by a third; the stomach by a fourth; the lungs and circulatory system by a fifth. The brain, also, requires a method of discipline corresponding to the peculiarity of its nature. In this view of the subject, which is the only rational one, the education of the brain, in all its departments, is as truly a physical or physiological process as the educating and training of any other part of the body.

We hear much said about matter being a clog to mind, and that the soul is incarcerated within the body, like a prisoner in his cell. The sentiment is untrue, and reflects on Him who made and governs both mind and matter. If the inferior substance be thus prejudicial to the superior, and so unworthy of it as many pronounce it, why did the Creator link them together? No good motive could have led to this; yet, who will dare to charge Him with an evil one? Did He unite them through inadvertence or mistake; or because He did not know what influence matter would have on mind until He had made the experiment; or was His motive a desire to show how unharmoniously and incongruously He could pack the works of creation together? We think no one will be bold enough to openly impute to Him faults or weaknesses like this. Yet, it is virtually done, or something worse, by those who pronounce

matter a clog to mind, in any of its operations. For ought that can be shown to the contrary, mind would be as imbecile without matter, as matter would be without mind. What can mind do in this life without the aid of matter? Can it see, hear, taste, smell, feel, or move? Can it lift a pound weight, make a pin or a pen, or use them if already made—think, reason, judge, or perfect a single useful act, intellectual or moral, theoretical or practical? If it can do any of these, let that act be specified and proved. We say proved, because we wish for *realities*, not *suppositions* and *fancies*. We are told that the mind can do wonders without the body; that it can traverse all space with more than lightning's speed; outstrip light, in journeying from world to world, to study and enjoy the beauties, sublimities, and grandeur of the universe; that were it disincumbered of the shackless matter, all creation would be subject to its inspection, ministering to its information and delight. All these things and many more are told us; but they are only told. They are not proved; far from it. The contrary is proved by evidence which we cannot doubt. All that the mind has any knowledge of is matter; of spirit, as already stated, it knows nothing. All the means it employs to acquire knowledge are matter. It sees with materials, hears with material ears, thinks with material brain, and moves from place to place in quest of information and pleasure with material muscles and bones. Every implement, moreover, in addition to those received from nature, which it uses either in science or art, is matter. The mechanic works *with matter on matter*. The chemist analyzes matter by matter. The navigator triumphs by matter over the world of waters, which are themselves matter; and the astronomer scans the heavens with nothing else. Nor does the saying and believing all this amount to Materialism. The entire doctrine, then, comes to this, and nothing more: mind, being the superior, uses matter as its

agent to effect purposes that it could not attain without it ; as the chief gains a victory with his soldiers, which he could not achieve alone. He is as really the governing spirit of his army as the mind is of the body.\* We beg it to be understood and remembered, that we have been speaking of mind in our present state of being. It is the province of others to speak of its powers and prerogative in a future state.

We shall now offer a few remarks on the physical education of the brain, as we find that it is as susceptible of that form of education as any other organ of the system ; indeed, this is the only form in which it can receive education ; and were that brought to perfection, nothing more could be done, nor would anything more be requisite, for the improvement of the mind.

The brain, like all other parts of the system, is enlarged, invigorated, and rendered more dexterous in action by suitable, well-regulated exercise, and therefore, improved in every respect as the organ of the mind. This is as certain, as it is that muscles are improved by training ; and, as it is the case with other organs, it also may be exhausted and injured by too much, and enfeebled by too little action. It should, therefore, never be forgotten or neglected as a practical truth, that as action strengthens and improves living matter, inaction deteriorates and weakens it. This is one of the leading fundamental principles by which education is to be directed ; in fact, it constitutes its foundation.

Now, it is a fact, that should never be lost sight of : namely, *that the brain is regulated by the same laws of exercise as all other parts of the body.* If too little employed, it becomes weak ; if moderately and regularly exercised in all its parts, its state becomes that of health and vigor ; and if too much exercised, it becomes irritable and excitable, but weak and incapable of resistance ; just as, when a man over-works himself, he lies

\* Dr. Coldwell on "Physical Education."

restless and uneasy, instead of falling into sound sleep, which follows from moderate exercise. If some mental powers are kept in constant activity, and others are never used, an opposite cause is brought into operation to produce weakness and disease in the same brain, and induce a proneness to irregular action. It is, therefore, obvious, that the Creator has endowed man with such powers only, which He considered necessary and *intended to be used*, and attaching disease or infirmity as a consequence, to both neglect and excess of action. He has clearly pointed His will to be, that all should be employed in strict accordance with the laws of health, and that none of our powers should be allowed to engross our whole time and attention, however exalted their object and high their function.

The brain is not a simple but a compound organ ; or, in other words, an aggregate of many smaller organs, distinct from each in function, yet closely linked in their sympathy ; the soundness of one of them aids in giving soundness to the others, and the converse. These organs being the instruments of separate mental faculties, as well as the feelings, are destined to the performance of separate functions, no one of them being able to perform any other function than its own ; as the eye sees and cannot hear, and the ear hears, but can neither taste nor smell. As these organs, which unite in making up the cerebral mass, execute different sorts of work, so can they work at different times, some of them being active while others are at rest. In this, again, they resemble the external senses : for the ear may be impressed with sound, while the eyes are closed ; the eye may see while the ears are closed ; and the sense of smell may be active, while that of touch is dormant. The cerebral organs, like the external senses, are excited to action by different objects and kinds of impression ; thus, the eye is acted on only by light, the ear by sound, and the smell, taste, and touch by odourous, sapid, and tangible matter. In

like manner one cerebral organ is acted on and exercised by tunes, another by facts and objects, a third by form or figure, a fourth by size, a fifth by place, a sixth by number, a seventh by color, and others, again, by agents appropriate to them ; each one, however, can be acted on and exercised only by things which specially correspond or bear a direct relation to it. The same organ, for example, which takes cognizance of size, and is exercised by it, cannot be excited by form ; nor can that which is acted on by number be influenced by tune, time, or place. And thus of all the other faculties.

The organs we have named are intellectual ones ; but there are other organs termed animal propensities, and moral sentiments. These may likewise be excited to action, strengthened and improved, each by its own peculiar agent and form of impression ; and they may, on the other hand, all be enfeebled by a state of inaction. For it is suitable action which amends living, organized forms, while want of action deteriorates them to the same extent.

The human brain, as just stated, consists of three compartments : the propensities that we have in common with the lower animals, the moral and religious sentiments, and the intellectual faculties. Now, to raise the character to the highest perfection, these must be highly developed, well organized and healthy, and a correct balance must subsist between them. To a solid foundation for strength and energy of intellect, sound morality, and energy of character, these conditions are of the greatest importance. But to turn to account these high natural gifts they will require skilful training, so as to engraft improvement on capacity. Were the natural capacities of the whole family of man thus happily tempered, the condition of our race would be as perfect as it could be rendered, and the state of society correspondingly prosperous. Talent and knowledge would prevail and be respected, morality

and active virtue would predominate over profligacy and vice, and every one would be happy in himself and useful to others. But this state of things can only be brought into existence by the means of education being in strict conformity to the constitution of human nature ; as the perfection of the organization of man must constitute its basis, and more especially his brain.

Many may be disposed to ask, " Can the organs of the brain be *increased in size*, as well as rendered more *vigorous and active*, by any process of training ? " We beg to say, *yes*, with as much certainty as the muscles of the arms and legs can be increased, provided the process be commenced in childhood. On this principle depends the perfectibility of man ; that is, his susceptibility of the highest improvement compatible with the laws which govern his nature. Reject this principle and his case is hopeless.

To practically illustrate this principle, let us take two children of the same age and sex, with organizations as nearly alike as possible. Let one be skilfully educated, and the other unskilfully, or not educated at all. At the age of their maturity compare them with each other, and the difference will prove the power and advantage of education. Have the lower extremities of the one been exercised in walking, running, and leaping, much more than the other ? They will be larger and more powerful, and less easily exhausted by fatigue. Have the hands and arms been subjects of training ? They will surpass the untrained ones in bulk and strength. Has the brain of one been exercised more than the other ? The same will be true of it. Its size, figure, and force will be augmented. Has all the lower propensities of one been highly excited and fed by vicious indulgences ; and the moral and religious faculties of the other been equally trained in sentiments of practical virtue ? Here will be ground for another difference.



In the one in whom the moral and religious faculties have been thus trained, that part of the brain through which these faculties are manifested will be enlarged, and the region of the propensities comparatively diminished ; while the reverse takes place in the other, that part of the brain composing the propensities, will be augmented at the expense of that portion termed the moral and religious organs. Cultivate the intellectual organs to the neglect of the other two, and they will increase in size and vigour. Thus, as relates to augmentation and diminution, power and weakness, the brain is governed by the same laws with other parts of the system. We do not say that the brain can be increased in bulk, by exercise, as much as muscles, but it can as certainly be increased.

We beg to call attention to another principle of great practical importance. Now, in proportion to the size (other conditions being equal) of those sections of the brain, either of the organs of the propensities, or those of the moral and religious faculties, there will be a proneness to action for the gratification which that action bestows on the individual. Does the animal propensities preponderate ? The taste for animal indulgence is keen, the pleasure derived from it intense, and the danger of lawless devotion to them great. Does the organs of the moral and religious sentiments predominate over the propensities ? There will be a strong innate desire to comply with moral obligation, and his chief delight will be to do his duty. To him each act of well-doing is its own reward. He follows virtue for virtue's sake. This he does from *moral instinct*, without the influence of human laws. The law he obeys is that of his own constitution ; he is, therefore, a law in himself. The person, whose intellectual organs predominate, is devoted to enquiry, if not to study. He delights in knowledge, deems it a valuable possession, and devises and practises some mode of attaining it. The kind of knowledge most

agreeable to him is determined by the intellectual organs most developed.

These views are important and encouraging. They point out a plain and easy process by which the condition of our race may be improved. If the moral and intellectual organs be comparatively small in a child, they may be enlarged by training; and in proportion as they grow, will its taste for knowledge and virtue increase. By maturity in years this taste will be confirmed; and, in organization and its effects, the amended of the adult will surpass not a little the promise of the child. Then, by the law of inheritance, the children of this individual, resembling himself in his mature condition, will be better organized than he was in childhood. Train them and their descendants as he was trained, and organic improvement will go on in them, until in time the highest perfection of their nature shall be attained. Let this treatment be extended to the whole of our race, and universal improvement in organization will be the result. Then will be completed, on a foundation which nothing can shake, the triumph of the intellectual and moral, over the animal character of man.

### CHAPTER XIII.

## INFANCY, AND THE EARLY ERRORS OF HOME EDUCATION.

THERE is nothing in which philosophical writers on education are more unanimous, than in holding that the training bestowed on infants, in the earliest years, is by far the most important in reference to their future character. "The great mistake," remarks Locke, in his *Thoughts Concerning Education*, "I have observed in the people's leading their children has been, that this has not been taken care enough of in due season; that the mind has not been made obedient to discipline, and pliant to reason, when at first it was most tender, most easy to be bowed." Montaigne says, in his *Essays*, b. i. chap. 22.—"Plato, reprehending a boy for playing at some childish game. 'Thou reprovest me,' says the boy, 'for a very little thing.' 'Custom,' replies Plato, 'is no little thing.'" "And he was right; for I find that our *greatest vices* derive their first propensity from our *most tender infancy*, and that our *principal education* depends upon the nurse." "PRACTICAL EDUCATION," says Miss Edgeworth, "begins very early, even in the nursery. The temper acquires habits much earlier than is usually apprehended; the first impressions which infants receive, and the first habits which they learn from their nurses, influence the temper and disposition long after the slight cause which produced them are forgotten."—*Practical Education*, vol. i. p. 12. And Mr. Mill, in his article "Education," *Encyc. Brit.*,

observes : " It seems to be a law of human nature, that the first sensations experienced produce the greatest effects. . . . Common language confirms this law, when it speaks of the susceptibility of the tender mind. . . . Education, then, or the care of forming the habits, ought to commence as much as possible with the *period of sensation itself* ; and at *no period is its utmost vigilance of greater importance than at first.*" The propensities of children are first called into action, and if indulged, are growing evils ; hence, they should be vigilantly held in check from the earliest period. If not thus restrained they become noxious weeds in the garden of the mind, deprive valuable plants of their nourishment, and blight them with their shadow. If, instead of being curbed, they are *fed and fostered*, they become the *ruling elements* of *character*, and *insure* to the individual a *life of trouble*.

That the work of education is to begin at home, extends often to the more important portion of our nature, the moral feelings. But the training and culture of these seem to be considered as belonging exclusively to the minister of religion. But what can the minister accomplish ? he can only act as an auxiliary to parents in the work of moral culture. Indeed, one great reason why the labours of the minister, as an instructor, are not more successful, is, that he is not properly assisted in his benevolent efforts by the co-operation of home instruction. The minister, in two or three discourses a week, a very small portion of which is addressed to children, and little of that would be understood by them, cannot perform the work of *education* of the moral feelings. It must be done at home, or it will most assuredly be left undone ; and at home, the greater portion of it must be performed by mothers.

Nor is the case better with regard to the animal propensities. How very few intelligent attempts are made to give these feelings a proper education. It is almost never attempted, except

at home ; seldom is it attempted there, and when the effort is made, it is scarcely ever made *intelligently*, that is, with a true knowledge of the elements which enter into the nature of the child, the proper mode in which to operate on those elements, and the proper means with which so to operate.

And yet, to parents is committed this important duty. Children manifest feelings and faculties at a very early age ; and this fact indicates the design of the Creator that the education of them should be performed at home ; and it shows, at the same time, how important it is that the education received at home should be conducted aright — conducted according to the nature of the being who is to receive instruction ; for *that only* deserves the *name of education*, which is characterised by this adaptation.

It is indeed a fact, that parents do give instruction to the propensities, to the intellect, and to the moral feelings of their children ; that is, they teach them *to act*, but alas ! in the large majority of cases they teach them *to act erroneously*, and *even injuriously*.

Parents frequently express to us an anxious and laudable desire to have their children properly educated ; and the questions are as frequently asked, “ What will ? ” “ What can best educate our dear children ? ” Our invariable reply is, in the words of the Rev. Christopher Anderson, “ Look to *yourselves* and your *circumstances*. Your example will educate them ; your conversation with your friends ; the business you transact ; the likings and dislikings you express ; *these* will educate them ; the society you live in will educate them ; your domestics will educate them ; and whatever be your rank in life, your home, your table, and your behaviour there—these will educate them. To withdraw them from the unceasing and potent influence of these is impossible, except you were to withdraw yourself from them also.” Some parents talk of *beginning*

the education of their children. But all such parents should bear in mind the important fact, that the moment children are capable of forming the least idea, their education is already begun. The education of circumstances, like insensible perspiration, is of more constant and powerful effect, and of far more consequence to the formation of habits, than that which is direct and apparent. The education of circumstances goes on at every instant of time ; it goes on like time, you can neither stop it, nor turn its course. Whatever then has a *tendency to make your children what you desire them to be, "look to yourself and your circumstances."*

It will then be evident to all who observe and reflect, that the instruction too frequently given to the various faculties of the infant mind is given ignorantly, by example and circumstances, without the knowledge on the part of the parent that it is given ; or if the fact be adverted to, that the child is instructed by these, no care is taken to secure the presence of an example which may be safely imitated, and of circumstances which shall have a healthful influence. Instead of the education arising from these agencies being a systematic course of procedure, upon known principles, carefully adapted to a certain end, and as skilfully directed towards it, an end is secured,—and education given, which not only was not designed, but which is, in many particulars, the reverse of what is wished.

When we reflect and trace the steady, progressive process of the education of circumstances in the moulding of character in those families where the example of parents is a sure source of vice in their children, the mind sickens with sorrow in contemplation of the moral disasters that the criminality of corrupt and parental examples entail on families and the community. To pronounce them, by way of distinction in guilt and mischief, **THE CURSE OF THE LAND**, would not be a denunciation too strong for their demerits. For when we

calmly reflect and survey the whole scope of their influence, direct and indirect, present and future, we are compelled to regard them as a fountain of evil more hateful and prolific than any other. Contrasted with them, the seductive influence of youthful associates whitens into innocence. If guilt and infamy are a greater evil, and more to be deprecated than disease and death, there might be a difficulty in proving to the satisfaction of sound reason, that parental infanticide is a deeper crime than parental profligacy. The one consigns to the grave a single innocent, saving it from the ills that humanity must endure ; while the other is instrumental in rendering a whole family monuments of depravity, vice, and misery ; revolting to sense, outcasts from affection and sympathy, and as far as their influence extends, a blight to society. Nor does the evil terminate with themselves. They in turn become profligate, and infect their descendants ; and thus the stream of corruption runs on and widens, diffusing its mildews to an unknown extent.

There may be minds so refined in sentimentality who will allege that we delineate too broadly, and color too highly ; but we do not think so. Instances innumerable in proof of what we advance might easily be cited. There is scarcely a village that does not furnish them, and towns and cities exhibit them in thousands. Some may allege that parents are not aware of the extent of the moral desolation they spread around them, by their corrupt examples. But we beg to observe that it is impossible for them to be ignorant of the facts which they daily witness, and had not vice and profligacy so hardened their consciences, would madden them with remorse. Does not vegetation wither under the emanation of the mancinella and the upas ? and does not the poison bred of material corruption infect and destroy the most powerful frames ? All will readily admit it does. How, then, can the tender and susceptible mind

of infancy, childhood, and youth, resist the poison of moral corruption? and more especially when it is administered by a parent, on whom the child has been accustomed to rely for mental as well as corporeal sustenance. Under such circumstances to escape contamination is all but impossible. If the infection does not strike in one form, it will in another. Of this parents must be sensible, because they see it. They, therefore, sin deliberately against knowledge.

Can a man be found who believes that he can rear a family in virtue, industry, and usefulness, while he is himself an idler, or a spendthrift, a gambler, or a debauchee, a drunkard, a profane, a brawler, a liar, and a slanderer, or an open cheat; or while he indulges in impure and licentious conversation, or destroys the peace and harmony of the fire-side, by habitual outbreaks of groundless jealousy, unprovoked rage, or any form of furious passion. But if these outrages on morals, or any of them, be indulged in by a mother, we need hardly say that the scene is still more revolting, and in some respects the more deplorable. Morality is the growth of home, early impressions, virtuous examples, and practical lessons. We do not deny that reading and studying moral productions, especially the biographical memoirs of virtuous and distinguished characters, and attendance on moral exhortations in places of public worship and elsewhere, are useful. But we contend that their influence is limited, that they make but a small portion of the aggregate that constitutes a complete moral education; and that a reliance far too exclusive is placed on them, to the neglect of means much more effectual. We further contend that parents, especially *mothers*, whose responsibility to God and society for the conduct of their children is unspeakably weighty; we contend that they have it in their power to do, for the morality of the country, ten thousand-fold more than all our teachers of theology, literature, and



204 INFANCY, AND EARLY ERRORS OF HOME EDUCATION.

science, and all our pastors of churches united. By reading, and an attendance on public instruction, much may be learnt of the science of morals; but habits of correct and efficient morality, and a fruitful love and pursuit of virtue, are the issue chiefly of practice and example of home. Until views like these have been adopted as rules of action, man will not arrive at that sound moral elevation of which he is capable.

## CHAPTER XIV.

### THE NATURE OF THE BEING TO BE EDUCATED.

We have before stated that the brain is the organ or instrument of the mind. It is, however, found by long experience and observation, that before we can have a perfect manifestation of all the faculties of the mind, a perfect instrument is as necessary for that purpose, as perfect eyes and ears are for correct vision and hearing.

If we turn to nature, we find that as animals advance in the scale of instinctive sagacity, the structure of their brains is correspondingly improved in configuration by the addition of new parts, and the spinal marrow and nerves augmented in volume more and more, till we arrive at the human brain. It is, however, a remarkable fact, that a human being seems to pass through every gradation of animal existence. In the progress of formation before birth, the heart, in the first instance, is a mere pulsating vessel, like that of an insect; then a sac, like that of a fish; then two sacs, like that of an amphibious animal; and then a regular double heart. So that in the formation of the human brain, it presents appearances analogous to the brains of fishes; then to that of birds; then to that of mammalia; and finally becomes, by the addition of new parts, a human brain. But if, in the progressive development of the child's brain through its various stages, it should be stopped before it has arrived at the advanced stage

of a proper human brain, the child is born with an imperfect mind instrument.

Now, the human brain is composed of three distinct orders of mind instruments, which are the propensities or instincts that we possess in common with the lower animals, the moral feelings, and the intellectual faculties. The human mind, however, manifests moral feelings and intellectual faculties that are not manifested by the lower animals, and we find that the difference in the configuration between the brains of brutes and that of a proper human brain, is as distinctly marked as the difference between the mental and moral manifestations of a highly-gifted man and such manifestations in brutes.

In the degree (all other conditions being equal) that the propensities that we have in common with the lower animals, preponderate in an individual over the moral and intellectual faculties, the desire for merely animal gratification will be increased, and the individual will seek a sphere that will afford gratification to his predominant qualities; for he would find no pleasure in the sphere that would afford the highest enjoyment to an individual of high mental and moral refinement. Indeed, such a state of things would be as incompatible to his ideas of enjoyment, as the philosophy of Lord Bacon would be to the comprehension of a mental idiot.

It is a fact in nature, that mental idiocy is caused by a defect or malformation of the anterior lobe of the brain, by which the mind is deprived of its proper instrument for the manifestation of its mental powers. The mind also requires a proper instrument for the manifestations of its moral powers; and it is found by long experience and observation, that the coronal or upper part of the brain is the region of that instrument, and that we can no more have full or correct manifestations of the moral feelings without a proper development of their instrument in a healthy and cultivated condition, than we

could have a full and perfect manifestation of all the mental faculties with an imperfect instrument, in its organic structure, in an unsound and uncultivated condition.

There may be persons who may be startled by the subject being placed in so strong a light, but a moment's reflection will show them that everything acts in obedience to the inevitable laws which govern the fitness of things, and that no phenomena can be manifested, only in strict obedience to those laws. The mind cannot see without eyes, hear without ears, or become conscious of external impressions without the nerves of sensation. Seeing, hearing, tasting, smelling, and touching, are acts of the mind as certain as those of mental and moral action; and the former can no more perform their true functions, unless their instruments are in perfect condition, than we could have perfect mental and moral manifestations with imperfect organic mediums.

Having stated that the mind requires, for the full manifestation of its power, a proper brain instrument, in a healthy and cultivated condition: it is important, however, to bear in mind, that an individual may possess a properly constructed brain, but, owing to other conditions of his constitution not being in correct relation to it, the manifestations of the mind will be correspondingly affected. Now, in the formation of all bodies, certain elements enter, necessary to their structure and use. This is true of man as a being, and his body in all its parts; but before we have harmony of function in all the departments of the physical constitution, we must have symmetry of parts. If one organ be too large, it takes up more than its proportion of the vital energies, diverts to itself more than its share of nutrition, and thus deranges the harmony of the whole; for in the normal or natural state, the vital energies are universal, equal, and all-pervading; the strength is distributed to each viscus alike, and the whole organism is made true to its design,

without dissimilarity of parts or excess of function. The size of the organ bears an exact relation to the amount of vital energy necessary both to its reproduction and function. Now, if an organ be too large, more than its proportion of vital power is exhausted from the other organs, or it may be, from the functional power of the organ itself; hence, it is self-evident, that symmetry of organism is essential to equilibrium in its growth or function. In a badly-formed organization, the vital powers are ever labouring to equalise the functions of the parts. By adhering strictly to this incontrovertible principle of physiology, we have a guiding law which will enable us to proceed in the investigation of mind phenomena, as manifested by different individuals, by the same scientific method that all the positive sciences are treated.

The human constitution, as we have before observed, is composed of a vast number of organs, intimately related to each other; and when every part and condition of the body is in complete order, all act together in the most beautiful and perfect harmony. Notwithstanding the exalted nature of man, he is subject to the same laws that regulate the rest of the animal and vegetable creation.

Moral action, intellectual action, and physical action have their seats and instruments in different parts of the human system, and those parts are essentially connected by sympathy and other ties more mechanical and obvious. One of them being injured, or benefited, the others are affected in a corresponding manner, deriving their being and sustenance from the same source, and serving as elements of the same individual person, each of whose parts is necessary to the integrity and perfection of the whole.

That this may be fully understood, it may be observed, that the morals of every individual depend on the condition of that part of his brain through which the moral faculties are mani-

fested ; the intellectual, on the conditions of his intellectual organs ; and the other, on the condition of his physical powers.

We have shown, in the preceding pages, that the human body is a very complicated apparatus. That it consists of many organs, which are made up of other organs, each performing its specific function ; but these organs, instead of acting every one for itself alone, act for each other individually and collectively, and are united in a system of function and sympathy. The condition of the organ, therefore, whether sound or unsound, influences and modifies that of many others. If it be a principal organ, it influences the whole machine. There are three great sets of organs, which, while they are intimately and indispensably connected with each other, control all the rest, and assimilate their condition in no small degree with their own. They are the chyle making or digestive organs ; the blood making and blood circulating organs, consisting of the lungs, blood vessels, and the heart ; and the brain, spinal cord, and nerves, which are the instruments of intellect and feeling, and are essential to voluntary motion. These three sets of organs are said to control all the others ; and this they do by mutually controlling themselves, by exercising such reciprocal influence as to be at the same time somewhat assimilated in condition. They are as necessary to each other as they are to the whole ; if one of them is deranged in its action, the two others suffer immediately, and all the rest of the system in its turn. If one is diseased, its healthy influence, which is indispensable to the well-being of the two other sets of associated organs, is withheld from them, and they also fail in their actions as well as all their sound sustaining sympathy. The chyle is deteriorated ; this proves a source of further injury to the brain, which, unless it is supplied with well-prepared blood, is neither itself in good condition nor capable

of contributing to the health and efficiency of other parts of the body. It cannot prepare from scanty and bad material the substance or agent of its own influence, whatever it may be, in sufficient quantity and sound quality. The general mischief arising from a primary affection of either of the two other sets of controlling organs is equally demonstrable, and depends on similar principles. But it is needless to dwell longer on this subject, as it is already familiar with the reader, that out of chyle of bad quality, or deficient in quantity, a sufficient amount of good blood cannot be prepared ; that if respiration be defective, the latter fluid cannot be duly vitalized ; and that, if the heart is enfeebled, it cannot throw the blood with requisite force into every part of the system.

In the investigation of mind phenomena the physical man has been too much overlooked, and we may exclaim, with Dupaty, on seeing the magnificent anatomical museum at Florence, " Philosophy has been in the wrong not to descend more deeply into physical man ; there it is that the moral man lies concealed."

We have called attention to the importance of keeping in view the physiological principle, that harmony of functions depends on symmetry of form. That a full and clear idea may be formed of the vast importance of this principle, and the way that the mind is influenced in its manifestations by the degrees of relation that the three great vital regions bear to each other in size—these regions are denominated the *abdominal*, the *thoracic*, and the *cephalic*. But the relation, in size and quality, that the muscles and bones bear to these regions forms an important condition in the manifestations of the mind.

**THE ABDOMINAL REGION.**—This region lies below the diaphragm or waist, extending down to the lower extremities, and embracing the several organs of digestion, the liver, spleen, pancreas, bladder, kidneys, and the organs of generation. We

include all the artificial regions of the abdomen proper, as also the whole pelvis. In these organs several of the most important functions are performed; and nearly all those of organic life. To these most of the external and physical stimuli are constantly applied. It is by overacting these organs that nearly all the habits of men are formed, such as intemperance, gluttony, and licentiousness; it is here the great majority of diseases, both acute and chronic, manifest themselves.

Perhaps we can use no better word than *appetite*, when we wish to express the result of this region being too large—appetite, which is accompanied with a tormenting longing and hankering after something to stimulate and satisfy. We do not now speak of disease, but refer to the natural consequence of unequal size in a healthy state. The base of the brain and this region have a close sympathy; at all events, in the human subject, if these organs be too large, the lower propensities are the most active of the cerebral organs. They draw away the natural action of the other organs, and use the innervation thus stolen in fostering the lower vegetative appetites. If too small, they derange the thoracic and cephalic organs by second causes; that is, they withhold the elements of innervation and nutrition. When harmoniously developed, the secretions are appropriate, the tone of the system equal, the health firm, and the mind free.

**THE THORACIC REGION.**—This region is bounded by the dorsal vertebræ, the ribs, the sternum, the diaphragm below; and the throat above. It embraces the heart and lungs, and is the centre of the functions of respiration and circulation—the two great forces of the organism on which depend animal heat and motion.

If this region be too large, the brain is overcharged with blood, partakes partially of the nature of a muscle, suffers mere physical action, gives out volition for muscular motion rather than elevated mental phenomena, sinks in the tone of its senti-



ments and intellectual functions, and is subject to the demands of the voluntary organs. If the region be too small, then the system, with the brain, is poorly nourished, the blood is not sent efficiently into the distant organs, the cuticle is dry and ill-odored, the digestion is obstructed, and physical and mental imbecility succeeds. The man is a cypher while living, and his life is short. An average or symmetrical development of this region gives a business-like, steady, strong, and able constitution, and supports the brain in healthy action.

THE CEPHALIC REGION.—The head constitutes this region, containing the brain proper, the medulla oblongata, the roots of the cranial nerves, the face, and the blood vessels supplying these parts. In this region the mental phenomena all occur, the great centre of sensation is located, and the spirit is enthroned. From this goes out all the forces of innervation, and here are the principle muscles of expression. In our design we mainly consider the cranium, and those organs in its cavity, and leave the face for analogy in comparative anatomy.

When this region is too large, its functions, as they depend so much on the other regions for nutrition and growth, are too nervous, rapid, changeable, and self-exhausting; or from a size induced by a normal development, they are languid, imbecile, weak, and inefficient. This is an important fact. A very large head, where the organism is badly proportioned, is a sure sign of a weak character. When too small, the mental faculties have no range nor elevation, the character is small, and made up of little traits and actions. When the head is in fine symmetry with the other regions, the mind is in all cases sufficient for the uses of life; and if the head be large and the temperament firm, the character will be equal and harmonious.

The organs, however, which form the human constitution are so numerous and complicated, and the offices they perform

so different, that it would be impossible to form a correct idea of them without classing together those which perform kindred functions, and considering them as distinct and partially independent systems. Thus, the bones are denominated the osseous system, and constitute the frame on which the other organs are supported. But the bones cannot move without the agency of the muscles; these constitute another class, denominated the muscular system.

When all the systems which compose the human constitution are in perfect relation to each other, in form, size, health, and vigour, then the individual may be said to possess a balanced constitution. All will admit, that if we could find a human being in whom all the qualities of mind and body were harmoniously developed, we should then behold a being who would realize, humanly speaking, the idea of human perfection. That all men fall far short of this standard is a truth which religion and experience alike confirm; but some approach nearer to it than others.

The great object in educating children, is to train all the qualities of the mind and body to act harmoniously. Now, the proper training of the mind, means the proper training of the organs of the brain. Without the brain, it cannot act; without a healthy brain, it cannot act energetically. The first element, then, in education, is to have the brain in a state of vigorous activity; but this condition depends on good and sufficient food, good air, the proper excretion of waste matter from the body, cleanliness of the skin, and on the clothing being adequate to the season. The great importance of understanding whether the brain be a single or a congeries of organs, cannot be too clearly set forth. If the mind be a single organ, then mental exercise, of whatever kind, should be beneficial to its whole powers; but if it be a congeries, we have to attend to the particular exercise of each. Suppose a trumpet to be

improvable by practising on it, every note would be improved by improving the tone of one ; but if the instrument were a piano-forte, in which each note depends on a separate chord, it would be absurd to hope for improvement of all the chords by improving merely one. Some might produce correct notes when struck, while others might produce nothing but discords ; and others, being broken, might emit no sound at all.

From the fact of the brain being the organ of the mind, flows many important results ; one of which is, that being weak and immature in childhood, like the legs and arms, it cannot bear much exercise ; that it strengthens with age, and that the exercise or labour should be proportioned to the strength. Excessive labour cannot be imposed on the brain any more than on the rest of the body, without doing injury ; hence, the great practical folly of that constant mental application which, we are sorry to say, has been and still is, to a great degree, the endeavour of parents to keep up.

In the educating of children, it is of the utmost importance to take into consideration the influence of temperaments. If the brain and nervous system predominate, the child is delighted to learn, and would be continually at his books. He shows great intensity of feeling, and twines himself round the affections of his parents, who are in raptures at his astonishing progress, and urge him on his career, ignorant of the almost inevitable result. The nervous energy being drawn to the brain, the digestive system suffers most materially ; and while, by this premature development, he stands conspicuously above children of his own age, the blaze of excitement in which he is kept by continued thinking and feeling, soon undermines his health, and, if not arrested, throws him into a premature grave. In such cases add not to, but keep down excitement. See that such children take much exercise in the open air, urge them to lay down rather than take up a book. To do

otherwise is to transgress the laws of Nature or of Nature's God ; and long life is promised, not to those who transgress, but to those who obey His law ; and the promise is fulfilled. That life is long and happy, which is spent in obeying the laws, which is made manifest by practically observing them.

When the thoracic, or region of the chest predominates, the child will show a marked fondness for exercise, the food will be eaten heartily, and the sleep sound. Suppose a child of this temperament to be sent to school, after a sound sleep and a good comfortable breakfast ; for a short time he may be still, but in a while the craving for muscular exercise will be too strong ; he may be pent up, but he cannot be kept quiet. He begins to be fidgety ; may receive blows for it, but still he fidgets ; the blows may be repeated, but without effect. He continues fidgeting, poking with his elbows, striking his neighbours with his feet, throwing peas, or anything else, and striving in every possible way to expend his energies. Such children are generally said to be clever, but to have no liking for their books. The usual plan has been to scold such children well ; and, if not quieted by this, as is very unlikely, the scolding is followed by a flogging, which is generally as ineffectual. Now the object, in cases like these, should be to remove the cause of the evil. Let us attend to nature ; give such children an opportunity of first expending their muscular energy, and then they will be delighted with mental activity.

Some children are of the Lymphatic Temperament ; these are dull, and slow to learn, and indisposed to any kind of activity. The old remedial plan has been to flog them day after day. Now, the more wise and rational plan is to study their constitutions, and regulate the treatment accordingly. Such children should have a proper quantity of nutritious diet—(animal rather than vegetable)—and plenty of free muscular exercise in the open air. By these means the

lymphatic is diminished, and the sanguine and nervous elements of the constitution increased. It is, however, a remarkable fact, that, in all countries, the method used to correct defects of organization and temperaments has been to flog and shame the child that needed improvement. Had Hopley, the schoolmaster, understood physiology and phrenology, he never would have been led to inflict the revolting cruelty on the poor boy, Reginald Cancellor. He would have known why the deceased boy was slow to learn, and difficult to govern, and would have rather *pitied* than punished him. He is, most likely, not more cruel than many other schoolmasters, who rule by physical instead of moral and intellectual force, nor is his poor victim the first, by many, of a system disgraceful alike to parents and schoolmasters.

The use of the cane or strap in education may be as old as Solomon, and may perhaps claim the authority of the oft-repeated proverb. But even the authority of Solomon cannot justify the delegation by parents to strangers of a power which may be used to render them childless or worse. If corporeal punishment be really necessary, it should be strictly reserved to the hands least likely to use it with indifference or severity. To schoolmasters we would absolutely deny it, even by law. But even the fearful consequences of its abuse might be tolerated if the use of the power were at any time necessary. On the contrary, we maintain, that it is absolutely needless and pernicious. The schoolmaster who employs rod, cane, or stick, or any other means of corporeal punishment, is either too ignorant or too lazy for his office. If he knew as much of the human material on which he lays his rude hand as he may know of philology or mathematics, he would recoil from the absurdity of thrashing a boy into the intellectual use of what faculties he has, much less would he hope to produce them if they did not exist. Stupidity is a disease, or a defect, not

a vice; and if it were a vice, it would not be eradicated by physical force. In the case of Cancellor, it was discovered by the surgeon after death, and would have been discovered by any tutor who practically understood physiology and phrenology during life, that there was a condition of brain which quite accounted for that inability to cipher, which Hopley treated as a proof of obstinacy. There are plenty of boys, and clever boys too, who exhibit a similar inaptitude for some branch or other of their studies, from deficiency in the corresponding faculty. The arithmetical talent was very weak in Mr. George Combe; yet, in other respects, he manifested the highest qualities of mentality. In speaking of this talent he observes, "I can speak on this subject the more decidedly, from being myself very deficient in this faculty, notwithstanding my exertion to cultivate it. Arithmetic has always been to me a profound mystery; and, to master the multiplication table, an insurmountable task. I could not now tell you how many eight times nine are, without going to work circuitously and reckoning by means of the tens; yet, for seven years, I studied arithmetic. This faculty in me is, in fact, idiotic; and the organ is small. Were my other powers in like condition, I should be totally unfit for the ordinary business of life." It is the common habit of incapable teachers to mistake such defects for vice, and to attempt their correction by violence. Even where the moral faculties are more in fault than the intellect; where there is a riotous, disobedient, stubborn disposition, of what use is the stick but to harden into obduracy or hypocrisy? If there be any such thing as the philosophy of motives; if boys, like men, are reasonable beings, or even not more intractable than brute beasts; habitual resort to violence is nothing but a lazy substitute for methodical training. Education consists not in the compulsory performance of tasks, but in the harmonious development of faculties. What

Mr. Rarey has done for the horse, can be done for a much more valuable animal. Poor Cancellor has not died in vain, if henceforth the school boy should be free from the tyranny of the cane or stick, and brought under the management indicated by physiology, phrenology, and kindness.

MAN, VIEWED IN REGARD TO THE CONSTITUTION OF HIS MIND, AS AN ANIMAL, MORAL, AND INTELLECTUAL BEING.—To discover the adaptation of his nature to his external circumstances, we must first know what are his various animal, moral, and intellectual powers themselves. Phrenology is the only means by which we can have a clear view of them, and form a correct estimate of their natural bearing to the external circumstances of daily life. We have, for the last thirty years, verified the indications of this science, so as to fully satisfy ourselves that it is the best exposition of the nature of man which has been given. The light which it throws on the natural constitution of the mind, renders it of the greatest practical importance in conducting education. Philosophers and divines have for ages disputed about the number and functions of the human faculties; and each assumed his own consciousness as the standard of nature, which led to endless discussions, and too frequently to the most profitless practical results. But we can, now, see and feel the organs of the mind, and estimate their size and capability for the manifestation of its faculties.

According to phrenology, the human faculties are the following:—

#### ORDER I.—FEELINGS.

##### GENUS I.—PROPENSITIES COMMON TO MAN WITH THE LOWER ANIMALS.

1. AMATIVENESS.—*Use*: Sexual instinct; propagation. *Abuse*: Lecherous: the feeling uncontrollable.

2. **PHILOPROGENITIVENESS.**—*Use*: Parental instinct; love of children. *Abuse*: Excessive indulgence of children in the gratification of all the lower selfish propensities, which lead to disease and crime.

3. **INHABITIVENESS.**—*Use*: Love of home; attachment to place and country. *Abuse*: Absurd aversion to leave home; ridiculous home sickness.

4. **CONCENTRATIVENESS.**—*Use*: Unity and continuity of thought and feeling. *Abuse*: Absence or abstraction of mind; in writing and speaking, the style is ambiguous from paucity of expression.

5. **ADHESIVENESS.**—*Use*: Attachment, friendship, and society result from it. *Abuse*: Blind misguided romantic attachment.

6. **MARRIAGE.**—*Use*: The instinct to unite in marriage. *Abuse*: Inconsolable, and neglects everything on the loss of husband or wife.

7. **COMBATIVENESS.**—*Use*: To oppose aggression; courage to meet danger and overcome difficulties. *Abuse*: Love of contention; intense opposition for the mere love of it.

8. **DESTRUCTIVENESS.**—*Use*: To kill for food, and destroy noxious objects. *Abuse*: Murder; wanton cruelty.

9. **PRESERVATIVENESS.**—*Use*: The instinct that prompts us to protect ourselves from injury, disease, and destruction. *Abuse*: Extremely sensitive about health and life; perpetual dread of annihilation.

10. **ALIMENTATIVENESS.**—*Use*: Discrimination in the choice of food. *Abuse*: Gluttony, drunkenness, epicurism.

11. **ACQUISITIVENESS.**—*Use*: Desire to possess what is useful and necessary; the sense of property springs from it. *Abuse*: Inordinate desire of property; makes money an idol; penurious, sordid, and covetous.

12. **SECRETIVENESS.**—*Use*: To conceal emotions and



thoughts, that involuntarily present themselves, until the judgment has approved giving them utterance; it is simply the propensity to conceal. *Abuse*: Cunning, artful, double-dealing, duplicity, deceitful, sly, subtle, and lying.

GENUS II.—SENTIMENTS.

SENTIMENTS COMMON TO MAN WITH SOME OF THE  
LOWER ANIMALS.

13. CAUTIOUSNESS.—*Use*: Circumspection; it gives origin to the sentiment of fear, and it is an ingredient in prudence. The sense of security springs from its gratification. *Abuse*: Excessive timidity, morbid fear of imaginary danger.

14. LOVE OF APPROBATION.—*Use*: Desire of the esteem of others, and to please; desire of fame. *Abuse*: Vanity; finical; dandyism; puppyism; extremely ceremonious; thirst for praise independently of praiseworthiness.

15. SELF-ESTEEM.—*Use*: Self-respect; innate pride of character; love of independence. *Abuse*: Egotism; arrogance; pride; disdain; overweening conceit; endure no restraint; takes no advice; love of dominion.

16. BENEVOLENCE.—*Use*: Desire for the happiness of all; compassion for the distressed; kindness and mildness of disposition; and a lively sympathy with the enjoyment of others. *Abuse*: A prey to mendicants and impostors; injurious indulgence of the appetites and fancies of others; Utopian schemes of philanthropy.

17. FIRMNESS.—*Use*: Stability; fixedness of purpose; determination; perseverance. *Abuse*: Obstinacy; stubbornness; infatuation; tenacity in evil.

GENUS III.—SENTIMENTS PROPER TO MAN.

18. VENERATION.—*Use*: Prompts to venerate whatever is great and good; gives origin to religious adoration and devo-

tion; prompts filial piety. *Abuse*: Senseless respect for unworthy objects consecrated by time or situation; love of antiquated customs; abject subserviency to persons in authority; superstitious awe.

19. CONSCIENTIOUSNESS.—*Use*: It gives origin to the sense of justice, or respect for the rights of others; honesty, sincerity, honour, love of truth. *Abuse*: Scrupulous adherence to noxious principles when ignorantly embraced; excessive refinement in the views of duty and obligation; excess of remorse and self-condemnation, although the character is unblemished.

20. HOPE.—*Use*: To rely on the future for happiness and success; it cherishes faith. *Abuse*: Credulity with respect to the attainment of what is desired; absurd expectations of felicity not founded on reason; absurd speculations; castle building; dabbling in lotteries.

21. IMITATION.—*Use*: To copy the manners, gestures, and actions of others, and appearances in nature generally. *Abuse*: Absurd fondness for mimicry; a complete copyist.

22. MARVELLOUS.—*Use*: The desire for novelty; admiration of the new, the unexpected, the wonderful and extraordinary. *Abuse*: Absurd credulity; thirst for supernatural absurdities—as ghosts, sorcery, dreams, omens. This organ, with hope and veneration combined, give the tendency to religion; their abuse leads to superstition.

23. HUMOUROUSNESS.—*Use*: Gives the feeling for fun, joke, cheerfulness, and the ludicrous. *Abuse*: Absurd fondness for the ludicrous, and burlesque.

24. IDEALITY.—*Use*: Desire of perfection, the beautiful, lovely, and poetic. *Abuse*: Wild romantic fancies; extravagant love for the showy and glaring, in preference to the solid and useful; a tendency to dwell in the regions of fancy and to neglect the duties of life.

25. **SUBLIMITY.**—*Use* : A sense of grandeur and the sublime in nature and art. *Abuse* : A wild romantic love of the grand and awful in nature.

ORDER II.—INTELLECTUAL FACULTIES.

GENUS I.—THE PERCEPTIVE, OR KNOWING FACULTIES.

INTELLECTUAL FACULTIES, WHICH TAKE COGNIZANCE OF THE EXISTENCE OF EXTERNAL OBJECTS AND THEIR PHYSICAL QUALITIES, AS TRANSMITTED THROUGH THE NERVES OF THE EXTERNAL SENSES.

26. **INDIVIDUALITY.**—*Use* : To perceive and remember individual existences. *Abuse* : An absurd love to know, without reflection, on the nature of things.

27. **FORM.**—*Use* : To perceive the configuration of things and remember them. *Abuse* : Over fastidiousness as to shape, and accuracy of delineation.

28. **SIZE.**—*Use* : To perceive and remember extension, height, depth, and size. *Abuse* : Fastidiousness as to space, and the size of objects.

29. **WEIGHT.**—*Use* : Perception and memory of motion and mechanical forces. *Abuse* : Extravagant fondness for speculation in mechanical forces ; perpetual motion.

30. **COLOUR.**—*Use* : To perceive and remember colours. *Abuse* : Excessive fondness for gaudy colours ; the taste for colours absurd.

GENUS II.—INTELLECTUAL FACULTIES, WHICH TAKE COGNIZANCE OF THE RELATIONS OF EXTERNAL THINGS IN TIME, PLACE, EVENT, AND NUMBER.

31. **LOCALITY.**—*Use* : To perceive and remember places, and their relative position. *Abuse* : Extreme fondness for rambling about.

32. **NUMBER.**—*Use* : To perceive and remember numbers.

*Abuse*: Excessive fondness for numbers to the neglect of every thing else.

33. ORDER.—*Use*: To perceive and remember the order of physical things. *Abuse*: Too precise and methodical; tormented with disorder.

34. EVENTUALITY.—*Use*: To perceive and remember events, both active and passive. *Abuse*: Absurd prying and craving for news, gossip, and stories.

35. TIME.—*Use*: To perceive the relations of time; succession. *Abuse*: Fastidiousness at the slightest deviation of time in music or dancing.

36. TUNE.—*Use*: To perceive and remember the harmony of sounds, as music. *Abuse*: Squeamishness at the slightest discord in music.

37. CONSTRUCTIVENESS.—*Use*: Produces the desire to construct, or the ability to fashion, by putting materials together, as in building and making machines, &c. *Abuse*: An incessant fondness to construct, without any regard to utility.

38. LANGUAGE.—*Use*: To perceive and remember words and express ideas. *Abuse*: Literally a talking machine; write and talk by the hour about nothing.

### GENUS III.—REFLECTIVE FACULTIES.

These powers constitute what is called reason. They compare one thing with another, and trace the relation subsisting between effects and causes.

39. COMPARISON.—*Use*: To perceive and remember analogies, either in things or ideas. *Abuse*: Absurd fondness for analogies; over critical.

40. CASUALTY.—*Use*: To perceive and remember the relation of cause and effect. *Abuse*: Absurd fondness for mystical reasoning, and metaphysical abstractions.

By long experience and observation it has been ascertained that each of these faculties is connected with a particular portion of the brain, and that all conditions being equal, the power of manifesting each bears a relation to the size of its organ. The organs differ in relative size in different individuals; and hence arises differences in talents and dispositions. This fact is of great importance in the philosophy of man, as it leads us to view human nature in a practical matter of fact light, and to deal with children, in conducting their education, according to the degree of their natural abilities.

For a fuller treatment of Phrenology, see "*Phrenology Made Practical.*"

## CHAPTER XV.

### EARLY EDUCATION.

HAVING divided the various feelings and faculties, which belong to the being to be educated, into their classes : we shall now present a portrait of feelings in connexion with what belong to nursery education.

In order that the reader may profit by our remarks of the elements of human nature, or the materials upon which we have to operate, in the early training of children, it is absolutely indispensable that the following principles be constantly borne in mind, and that mothers will work them, so to speak, into the very texture of their own minds.

1.—That all the mental faculties and the feelings are possessed by every sane individual.

2.—That different individuals possess them *in different degrees*.

3.—That they are innate, or belong to our nature.

4.—That they cannot be created or annihilated ; though they can be controlled or modified, and stimulated and improved.

5.—That they are capable of combined activity, as well as separate activity.

6.—That they are not all of the same rank or authority ; that the reflecting faculties are superior to the perceptive faculties, and that the moral and religious feelings are superior to the animal propensities.

It is also of great practical importance, in conducting the

education of children, to strictly keep in view the vast difference between training and instruction. Instruction means *communicating knowledge*; while training implies the *repetition of certain modes of action in the mind and body, until they become habits*. It is a law of our nature, that any organ, when accustomed to repeat frequently its action, acquires additional aptitude in so doing; from this arises the force and advantage of habit. Suppose a young lady be told, that to produce certain notes upon the piano, she must strike such and such keys; we might continue the instruction for years, without enabling her to play a tune, if she did not practice. So in the same way, a child may be instructed in the moral precepts of the bible; but if he be not trained to morally practice these precepts, instruction will be of little use. We must not be content with telling; we must act, and train the child to act. Do we wish to make a child kind, benevolent, respectful, and courteous, we must be so ourselves; we must manifest the same feelings by addressing him with kindness, respect, and courtesy.

As regards early education, it may be divided into two periods: **INFANCY** and **CHILDHOOD**. Infancy may extend with some children to one age, and with others to another. It is a mistake to suppose that this period can be precisely indicated by months or years, so as to be applicable alike to all children. Some children are said to be more "forward" than others; and this language is applicable to the manifestations of the feelings and intellect, as well as the corporeal development. With some children it may extend from the birth to six months old; and in others, may be extended to a year or eighteen months, or even to two years.

We have stated, as a fundamental principle, that all our mental faculties and feelings are innate, and are found in some degree in every individual; and that no one of them can be

either created or annihilated. Indeed, it must not be expected that education can accomplish either one or the other ; and the assertion sometimes made, that it is education which makes all the difference which exists between individuals, must be received with considerable limitation.

Education can improve, or weaken faculties and feelings ; and its true office is to improve those faculties which are too weak, and to reduce those which are too energetic, and require to be brought into subordination. Indeed, the true province of what is termed the education of the mind, is to cultivate the intellectual faculties and moral sentiments, so as to control the animal propensities. It is intended to *train the intellect to observe and reflect*, and the *moral feelings*, under the *guidance of enlightened intellect*, to *command the propensities to obey*.

The animal feelings are the first that are manifested in the infant, and are therefore the first that require to be subject to the earliest discipline. But by discipline we do not mean coercion, and can by no means subscribe to the opinions of some strenuous advocates for discipline, who maintain the propriety of coercion even to beating, in cases of infants only a few weeks old. Such discipline we cannot believe ever to be necessary, indeed it cannot be otherwise than pernicious. The first instinct that is manifested, is that which prompts us to preserve our bodies from injury and destruction : it is called Preservativeness. The manifestation of this feeling is displayed in the cries of the new-born infant. No propensity is more universally manifested than this and Alimentativeness, and none so essential to the preservation of our existence. The cry of the infant is the language of nature supplicating for relief. It can express its wants in no other language. This instinct, when large, causes the infant to manifest great sensibility and fretfulness, when suffering from pain or



hunger. Now, when an infant shows these symptoms we may rest assured that it is suffering, because children so young never cry, but from pain and sickness, and, therefore, the cause of distress should be at once carefully enquired into. If allowed to continue, it disturbs all the animal functions, especially the digestive organs, and from the disorder of these most of the diseases of children proceed. But instead of attending properly to the cry, the children are too frequently put into cradles, where the noise and violent motion confounds all their senses, and extinguishes all feelings of pain in a forced and unnatural sleep. Sometimes they are allowed to cry till their strength is exhausted. Their violent struggles to get relief, and the agitation caused in the feelings, equally disorder their constitutions.

When the mother observes that there is a marked tendency to manifest sensations which partake so much of pain and distress, and when the turbulent passion is so early awakened and exercised, she cannot be too vigilant in keeping it in check, because if fed and fostered, it becomes the ruling element of the character, and insures to the individual a life of misery and trouble.

Some children manifest from birth a fretful, petty peevishness of temper, and we have found the organ of Preservativeness large in all such cases we have seen. This feeling, if not rightly trained from infancy, becomes the torment of the life of the individual, and particularly so in delicate constitutions.

As cleanliness of children is indispensable to the healthy action of the skin, and through that to their general health, the water for such children should be tepid. Though vigorous children may bear bathing in cold water, delicate sensitive ones cannot; and even the former, if in the slightest degree indisposed, may be injured with it. As it is not always easy to ascertain whether children are in perfect health or not,

tepid water is always safest. Infancy is not the period to attempt to produce hardihood of constitution, by exposure to low temperature ; and a practice the opposite of this, is often productive of serious results, not to say fatal.

Another of the earliest instincts manifested by the infant is the *desire for food*. This instinct is termed ALIMENTATIVENESS. In the newly-born infant, nature appears unsophisticated ; and when its cravings for food are satisfied, it spontaneously relinquishes its hold on the vehicle of its reception. But how frequently is the order of nature virtually reversed, through the ignorance of mothers and nurses. The infant knows better than the parent when it has had sufficient food, and indicates it by declining to receive more. If mothers would attend to the language of nature, as manifested through the instinct of the *babe*, much mischief would be prevented ; but Philoprogenitiveness, the instinct of maternal love, blinds the judgment of the over-fond mother, and she conceives that more food would be gratifying to her little darling, and induces it to receive more. In this way the organ of ALIMENTATIVENESS is *stimulated*, which is an animal one, and which belongs to a class that seldom require stimulation, as they already possess undue energy, and require their activity to be *diminished* not increased ; but the presentation of a stimulus to an organ increases its action, which progressively increases its power of action. By the means of a stimulant, whether sugar or what not, the organ of Alimentativeness is re-excited, after having been satisfied, and a further portion of food is received into the stomach, which not only increases the size and energy of Alimentativeness, but the stomach is in some measure distended by the additional food forced into it ; thus an increasing desire for food is stimulated, and again and again gratified. The process is repeated from day to day, until the mother discovers, to her sorrow, that the child of her affection is a

glutton, absorbed in the mere pleasure of eating. She now bewails her hard fate ; but she “ *has rewarded evil unto herself,*” in *violating the fiat* of the ALMIGHTY. It is a law of our nature, that our natural powers shall be strengthened by indulgence ; but she has pursued a course of conduct, in stimulating and pampering the appetite of her child, contrary to the will of the CREATOR, and the consequence resulting is, the penalty which He has annexed to transgression. It is the natural consequence of her conduct ; and it is a righteous consequence, even though she knew it not, because she is endowed with faculties for obtaining knowledge of it, and is in duty bound, to God and humanity, to employ them. It is, therefore, an indispensable necessity, in order to a proper education of a human being, that those who conduct it should possess definite positive knowledge of the nature of man, and of the effects of a given course of procedure on any of the innate elements of his nature.

Among the feelings early called into play, it is obvious that of ADHESIVENESS or the instinct of attachment is early excited. This feeling if properly cultivated may be rendered a powerful means for enforcing rules of conduct in after life. Words are called the signs of ideas, and to the man and even to the child, they are such ; but words are only the artificial signs of ideas, and with these the infant is as yet unacquainted. Long before it can utter these, or even understand them, it can feel and express emotions though not in words ; but in the language of nature. With what sweet innocence does it nestle its little head on its mother’s bosom, after having satisfied its hunger from her breast. With how much delight does it look up into her face and smile, and then playfully bury its face in the bosom on which it rests. And how obvious is the satisfaction it derives from her affectionate pressure and caresses.

But how can we sufficiently admire the wisdom and goodness

of our Creator, in endowing the mother with the powerful, unwearied instinct of parental love, and imparting to it an exhaustless intensity at a time when the helplessness of its object renders it especially necessary, and which secures an early reward in the manifest attachment of her child. This attachment calls forth new gushes of maternal love; which is continually repeated, because there is continued need of the exercise of this love, in order to secure the well being of its object.

Some mothers, of strong natural intellect, have perceived how they could avail themselves of the attachment of a child, and found it a most powerful auxiliary in stimulating the higher motives of the mind. Indeed, no intelligent mother can be ignorant of the immense influence over her child, which she derives from his affections towards herself; and no such mother who knows it, will fail to endeavour to retain this influence, and watch for the occasion to exert it for his benefit. Some mothers have made this single feeling of attachment to herself, a cord by which to hold back a wayward son from ruin, and guide him in the path of religion and virtue. Cecil, in recording his own experience of his mother's influence over him, says: "When parental influence does not convert, it hampers. It hangs on the wheels of evil. I had a pious mother, who dropped things in my way; I could never rid myself of them. I was a professed infidel, but then I liked to be an infidel in company rather than alone. I was wretched when by myself. These maxims, and principles, and data, spoiled all my jollity. \* \* \* My mother would talk to me, and weep as she talked. I flung myself out of the house with an oath, but wept too when I got into the street." How distinctly marked in this case, is the power which the affection of a child places in a mother's hand. Another case, very similar, of a young man, "the only son of his mother, and she

was a widow," on becoming of age and receiving his patrimony, entered into company, and indulged in the dissipations of genteel society. Her watchful eye saw his danger, and pointed out its tendency to ruin, both of body and soul, and used every means to induce him to relinquish it, but in vain. One day she learned that he was to dine with a large and jovial party, and she spent the forenoon in intreating him not to go, but it was useless. "Mother," said he, "I will go." "Then John," replied the widowed parent, "I will retire to my closet, and pray for you, till I see your face again." He went to the party, but could find no enjoyment, the thought of his mother on her knees in prayer for him, formed such a contrast to the scene before him, that he slipped away, found his mother in the act of prayer, knelt by her side, fell on her neck, and from that day became the delight of his pious mother's heart.

It was the operation of an active and powerful Adhesiveness, which haunted him with the vision of his kneeling mother, praying for him, and which rendered all the gaiety and jollity of the party not merely insipid, but disgusting, which withdrew him from the circle of dissipation, and ultimately brought him to the path of goodness and truth.

In the early management of children, care should be taken that Adhesiveness is not easily pained. It is a principle in phrenology, that pleasure is the result of the legitimate exercise of any faculty. But a faculty cannot act legitimately, except on its appropriate object; and to deprive a faculty of its proper object, is to inflict suffering. The same effect is produced when the individual supposes that the object on which any of the faculties may delightfully operate, has been removed or lost. This is the case with Adhesiveness. It is, therefore, exceedingly wrong, injurious and cruel, to endeavour to persuade a child that his mother does not love him, or that she

will exchange him for some other little boy ; or that his brother and sister is beloved more than himself. How often this is done in mere thoughtlessness, and for it no apology can be offered ; but where it is done in wantonness, from a desire to give pain, it is downright cruelty, and cannot be too severely censured.

The injuriousness of such a course of treatment is obvious, when we look upon its effect on the child. Its LOVE of APPROBATION is *keenly pained*. The little one is told, that another possesses that place in his mother's affections which he *did* possess, and which he has not forfeited by any act of disobedience or transgression. His CONSCIENTIOUSNESS is indignant at this outrage on his rights. His COMBATIVENESS is roused to contend for his violated and valued rights, and against the real or supposed invader of them ; also DESTRUCTIVENESS turns on its rival, whether brother, sister, playmate, or stranger. Thus arises, at once, anger, envy, and revenge, in their germs and essence.

But this is not the whole amount of the mischief. The mother suffers in the child's esteem ; his confidence in her is no longer entire and unlimited ; she has (as he is made believe) *unjustly* withdrawn her love from him ; and he cannot *trust her* as before. Mothers ! can you bear to be regarded with *distrust* by the children of your affection ? Will you barter their entire *confiding love* for the pleasure of seeing them angry, envious, and revengeful ? Beware, then, how you treat their Adhesiveness. Let them be taught, by all your conduct, even before they can understand your language, that no child of another family is *so* loved as themselves ; and, that you love them not the less for loving others, whether older or younger, as the objects of your affection. Alas ! how numerous are the cases in which a permanently and in-ween

rigibly bad temper has been originated by the conduct to which we have adverted.

We may have led the reader to suppose that the evil in question has been traceable to the mother herself ; but it may be otherwise. It may have proceeded from the father, or from an elder brother or sister, or from a misguided though well-meaning domestic. In all cases, except the first named, it will certainly be a mother's duty to interpose her authority to prevent the infliction of pain and injury on an innocent being so tenderly dear to her ; and are confident that an intelligent and affectionate husband and father will need no inducement to abandon the mischievous course, beyond a mere glance at the consequences which must result from it.

There is another consequence, but not so immediately connected with the *suffering inflicted* on the child, as with his moral interests. His regard for truth will be weakened. Some may smile at the idea of the moral interests of an *infant* being injured, but let them smile ; we are as sure that there is too much ground for our apprehension in this case. The child, when sufficiently tortured by the treatment referred to, to satisfy the mind of the torturer that it should be no longer continued, he is soothed, and *may be*, satisfied that his mother does love him as well as before ; that she will not change him for another boy, and that, therefore, he has not been injured as he had supposed. But what is the effect of this upon his moral feelings, for of these he has the germs, and they act as soon as he can form an idea ; does he not suppose that it is right to *say* one thing and *mean* another ? that *falsehood*, in fact, is *not* a serious evil, even if it be one at all, for his parents and friends utter it ; and a child takes for granted that what its parents do is *not wrong*. Thus is the almost embryo feeling of *Conscientiousness* enfeebled, and those of *Secretiveness* and *Imitation* excited to activity ; and

the child learns, in its very cradle, from its own parents themselves, its earliest lessons in deception, falsehood, and hypocrisy—evils, for the practice of which, in after life, it is to suffer punishment, and not improbably may cost its eternal happiness. “Behold, how great a matter a little fire kindleth!” how great a stream issues from an apparently insignificant fountain.

COMBATIVENESS, the instinct to oppose, is another feeling that we possess. Let not mothers be alarmed at this, if it could not be true that anything unlovely could be an original element in human nature, and especially in the nature of their gentle babes. Perhaps, when this feeling is properly understood, it may be found in its nature less unlovely than would appear in the name given it. Our infinitely wise Creator knew, when he created man, that in passing through this life he would meet with many enemies and dangers, and difficulties and temptations, and that it would be necessary to be prepared to meet them. He, accordingly, implanted in our nature the *instinct of opposition*, and thus adapted us to the condition in which we are placed; and like all the others of our animal feelings, it is bad and unlovely when misdirected and excessive. This is the instinct of courage, the element of intrepidity, the feeling by which we are braced to encounter difficulties, surmount obstacles, and sweep aside impediments. But mothers, your infants have never been called to this, and hence, you may conclude that the feeling does not exist, and therefore you are not called on to educate it. But does your child never, even though an infant, manifest a spirit of disobedience, of opposition to your will? Is there never exhibited a disposition to contradict, and even to contend? That is the element whose existence we maintain.

Now, in noticing children, we may easily distinguish between those who are only occasionally passionate, and those who have



an almost constant tendency to be quarrelsome. Those children of the first class will color up and cry, and call out when under an angry fit, and in this manner exhaust themselves and the feeling at the same time. Those of the second class may also express themselves in a similar manner, but they will not do so passively, for when once offended, they will have recourse to blows. Such children show their pugnacity upon all occasions. They refuse to do anything that they are required to do, and always appear to delight in contradiction; yet it would be perfect folly to strike or threaten them, for in such cases the little creatures are sure to lift their hand, and with extraordinary daring strike again. It is difficult to deal properly with such tempers, or to legislate for these little tyrants of the nursery. They will exercise an overbearing sway, and seize with lawless selfishness upon the toys and playthings of their brothers and sisters, not so much from the desire of possession as from mere love of contention; and should force be employed, "then comes the tug of war," pulling, pushing, crying and kicking to get possession; one child claiming the toys by right of property, and the other by the right of the strongest. In such cases it is the best to ascertain to whom the property really belongs, and to make restitution accordingly; mildly impressing upon the aggressor the evil of injustice, and upon the aggrieved party the more noble conduct of forbearance and kindness in similar circumstances. It would be well to avoid exciting the combative feeling at any time, but with some children it is certainly most difficult; for we frequently see children, who are naturally pugnacious, evince their inveterate tendency by refusing to have what they first cried for. If food be placed before them they push it from them, or throw it down. If taken away, they cry for it; give it them again and they renew the first proceedings. In all such cases the child should be at once

removed from the table into another room, and told that as soon as he is capable of better conduct he may return.

Now, in educating this feeling, we must keep constantly before our mind this great principle: that it is an *animal* feeling, and that it is the will of our Creator that animal feelings should be educated *to obey*. In order to accomplish this, measures must be taken to enfeeble the feeling. Now, the measures we should take to reduce the strength of a limb of the body, would not be by daily exercising that limb, but by preventing its action; as it is a law of our nature, that due exercise of any organ of our body increases its strength, vigour, and activity. The same law governs the action of the brain. If, then, the law of exercise imparts increased vigour to an organ, it will be at once obvious, that to reduce the vigour and activity of an organ, is to prevent it being exercised.

To enfeeble the feeling under consideration, is to prevent it by every possible means from being excited, and when it is excited it should be quieted as soon as possible. But this must not, and cannot be done by force; the employment of this will only excite, and thus increase the feeling. The caprices of an infant must not be administered unto; but until he is at an age to be reasoned with, it is best to silently remove the provocation, and *sedulously watch against* its future presentation. We frequently hear parents complain of the fretfulness and impatience of their children when a year or two old, and who affirm that, for the first few months, they were perfectly good tempered. The neglect of the preventive method no doubt is the cause. The first exhibitions of temper were not treated as we recommend, but in an opposite manner, and thus the seed was made to germinate; and subsequent steps in the training adopted, changes the seed into a plant, and, alas, a fruitful one for evil. This evil consequence results sometimes from intrusting the care of an infant to an injudi-

cious nurse. Children are sometimes themselves made the attendants of children, and by them they are too frequently neglected, teased, and provoked; hence, a sour, fretful, impatient, irritable, pugnacious disposition is thus originated in the infancy of a child, and without the knowledge of the mother, which to her is surprise at first, and of affliction afterwards; and which becomes the source of the bane of his happiness to the latest period of his life.

If this quarrelsome disposition require such constant care, and the application of negative means to restrain it, what can we say of those thoughtless parents who encourage the feeling for the sake of the temporary pleasure of seeing the daring posture of defiance which their approbation induces in the child? "Shut your fist, Bob, and fight the gentleman—run at him—give him a good blow." If the poor child obeys, the foolish parents laugh and applaud him; but such an act of levity and folly may so far influence the character of a child as to render him a pugnacious, insolent, and disagreeable man.

That the mother may not be left without some hints as to the management and training of this feeling, we will suggest what we deem an advisable course in treating it. It will be remembered that it has been laid down as a fundamental principle, that "*the feelings and the mental faculties are capable of single or combined action;*" that is, that more than one feeling or faculty can act at the same time. Now, a child with large combativeness, and large self-esteem, will be prompted by the latter feeling, with an innate desire to assume authority and be as the chief of the nursery, as his unquestionable right; he must be first. For this distinction, combativeness inclines him to contend. If there be another child in the family similarly constituted, he is, of course, the subject of the same feelings; hence, the supremacy of the nursery must be settled by the law of the strongest.

Now, for the mode of treatment of such a child, we have before observed, that the feelings of our animal nature are blind in themselves ; therefore, the first step to be taken, to prevent their acting blindly, is to enlighten the intellect : knowledge must be imparted, and the child trained. "Let him be taught that he and his fellows are equally the creatures of God ; and that God regards them with equal love, and commands each of them to love others as themselves. He should then be shown that his pride and self-preference transgresses this command, and really degrades him who indulges in it ; for God loves 'the humble and lowly,' the meek and gentle, and not the proud and assuming, the angry and contentious ; that God's estimate of worth, or of the *right to be chief*, is the *proper one* ; and that He has said, 'honor shall uphold the humble person ;' that to *such* He will give grace, while 'the proud he knows afar off,' and accounts 'a meek and quiet spirit of great price ;' not a proud, arrogant, contentious one. We think that it will be obvious to most minds, that such a course is the right one ; because, it at once enlightens the intellect, and appeals to the moral and religious sentiments. Benevolence, Conscientiousness, and Veneration are all appealed to, and stimulated by their appropriate food, moral and religious truth ; and to these, as the highest principles of our nature, God has given the dominion of the soul."—"*Phrenology in the Family*," by the Rev. J. A. Warne.

Lessons like these, with a child of average intellect, if inculcated in a proper spirit, at proper times, and in a suitable manner, could scarcely fail of being understood, and exerting a beneficial influence. It must not however be supposed, that lessons addressed to the intellect and moral feelings can be beneficial, while the *teacher* is the subject of *irritation* and *resentment*. Lessons given in such a frame of mind would be utterly powerless for moral good. In fact, they would be

pernicious, as the manner and tone of voice would, by the law of sympathy, stimulate the very feelings that required to be brought into subjection.

ANGER, in childhood, may be defined to be the painful affection of Preservativeness, Combativeness, and Destructiveness. The education of this feeling requires the most careful watching, and the wisest and most judicious treatment. Indeed, systematic discipline is absolutely indispensable to it; but it never can be brought under proper discipline without a knowledge of its nature. Anger, then, is the result of the simultaneous activity of three of the animal propensities before named; its nature is, therefore, animal. Now, a knowledge of this fact must guide us in the discipline to which we subject it. We have already observed, that it is a law of our nature, that all animal feelings are *excited by opposition*; therefore, anger is thus excited. It is then obvious, that it must not only be useless, but positively pernicious to resort to direct opposition of this feeling:

If the passion of Anger be indulged, it is a growing evil, and blights the moral character; and insures to the individual a life of trouble—not to say of accident, disease, and suffering. The extremes to which this passion will lead an individual may be observed in the violent paroxysm of Anger, where the countenance becomes distorted and repulsive, and the eyes sparkle with a brutal fury. All the vital action of the system is commonly oppressed, and frequently overwhelmed. The blood retreats from the surface, leaving it cold and blanched; and tremulous agitations frequently come over the limbs, or even the whole body; and sighing, sobbing, and distressing nervous affections—as hysterics, spasms, and convulsions—frequently supervene. The vital and nervous influence being expelled from the surface is accumulated on the internal organs; the functions of these organs become sensibly embarrassed.

The motion of the heart is irregular, and oftentimes painful. The breathing is short, rapid, difficult, or suffocating; and a tightness is felt in the whole chest, in some cases extending to the throat, causing a sense of choking, wholly interrupting speech; hence, the phrase, "to be choked with rage."

Under the active stage of Anger, the following train of phenomena will be manifested in greater or less strength. The heart, now roused, beats quick and forcibly, the blood rushing impetuously to the head and surface; the brain becomes heated, the face flushed, the lips swollen, the eyes red and fiery, the skin hot. The muscles contract with inflexible strength. The hands and teeth are clenched; and the individual vociferates, stamps, threatens, and every part is so violently agitated, that he appears to have become allied to the maniac. While in this state he may commit acts at the bare thought of which he would shudder in a rational state of mind.

Fainting sometimes takes place in violent anger; the system, unable to re-act under the shock, life has yielded almost as to a stroke of lightning; and death from sudden gust of passion is, according to Hunter, as absolute as that caused by the electric fluid, the muscles remaining flaccid, the blood liquid, or dissolved in its vessels, and the body passing rapidly into putrefaction. Reaction, in fainting, however, does for the most part speedily ensue.

Anger sometimes proves fatal in suppressing the action of the heart, or causing the actual rupture of this organ or some of its large blood-vessels. Apoplexy, hemorrhages, convulsions, or other grave affections may also succeed to it, speedily terminating existence.

Valentinian, the first Roman emperor of that name, while reproaching with great passion the deputies from the Quodi, a people of Germany, burst a blood-vessel, and suddenly fell

lifeless. The emperor Nerva died of a violent fit of anger against a senator who had offended him. "I have seen," says Tourtelle, a French medical writer, "two women perish: the one in convulsions, at the end of six hours; and the other suffocated, in two days, from giving themselves up to transports of fury."

Numberless instances of apoplexy, excited by anger, may be found both in ancient and modern writers on this disease. Bonetus tells of a lady, who, in consequence of a sudden fit of anger, was seized with a violent apoplexy, and in whose brain blood was found largely diffused. "A gentleman," observes Dr. Cook, in his work on *Nervous Diseases*, "somewhat more than seventy years of age, of full habit of body and florid countenance, on getting into his carriage to go to his country house, was thrown into a violent passion by some circumstance which suddenly occurred. He soon afterwards complained of pain in his head, and by degrees he became sleepy, and in about a quarter of an hour wholly insensible; and in about twenty-four hours he died."

The celebrated John Hunter fell a sudden victim to violent anger. He suffered during his latter years under a complaint of the heart; his existence was in constant jeopardy from his ungovernable temper, and he has been heard to remark, that "his life was in the hands of any rascal who chose to annoy and tease him." Engaged one day in an unpleasant altercation with his colleagues, and being peremptorily contradicted, he at once ceased speaking, hurried into an adjoining room, and instantly fell dead. The name of Hunter is familiar to medical readers as a man of great natural parts, but from the defect of his early moral training, he had not learned the habit of controlling his violent temper.

Morbid effects, of a more or less grave and lasting character, are the result of intense anger. Thus palsies, epilepsy, and

insanity are among its consequences. Violent and ungovernable temper holds a prominent place among the causes of insanity. Raving madness frequently results from this cause, which has, sometimes, at once followed violent passion. Charles the Sixth, of France, is a case in point. Being violently incensed against the Duke of Bretagne, his burning rage had such powerful influence, that he could neither eat, drink, nor sleep for many days together, at length became furiously mad as he was riding on horseback, drawing his sword and striking promiscuously every one who approached him. The disease became morbid and accompanied him to his death.

Anger destroys the appetite, and checks or disorders the functional action of the digestive organs. Let a person have his temper excited in the midst of his dinner, and the food at once loses all its relish for his palate. Dr. Beaumont, in his observations on the various action of the stomach of St. Martain, referred to in page 96, remarks, "that anger, or other severe emotions, would sometimes cause its inner or mucous coat to become red, dry, and irritable, causing a temporary indigestion." Pains, and cramps of the stomach and bowels frequently follow fits of passion; and the liver has been so implicated in its effects, and the flow of bile so augmented under its sudden influence, as to produce a bilious vomiting, or diarrhœa. Indeed, if it were necessary, we could show that a large proportion of the evils of life, as respects both health and fortune, is the product, more or less directly, of ungovernable passion. The higher virtues, both moral and religious, cannot flourish under unruly passion.

Children should never be allowed to have what has once been denied them, by crying or breaking into a passion about it. Such an act ought to be always resisted by a positive privation of the thing desired; and the ground of the denial should be made known to them. Never let a child have reason



to believe that going into a passion is a suitable means to gratify a wish. Teach him, as far as possible, to know and feel the reverse. When a child is offended at a pet or a plaything, do not beat it yourself, nor allow him to beat it by way of pacification or revenge. Such is food to vindictiveness, and leads to serious mischief, perhaps, in the end, to maiming or murder. The worst of family nuisances are ignorant, passionate nurses. They often blow into a flame the sparks of temper, which, without their aid, would have slumbered. These may be deemed small and trivial matters; but are they so in their consequences? "Little things are great to little men," and to a child especially so. A fiery education in the nursery renders unhappy the days of the mismanaged individual, and lays the foundation of a blasted reputation. It is believed that the late Lord Byron was greatly injured in his moral character by an education of this kind; and that Earl Ferrers expiated on a gibbet the fruit of a similar one.

The nature of the passion of Anger was well understood by the Apostle Paul, and the effect of direct coercion upon it. In the following precept he hints to parents on the subject of its education in the family. "Fathers provoke not your children to anger," and to "forbear threatening." But this direction of Paul is daily and hourly disregarded; and the angry child is either ignorantly or thoughtlessly coerced into submission, but always to its injury. How frequently do we hear well-meaning but injudicious and misguided parents exclaim, "I will break that temper!" Spirits may be broken, but never without injury to the moral nature of the child. But the result of breaking the temper does not always follow. There are children whose temper is of such a nature, from large and active Combativeness, Destructiveness, Self-esteem, and Firmness, that it would be as easy to "break the pillars of heaven," as to break such a temper. The attempt defeats itself.

We might as well attempt to smother the glowing fire by burying it in gunpowder, or extinguish the fire by exposing it to a current of air. In fact, a more scientific method could not be pursued, if the object was to increase the power of a temper like this ; hence, the evil they wish to remove, increases day by day, under the operation of the experimenter. The forcible language used, and the measures employed, can never be done without calling into play in themselves, the very feelings they are desirous of subduing in the children, which is strikingly shown in the proverb : " As coals to burning coals, and wood to fire, so is a contentious man to kindle strife."—Prov. xxvi. 21. Hence, the course pursued has the very opposite tendency to what is intended.

But it should be remembered, that the angry child possesses other feelings ready to act during his fit of passion, and they only wait for their appropriate object to call them into play. The faculty of *imitation* is active in children, and the means of its excitement is *example*. If it then be attempted, by *force*, to break the spirit of an angry child, the example presented at once rouses his imitation, and the very passion which in him is condemned he will seize with greater avidity, from the fact, that it affords the true stimulant for the gratification of his own bad temper. Thus, the evil is increased by the very means employed to effect its cure, because, the right means were not adopted to secure the desired end ; the means were pursued in ignorance of the nature of the being to be educated, and of the proper mode of addressing him.

There may, however, be people so wise in their own estimation, as to set up their authority in opposition to the working of the natural laws that regulate morality and mentality—simply, on the ground, that submission has often been produced in children by the very means that we object to. We do not say that submission is never produced. Indeed, we have

frequently seen it ; but the children so subdued were not of the type of the case in hand, where there is a strong natural tendency to anger, combined with stubbornness. Indeed, we have seen children of this class, by severe means, show the appearance of submission. But those who understand the philosophy of motives view the matter differently ; they can see that the child is not MORALLY SUBDUED, but DEBASED. He was not able, unflinchingly, to endure the pain which the excited Combativeness, Destructiveness, Self-esteem, and Firmness of his educator inflicted on him ; he, therefore, called to his aid Secretiveness, affected submission, and thus became a deceiver. Here we have the foundation laid for a sly, deceptive, cunning character, in the well-intended, but misguided attempt to subdue an angry stubborn child.

Now, in dealing with such a child, we should never lose sight of the two fundamental principles of our nature, namely : “ *That every faculty is strengthened by activity, and reduced by inaction.* ” And, “ *That all animal feelings are excited by opposition.* ” With the light of these principles, we at once see that the mode of treatment should be *uniformly mild and firm* ; being least likely to excite the feeling in question, and the most likely to lay it when excited. This mode of treatment presents to the imitation of the child a nobler object than the being transported by passion. It is the intellect and the moral sentiments controlling and subduing the animal feeling. The child feels that he is subdued by the mild and higher virtue, which he feels to be superior to those by which he has been actuated to stubborn and passion, and he yields a genuine, a cordial, and not a feigned submission.

We trust that no one will suppose that we are advocating indulgence in the training of angry children. No ; our views are as decided on this mode of training children as they are on coercion. For to minister to the imitation of the child

by indulgence, would augment the evil in another way; in accordance with the principle, that *indulgence increases the demand for indulgence in the animal feelings.*

The difficulty in the management of children who have a strong tendency to anger and wilfulness, is very great, all must allow; yet, it is by no means so difficult when guided by right principles, and the proper course pursued, with patience and perfect self-control, and this under severe and repeated provocations. When parents have attained this, they have gained the moral triumph of that charity which "*suffereth long, and yet is kind.*"

In the spring of 1849, a lady and gentleman called upon me with their daughter, to consult me respecting the proper management of her education. The girl was about twelve years old, with a fine vigorous constitution of the sanguine and nervous temperament, and the brain large and active, and highly developed in the mental and moral qualities. But in addition to these, I found Self-esteem, Firmness, and Combativeness very large, and Veneration low. The brain as a whole showed great positive action, either for good or evil, accordingly as external circumstances were brought to bear upon her. I remarked to her parents that she would be an extremely difficult subject, if not rightly managed, and that coercion of any kind would cause her to manifest a most wilful violent temper—in fact, so much so, that she would appear, for the time, a perfect fury. The girl looked at me, and then at her parents, in confounded astonishment of shame and confusion, and her face and neck covered with a deep blush. I quietly and kindly explained to her the nature of those feelings that led her to acts of violent temper, and showed her how much happier she would be by cultivating her moral feelings. She paid great attention, and showed a warm interest in all I said, and frankly promised me that she would do all in her power

to follow my advice. I then requested her to go into another room. No sooner had she left us, when her mother most anxiously asked me if I saw anything like insanity in the girl, as they had been told by three doctors, one in Paris and two in London, that she was insane. Indeed, from the account the mother and father gave of her conduct, no one could be in the least surprised at the doctors coming to such a conclusion; as she had, in her rage, beaten several governesses, and smashed the windows and the things in the room, and had also been turned out of four schools for violent conduct. When I had fully explained to her parents the cause of such conduct, and how it could be prevented in future, they expressed great satisfaction, and were delighted to learn that their daughter was not insane.

I begged that they would let me know how she went on. Two months afterwards the mother called, and informed me that the change that the new method of treatment had effected in her daughter's character and conduct appeared more like the result of a miracle, than that of simply obeying the social, mental, and moral laws. She further informed me that her husband was Judge ——; and that he had desired her to express to me the thanks and gratitude of a father. I am happy to have the satisfaction of saying that she is now a fine, handsome, well-conducted young lady, beloved and esteemed by all who know her.

Another remarkable case came under my notice in the summer of 1850. A gentleman called upon me to go with him to look at his son, whom he and two medical men considered insane. He resided in the neighbourhood of Liverpool. On entering the house, I found that his son was in a bed-room, with the door fastened inside. The father knocked at the door, and in a loud, peremptory tone, demanded admittance; but his son heeded him not. At length means were taken to

force open the door. I entered the room by myself, and closed the door, and a more pitiful and sickening sight it would be difficult to meet with. The room was filthy in the extreme, and the bed on which he lay was not less so. The bed clothes stunk with dirt, and he was covered with lice and fleas. I spoke to him in a kind and gentle tone, and requested him to tell me how it was that he was in such a dreadful condition, and if there was anything that I could do that would remove him from it; but he made no answer. I then examined his head, and found that he had good natural abilities; but that Combativeness, Self-esteem, Love of Approbation and Firmness were large, and Veneration small. I then remarked to him, that I was extremely sorry to find a young man, with such good natural abilities as he possessed, in such a position; and that God had intrusted them to his care to be used for a good and noble purpose, and that he was in duty bound to God, to himself, and society, to make a proper use of them. He then looked at me, smiled, and said—"I am extremely obliged to you for your observations, and I assure you, sir, that you are the only one who has treated me as a rational being for more than two years. As you appear to understand me, I will relate to you the cause of all you see.

"I may first inform you, that my parents gave me a good education, with the full intention of bringing me up to the medical profession, for which I had a strong aversion. Notwithstanding my aversion to it, at the age of seventeen, I was placed as pupil under Mr. —, a medical man; but instead of taking to it in the spirit of a pupil, my aversion to it grew stronger daily. At length I told my master that I had no taste for the medical profession, and that I would not be a doctor. He, in a pompous air, informed me that I could not help myself, that I was his legal pupil, and that he would make me do

my duty. I told him he was at liberty to do as he liked, but I would not be a doctor. 'Well, then, we will see who shall be the master.' With these words he left the surgery, and locked me in. I was so disgusted and enraged at such treatment, that I foolishly smashed all the medicine bottles in the place. But in the meantime he had sent for my father; when he arrived, my master and he came to me, and on finding what I had done, they both set upon me like two infuriated demons, and beat me so severely, that I suffer from it to this day. From that time I have been treated as mad."

On concluding the last sentence tears gushed from his eyes, and he wept bitterly; and in the most pitiful and heartrending agony he looked in my face, and asked in a gentle voice—"Do you, sir, think that I am mad?" I firmly replied "no; you are not mad. They do not understand you." He raised his hands and looked up to Heaven, and in a fervent and solemn manner said: "I thank thee, O God, that thou hast in thy goodness sent one to release me from bondage." I then asked him what he would like to do, and he appeared fully bent on a commercial life. I informed him that a good situation, no doubt, could be found for him. Now that I know the nature of the case, I should advise you to clean yourself as early as possible. He promised to follow my advice. I left the room and went to the family. On entering the room, I found them all anxiously waiting to learn my opinion of him. The father asked me whether I had not found him in the state of mind he had named. I answered "no; but the very reverse of it. His singular conduct, which you and others consider insanity, is nothing of the kind, but the result of the injudicious way in which he has been treated." At these remarks the father was not well pleased; and observed, that "he had been treated too well." But I proceeded to explain the nature of the case, and what ought to be at once done in the matter. The mother

and sisters, on hearing my statement, fell upon their knees, and in a solemn manner thanked God that he was not "mad." A situation was found for him in London, and in a short time his employers found him so clever and useful that they advanced him ; and he is now, I am pleased to say, a junior partner in the firm.

If it were necessary, we could recount similar cases that would fill volumes, that have all come under our own observation. We therefore speak on the authority of experience of what we know, and not merely of what we think.

SECRETIVENESS, or the instinct to conceal. It exists in children in every variety of degree. If we observe the actions of children, we shall recognise at an early age a tendency in some to be sly in their intercourse in the nursery or at school, and who are disposed to obtain their ends by the most artful means, and derive a pleasure from being able to overreach their companions by subtleness and trickery, instead of having recourse to open rivalry.

Now cunning, slyness, and evasion are from the too great action of the instinct to conceal. The individual so endowed invests everything with an air of concealment, even though there be nothing wrong, or which requires concealment ; still, he will endeavour to accomplish all his objects circuitously without observation. He will evince what in mature life is called "tact," and "management." He will be the agent, and make others his instrument ; he will remain behind the screen, but "pull the wires."

The excessive activity of this feeling is an evil, and one of the correction of which the early and unremitting attention of parents should be directed. Under proper directions and in a proper degree of development, it is both useful and good ; it is only from the blind excessive action of it, from which evil is to be feared. But it too often happens when this feeling is



seen in excess, most injudicious attempts are made to correct and eradicate it.

Now, children in whom this feeling is large and active are called crafty, cunning, artful, and sly; but large Secretiveness does not necessarily render them so. Cunning and slyness are the abuse of this feeling, from being uncontrollable or misdirected. When it is manifested so strongly as to produce cunning, and the parent has become the dupe of it, the child is too frequently harshly punished, which is anything but a wise course. It should be remembered that this is a blind instinct, and that the child is unenlightened; hence, it cannot understand how the desire of concealment can be *wrong*, any more than the desire to *eat* and *drink* can be *wrong*. But notwithstanding this, he is punished for an act which he cannot see that he deserves; his sense of justice is, therefore, indignant, but it is also *blind* and *unenlightened*, hence, insensible to what he *has done*. Self-esteem, Combativeness, Destructiveness, and Firmness, are all roused in connexion with Conscientiousness; and he shows a spirit to resist what he thinks an infringement of his rights. But the mischief does not end here. He is led to regard the punishment he suffers as the consequence of his want of tact in the exercise of Secretiveness; he, therefore, in future acts with more care to avoid detection, and goes on step by step, till he becomes more and more perfect in the art of deception. Finding his new mode of proceeding more successful than before, he conceives that he has been punished *not* for a fault, but for failure of success in his acts of deception. Hence, the punishment disciplines *Secretiveness*, and *not* Conscientiousness; and, according to our elementary principles, Secretiveness is rendered more vigorous and active, thus producing results the very opposite to what is desired.

We have known parents make the most strenuous efforts to

counteract or eradicate cunning and deception, by closely watching and trying, if possible, to detect the operations of Secretiveness. But this is not a wise course ; for if the parent has not as large and active Secretiveness as the child, it will, certainly, sometimes be successful ; and every success will be treasured in memory, and prompt Hope to stimulate Secretiveness. But only one instance of success, out of every twenty detections, would have a greater influence in stimulating Secretiveness to a high state of action, than all the detections would accomplish in preventing its activity. But let us suppose that the parent is always successful in detecting concealment ; this only exhibits to the child Secretiveness in a higher state of action than its own, and thus calls into play Imitation, which still further stimulates Secretiveness. But the contest also stimulates Combativeness in the child, which furnishes another stimulus to Secretiveness. Thus the very remedies, as they are called, renders the child more successful in the practice of deception.

It must not, however, be thought that Secretiveness is not necessary in educating the same feeling in the child. But, at the same time, it should be understood that the proper sphere for its activity is to *prevent*, rather than *detect* deception.

How frequently parents are guilty of expressing satisfaction at the exhibition of what they call "innocent tricks" of silly children. Now, the satisfaction manifested for these false misnamed tricks, produce the worst result, as they encourage this propensity by stimulating Love of Approbation, which ensure a repetition of the trick at the first opportunity, in order to gain the smiles and approbation of the parent or nurse ; and thus Secretiveness is stimulated, and gains power by such repetition. Many fancy that the ability to conceal or to act a part, is indicative of intellect, but such is not the fact. It is simply the manifestation of the same feeling that prompts

the cat to conceal itself till it can securely pounce upon its prey. But who has ever heard of an *intellectual* cat. We therefore trust that parents will not deceive themselves by supposing that cunning gives promise of mental greatness, or that it merits approbation.

The education of this feeling in a child requires great care and attention. The intellect must be made proper use of, and the little pupil must be led to fully understand, by being practically shown, the great distinction between this feeling and intellect; and that it is only a low animal feeling; and that many animals possess it in a higher degree than he does. This will tend to lower his estimation of its importance. Let parents always *be*, what they pretend to *be*, and not cultivate in their children deceit and artfulness, by what is erroneously called politeness. A child observes his parents express great pleasure at seeing a friend or acquaintance, and yet, by winks or inuendoes during the presence of the visitor, or by scandal and animadversion upon his dress or manners the instant he or she departs, proving to the child their gross insincerity of conduct. and violating the laws of hospitality by acts of mean duplicity; and when we regard the effect produced on the mind of a child, any way predisposed to artifice, can we expect its character and conduct to be fashioned to ingenuousness. Parents who are "*extremely* gratified to see dear *friends*," when they are nothing of the kind, exhibit to their child professions of heartlessness which they may rest assured the child will imitate. We beg to say to all parents, and especially to those who have a child with large and active Secretiveness, resolutely and undeviatingly be all that you profess and pretend to be, and then you will be more effectual in teaching your child to appear to *be* what he really is. Such training will keep up his moral health, and his future life will be marked by a proper degree of prudence and reserve, and

not by that of deceit and cunning. He will not be Solomon's "fool who uttereth all his mind," but as "the wise man who keepeth it in till afterwards."

This instinct in man is highly useful ; indeed, without it, he would be unfit for the world in which we live ; and by a proper cultivation of his mental and moral nature, he will not descend to craft, subtlety, and evasion, and the thousands of nameless manifestations of hypocrisy and deceit.

**ACQUISITIVENESS.**—In the education of this feeling, which is by no means an easy task, first principles must never be lost sight of. But it should always be borne in mind, that this feeling, like all others, is innate, and cannot be eradicated. It being then an original element of our nature, it requires a legitimate sphere for its proper activity, in which it can be directed and controlled. But the education that is too frequently given to this feeling, we are sorry to say, actually tends directly to increase its activity and energy, without any attempt to secure its activity in a right direction. In many families great merit is awarded to those children who excel in the propensity to hoard, and premiums are held out to those who save the most money. The selfish feeling being thus schooled from infancy, parents need not be astonished at their children being thieves and liars, because they have been practically trained to view grasping, hoarding selfishness as the cardinal virtue.

To train children to habits of prudence and economy, under the guidance of enlightened moral feeling, is a very different state of things, to training them to be grasping, hoarding misers, and low, cunning tricksters.

Now, the covetousness of which some parents complain in their children, is the natural consequence of the misdirection of this organ. In some children the sense of property is naturally very strong ; therefore, according to the fundamental

principles laid down, and to which we have frequently referred, the feeling should be kept as still as possible, in order to weaken its tone. But, instead of receiving such training, means are actually taken to stimulate it, in order to secure the obedience of the child. Experience soon shows the parent that this feeling is most active in a certain child, and that it can be readily actuated to do almost anything for reward, if it be something in a tangible shape that he or she can retain. Now, if this child is no way remarkable for diligence in his studies, or for obedience to authority, a reward is perhaps proposed to him, which may be found to work well, as he never fails to secure the reward.

But a moment's reflection will convince any reasonable mother, that it must be deeply injurious to the moral well-being of a child who receives such a training; as it is obvious that the object of this course is to stimulate a feeling already too active. But it should be remembered that it is a fundamental law of human nature that stimulation of a feeling augments its power; therefore, the direct tendency of this course is to increase the power and activity of the organ of Acquisitiveness; thereby to completely enslave the child to a feeling already too active. But the pernicious effects of this course appears the greater the more closely it is examined. The moral nature of the child is entirely overlooked—not the least appeal is made to it; while, on the contrary, every incentive is had recourse to, for the express purpose of stimulating a low animal feeling, the direct tendency of which is to subjugate the moral feelings of the child to its own absolute dominion, which is a violation of the design of our Creator, who made our moral nature for the express purpose to subordinate the animal feelings to its influence, and to His will; but this is practically opposed by the injudicious training Acquisitiveness receives in the child. Veneration is not taught to revere the authority of his

parents, nor Conscientiousness to regard duty; no, he is *hired* to do it, which is a most deplorable error in a child's education.

That the evil consequences of this kind of education may appear in the clearest light, let us trace it out in its moral bearings. Now, a child having been always hired to do his duty, which he ought to have done *freely*, from *enlightened* Veneration and Conscientiousness, he takes it for granted that his parents had done right in hiring him, and that he had done right in performing a given duty for a certain reward; and he is thus led to think that the price he receives for obedience is his due, and that he has a right to claim it, as well as an equal right to refuse obedience if not compensated for it; that without remuneration obedience cannot be justly demanded, and that the rightful exercise of parental authority in demanding it, is nothing else than tyranny. We think we may safely appeal to any intelligent mother, as to whether a procedure, that offers every incentive to the stimulation of Acquisitiveness, and affords no stimulant to Veneration and Conscientiousness, can be the right method of training a child. Such a procedure is not only productive of evil, but it perpetuates and aggravates the evil itself; because a feeling so indulged and gratified, becomes more and more active and energetic, and demands higher reward for obedience; nor can any limit be assigned beyond which their demands will not rise, for the animal feelings are in their nature insatiable.

When Acquisitiveness has been rendered excessively active by the injudicious treatment we have been considering, and has attained such an insatiable craving that it can no longer be borne by the parents, a necessity is felt that it should be restrained by punishment; and as a first means, they resort to depriving the child perhaps of food, or some other article that he may value. The punishment resorted to will, as a

matter of course, be felt by him ; but it only excites opposition, for he it remembered, that his Acquisitiveness has been highly trained, and he is led to conclude, as before shown, that, that of which he is deprived is his due ; and that he has a right to it, and that his right is violated by being deprived of it. Thus *his sense of right*, although erroneous, yet it is all the sense of right that he has ; because his Conscientiousness has never been trained to a correct feeling of the moral difference between justice and injustice. All that has been trained in him are the low selfish feelings ; and when they are deprived of their free gratification in the way that they have been accustomed, he views it as an act of injustice towards him. But we must at the same time remember, that the *moral feelings* are *blind* like the *animal feelings*, and the function of the organ of Conscientiousness is not to impart the knowledge of what is right and just, but only to give the feeling that there is a difference between right and wrong—and this feeling may be naturally strong in the child, as well as his Acquisitiveness—hence, Conscientiousness is outraged, although blindly and erroneously active, and arrayed against the new mode of discipline to which he is subjected. Now, the difficulty of the new discipline is at once perceived to accomplish the objects it contemplates, while the feeling pervades the mind of the child that he has right on his side. Now the first step towards success must be in correcting a child's notion of what is right ; but in the case we have been considering, it has not been corrected but perverted. Hence, his outraged Conscientiousness and Acquisitiveness call to their aid Combativeness, Destructiveness, Self-esteem, and Firmness, and render the little offender obstinate. Combativeness is roused to resist what he has been led to believe injustice ; and Destructiveness contributes its fearful energy in the same mistaken direction. Self-esteem feels itself degraded, and suffers from wounded

pride, and takes on the side of passion; and Firmness gives permanence to the activity of whatever feelings may be predominant. The child views the conduct of the parent according to the predominant principles in his own mind; and Covetousness being the ruling feeling in him, he ascribes the selfishness of his own acts to his parents, in depriving him of the gratification of his desire to possess that which he believes to be his right. But he is told, that it is done as a punishment for his covetousness; this he regards as mere pretence, and despises as hypocrisy. He, therefore, loses respect for the moral probity of his parents, which, in future, will be little influential for good. That some practical method may be applied to the judicious training of Acquisitiveness, we beg to offer a few hints on the subject.

*FIRST.*—*If the organ be large, never excite it more than is absolutely necessary; but preserve it as much as possible in a state of inactivity, which will enfeeble it.*

*SECONDLY.*—*Never allow a single instance of its improper manifestation to pass unnoticed, nor uncorrected; but do not forget the importance of being careful how you set about the duty of correction. Now, as a first step, be particular to enlighten the intellect of the child; but, in doing so, let your manner be calm, and the tone of your voice mild, but firm. When this is properly done, you have his understanding on your side; and if you make a wise use of this important advantage, you will readily enlist his moral feelings in the good work of self-reformation, and he will co-operate with you to suppress the undue activity of his own Acquisitiveness. The discipline to which you subject him may be self-denying and painful, but he will see the necessity of it, and yield to it as wise and good.*

*THIRDLY.*—*Let opportunities be afforded for the practice of generosity and self-sacrifice; and when they are practised, do*



not fail to afford the reward of an approving word, and he will soon learn that doing his duty brings with it, its own moral reward.

Now, if such acts were rewarded by gratuities, the feeling you are anxious to reduce in activity would be stimulated ; and one such stimulus would do more to strengthen it, than a dozen acts of generosity would do to overcome it.

In training the Acquisitive child, particular care should be taken to secure the agency and co-operation of Benevolence and Conscientiousness. He should be strongly impressed with the rights of others, and the rights of property, which such a child is strongly disposed to invade. Insist on the inviolability of those rights even to the minutest particular ; and by all means let it be evident that you yourself most scrupulously regard those rights which you inculcate, *not* in precept *only*, but *in practice*, so that the child may have a consistent model to imitate. Let him also be your companion to the abodes of poverty, misery, and woe, and witness the joy which the pecuniary aid of Benevolence, and the gratitude that kind, soothing sympathy will inspire in the afflicted and distressed. Express to him freely the pure and exalted pleasure you find in your works of mercy, in the diffusion of happiness by such means ; and that you even prefer foregoing some personal indulgence and gratification, in order that you can administer comfort to the inmates of the dull, dreary abodes of poverty, sickness and woe. These are object lessons presented to his mental and moral nature ; and his Imitation will prompt him to adopt them, and his Self-love will desire to participate in such acts of benevolence. Self-esteem will be gratified with the consciousness of living for a worthy purpose, and Love of Approbation, Benevolence, Conscientiousness, and Veneration, will glow with the thought of having performed his duty to God and humanity.

## CHAPTER XVI.

### THE EARLY EDUCATION OF THE INFERIOR SENTIMENTS, COMMON TO MAN, AND THE LOWER ANIMALS.

WE come now, to treat of a class of feelings of a higher order, than those considered in the last chapter.

#### SELF-ESTEEM.

Those who have an imperfect knowledge of the elementary faculties of man, confound pride and vanity, or speak of them as synonymous terms expressive of some deviation of an innate power of the mind. Now, pride is the abuse of Self-esteem; and vanity is the abuse of Love of Approbation. It is, therefore, very important not to mistake these feelings in their practical education; for when either pride or vanity predominates, there are certain specific consequences to be noticed, and each exerts a powerful influence over the character and actions of the individual. Ignorance is always a source of evil, and never more so than when either of these feelings is injudiciously cultivated.

It is a fact that must be familiar to even the most casual observer, that there are certain characteristics among men by which they are distinguished; not only man from man, but one race of men from another, and one nation of a certain race from another nation of the same race. There are, however, few characteristics among men, if any, more striking than the feeling of Self-esteem. As a national characteristic, it is a

leading feature in the English. It inspires the mind with self-elevation and self-preference. It loves pre-eminence, and claims it; and, if things are favourable to that claim, it may be expected to claim it on all occasions. No element of our nature is more liable to run to abuse, when uneducated, than large Self-esteem; and when the accident of rank, station, office, wealth, &c., favor its manifestation, abuse will almost be certainly exhibited in pride, self-sufficiency, disdain, haughtiness, love of power, tyranny where power is possessed. It must however be understood, that these are its abuses in mature life. But these abuses result from very small germs; it therefore behoves those to whom the instruction of children is committed, and especially mothers, to most carefully watch the budding of this feeling, and retard its irregular growth by a proper direction. When we say that the germs of Self-esteem are small, we mean the early manifestations in an improper direction, rather than the organ from which they arise. But in some children, at a very early period, may be observed a *braggadocio* spirit manifested in all they do. In the performance of certain little exploits the bosom swells with self-complacency, and they strut among their little play-fellows, saying, "There, do that if you can." They issue their mandates to all about them with all the consequence of an oriental despot. In play, they will dictate the nature of the games and the modes of conducting them, and be arbiter of all disputes. The natural language of Self-esteem will appear in the tone of their voice, gait, and looks, as if fully impressed with the conviction "I am; and there is none besides me. I am entitled to rule, and have a natural right to be master."

Now, to train a child imbued with this self-exalted spirit is a most difficult task, but it is not impossible. To do it properly, however, we must always keep in view first principles. The feeling in question is an animal one, and must be kept

in check and trained to obedience to the dictates of the higher faculties, which must be stimulated, if possible, to overpower it; and if we cannot succeed to the extent of our desire, the feeling will be very considerably modified and brought under control.

In training Self-esteem, in a child in whom it is large and active, two things are of vital importance.

FIRST.—*It must not be fed.*

SECONDLY.—*It must not be mortified.*

The desire to avoid rendering this feeling too active in a child, may, without great care, produce disagreeable consequences; for so arrogant is Self-esteem, that he may conceive that any concession that is made, is merely his right, and therefore, that no obligation is conferred, and of course no acknowledgment is necessary. But if you make concession to conciliate the little despot, he soon makes a new claim, and if complied with, the next claim is larger, and so on; because animal feelings are insatiable, and their demands become large in proportion as those demands are gratified. If such a child merits praise in any way, it must be dealt out with great caution, or it will be liable to increase the high opinion that he has of himself. He regards all praise due to him—that he deserves it; and that he *really is* what he *always* thought he *was*, the great *I am*, the *all in all*. Nothing is more ruinous to a child of this character than making appeals to his Self-esteem, in order to incite him to do things. You may, however, succeed in accomplishing your present object, but it is at the expense of the transgression of the laws of his nature; and you must afterwards pay the penalty of the transgression, as you have strengthened Self-esteem by affording it a stimulus, and the difficulty with which you have had before to contend, is now augmented by yourself.

The best way to lower the excessive tone of Self-esteem, is

by indirect means, and that even, too, when you present remedies to the moral feelings, through the intellect. To subdue or control the great activity of this feeling, the most powerful means we have seen for that purpose are certainly by moral influences ; but it is even dangerous to present these abruptly. If you would moderate the child's arrogance, even by showing him the exclusive claims of God to universal deference, be mindful that you choose wisely the time to do so, and not less wisely the mode and spirit in which you do it. It should never be done when Self-esteem is highly excited and claiming to subdue all things to itself, but when it is in a state of repose. Do not refer to his own natural desire to claim deference by opposing his claims to those of God, as this would instantly excite Combativeness in defence of Self-esteem, and you will have two powerful feelings to contend with instead of one. But that is not the worst part of the evil, it excites an aversion to God, which will be next to impossible to overcome ; but to avoid all this, approach the feeling in a gentle, pleasant manner, through the intellect. Explain to him the perfection of God, and His Divine character in general ; but in doing this, make no application that will have reference to the strong and dangerous points of his own character, which you wish to direct in a proper course. Let your applications lead him to trace himself in others, and then cautiously lead him towards himself. When you have led him step by step to perceive the right of God to govern, and that his will is supreme, show him that you most willingly submit to the absolute authority of the Almighty, and that in this there is nothing degrading to you as an intelligent and moral being ; because the will of God is perfectly *wise*, and *just*, and *benevolent*, and that your obedience to Him is your interest and duty. This point once gained you have a powerful hold upon him, as you have converted one of the strongest feelings of his nature into a *motive*

to influence him for good. Self-esteem may now be appealed to and rendered subservient to moral purposes.

Do not mortify Self-esteem, as it is not less *injurious* than *pampering* it. Many parents mortify this feeling without the least intention of doing so; but the purity of the motive changes not the tendency of the action to which it gives birth. The object intended is to decrease the activity of Self-esteem; but the means employed invigorates it. The only certain way to reduce its tone is, to render it as nearly as possible inactive. To mortify it, excites it directly, and calls into play Combativeness and Firmness, which lend their power to increase its energy. Too frequently mortification of Self-esteem is designed for the purpose to give pain, but such is seldom attempted under the proper influence of Conscientiousness and Benevolence. But such a course is neither prudent, kind, nor just. Some physical defect in the child, mental or bodily, is seized on as the instrument of torture. The child may be lame, or has a cast in his eye, or homely in features, or some other peculiarity wholly beyond his power to prevent or remedy. If he is taunted with this, or even reminded of it, the effects will be most injurious. Combativeness and Firmness are roused in support of Self-esteem, and he may indignantly say, "True I am ugly; I have a club foot; I do squint; but am I to be blamed for that? If I had made myself, I should not have chosen these deformities; I would gladly be free from them." At this flagrant injustice of reproach he suffers, and all the worst feelings of his nature are roused, and from his awakened Destructiveness he will most probably meditate some terrible revenge on the authors of his misery. It will be obvious that the tendency of all this is, to increase and maintain the activity of Self-esteem; he feels that he is wronged by such treatment, and that he has a right to punish the offenders, and therefore a right in devising the punishment they deserve.

It will then be clear to all right-thinking parents, that since the attempts to mortify Self-esteem are productive of evil consequences, not only by strengthening it, but by stimulating some of the worst feelings of our nature, thereby demoralizing the whole character.

We have before observed that Self-esteem should rarely be appealed to; and *never* except in connexion with the moral feelings. Appeals to it, through these feelings, may be made with advantage, if rightly timed. The tendency of Self-esteem inspires confidence in our own ability, and prompts the feeling that, what others have done, we can also do. A child with large active Self-esteem feels confident that he can do any thing if he pleased. Now, this is a valuable element in character, for without it difficulties would be dreaded, and conquest over them would rarely if ever be achieved. Persons with small Self-esteem seldom accomplish much, whatever may be their abilities, for they have not the requisite self-confidence under the conquest of difficulties. Still, there are persons with large Self-esteem, who will not undertake anything that is difficult; but in such cases the temperament is inactive, and Combativeness, Firmness, and Hope, low. Children thus organized require stimulating by an appeal to Self-esteem, in connexion with the moral sentiments, and every means should be taken to excite Combativeness and Hope; and they should be induced to undertake responsibilities that will require self-confidence and active energy to accomplish—which will excite Combativeness and Hope, and by degrees counteract their sluggish temperament. They should also be made fully to understand, that it is a moral and religious duty to make good and proper use of the powers God has given them, so that they may attain at least a respectable position in society, if not capable of rising to eminence. They should likewise be fully impressed with the fact, that it is *moral cowardice to dread*

*endurance of labour*, as well as a practical sin. By such means you stimulate Self-esteem, Combativeness, and Firmness, to operate in a right direction ; and by steadily pursuing the same course, permanency is given to their activity in the direction in which they are made to operate, and the organs of the brain will progressively increase in size and vigour, in conformity to the natural law which governs the exercise and growth of our physical system.

#### LOVE OF APPROBATION.

This is an innate sentiment, which may be designated the desire of estimation. Like Self-esteem, it is a lower sentiment. They are called so, because they are possessed by man and the lower animals.

If we turn our attention to the inward working of our own feelings, we cannot fail of being conscious of the existence of this feeling ; but when the feeling is in excess, it may be observed in the manifestation of vanity in some form or other. It is, however, a very powerful sentiment, and possessed very generally, in a very high degree, by persons of all ranks and conditions of society. In some the feeling is stronger than in others. This difference is observed among nations, as well as among individuals. The manifestation of the feeling is more conspicuous in the characters of the French and the Americans than in the English ; and the organ of Love of Approbation is generally much larger in the heads of the former than in the latter. But the education it receives in this and other countries causes its great activity, and gives a direct tendency to increase its power, according to the fundamental principle, "*That every faculty is increased by activity, and enfeebled by inactivity.*" Hence the propriety of keeping this feeling, in children, as quiet as possible.

We are fully prepared to admit the great difficulty of edu-



cating this feeling in a child, when large and active, and where there is a strong tendency to inordinate vanity. For if such a child seem to pay deference to its parents, it is mostly for the purpose of drawing forth something to flatter its Love of Approbation. Nothing is more common than to mistake the object of such a child, and regard its actions upon such occasions as if they were induced by a sense of duty or deference ; but it should be remembered that the little creature is incapable of making any reflections upon its natural or relative obligations, and will be officious and smiling merely for the sake of some such praise as this : “ There’s a darling ;” or, “ There, you are a good little boy ;” or, “ That was well done, you pretty little dear.” But all such praises are all so many appeals to Love of Approbation ; and the effects, as a natural consequence, are baneful to the individual, except done with great discrimination. Indeed, we may say with the poet :

“ Learn to contemn all praise betimes,  
For flattery is the nurse of crimes.”

And it is a lamentable fact, that little else is made use of, from the very earliest childhood, by all classes of society. Flattery is the common language of the nursery and of the parlour. It is the stimulus at meals, in tuition, and the play ground ; and however diversified as regards the mode of expression, its object is the same. The child is soothed by it, and constrained in its manners by the mechanical and artificial usages of etiquette ; and, under the name of emulation, its desire of applause is made the incentive for outstripping others, which becomes the evil source of contention and ill-will during the hours of relaxation. If we fairly analyse the motives of those who thus appeal to this powerful feeling, we shall find that, in every instance, they do so for the purpose of facilitating the otherwise laborious task of moral training. A servant, for

example, observes that the child can be acted upon by flattery ; and to avoid a little inconvenience, she administers the dose, which acts like an opiate, and which must be increased each time, or else the desired effect will not be ultimately obtained. The common practice of some parents to attempt to induce their children to behave properly whilst in the parlour, by assuring them that it is rude and vulgar for children to speak what they think, and ask for what they want—that young *gentlemen* and *ladies* should know better. This is nothing more than making an appeal to Love of Approbation ; or, in other words, appealing to an *animal motive*, which originates in a desire to spare trouble. But such is the harmony of the moral government of God, that, as a rule, the designs of such modes of instruction are defeated, and parents create for themselves infinitely more trouble in the end, than they would have had, if the moral qualities had been earlier and more judiciously worked upon.

In some families every opportunity is seized upon to minister to this insatiable feeling. The dress and personal appearance of the child are made matters of special notice, and such folly is persevered in, until the most baneful effect is produced upon the character of the child. By appealing so constantly to this feeling, it is rendered more and more active, and therefore such appeals may, with propriety, be said to sow the seeds of sorrow, disappointment, and immorality. Whenever this feeling becomes so active as to engross all the thoughts of a child, it is then a pitiable victim to the suffering of unintentional pain, caused by its non-gratification ; and the poor, vain creature is heart-sick at the fancied neglect of those from whom it anticipates approbation.

Parents would be surprised who had not paid attention to this subject, to see a full record of all the appeals made to the Love of Approbation in the actual training of children ; in fact,

the frequency would alarm them, if they only understood how the temporal and eternal interests of children are imperilled by such treatment.

It is this feeling, as we have before observed, that causes the little one to smile when noticed, and this even before he can understand the terms in which he is addressed. It is the same feeling which, in childhood, prompts to obedience, from the strong motive to be praised, and Mothers soon learn the power it gives them over their children. But they do not so easily learn how they may wisely employ it for the benefit of their children, which is well shown by the Rev. J. A. Warne. "In proof of this, we have only to look at facts. As soon as the child knows enough to value the love of its mother, she employs this feeling to sway his reluctant will to obedience to her commands; when other higher and holier motives should be urged. Obedience in children should flow from CONSCIENTIOUSNESS, VENERATION, and ADHESIVENESS, more than from LOVE OF APPROBATION or CAUTIOUSNESS. Thus we find the appeals of Scripture made to the former, and not to the latter, except as auxiliary motives to obedience: 'Children obey your parents in the Lord, for this is *right*'—here the appeal is to Conscientiousness. 'Honour thy father and thy mother,' the fifth commandment, addresses Veneration. In John xiv. 15, obedience to the commands of the Saviour himself is urged, by an appeal to Adhesiveness: 'If ye love me, keep my commandments.' As auxiliary motives, appeals to Cautiousness or the fear of punishment, and to Love of Approbation or the desire of praise, are occasionally made; but it is believed that to neither of these is the appeal made, as a ruling or principal spring of action. Now, how nearly in accordance with the suggestions of Holy Writ, is the mode of procedure actually adopted with children? We will suppose a mother to desire her little one to perform

some act of duty, and the child to exhibit some degree of unwillingness. Instead of taking his hand in hers, and looking him in the face seriously, to secure attention, and explaining to him that it is right to obey her—that she must be obeyed—and that she will be *pained* by his disobedience, (thus appealing to the above three faculties)—she takes a royal road to secure obedience. But, appealing to LOVE or APPROBATION, she says, ‘*mamma won’t love you, if you disobey her.*’ This, as the remarks above made must show, is not acting in accordance with the nature of the child; for it is appealing to but one motive, when three, at least, might have been addressed; and, besides this, the motive appealed to is inferior in its nature to two out of the three which should have been brought to bear on the child—that being only a *low* sentiment, and these two of the highest of our nature. But there is another, and an extremely weighty objection, to the course actually taken—it is one which offends against that elevated morality which ought *invariably* to characterise the intercourse of a mother with her child. The mother, in the supposed case above, has secured her child’s obedience by telling him a *falsehood*. She *would* love him, even if disobedient; does love him, even when disobedient: and she may be assured that her child can read the natural language of maternal love, with sufficient clearness and confidence, to convict her, at the bar of his intellect, of having spoken an untruth. The effect of this will be to lower her in his esteem and affection: that is, to enfeeble the activity of VENERATION and ADHESIVENESS towards her—to decrease the power of his CONSCIENTIOUSNESS, making him regard a *falsehood* as a *trifle*—to stimulate SECRETIVENESS and IMITATION, teaching him how to play off deception, and seek the accomplishment of objects by insincere pretensions—to weaken CAUTIOUSNESS, by the experience that the evil threatened to disobedience does

not follow on the heels of the offence—and to strengthen FIRMNESS in its wilfulness, by experience that it *can* secure its objects with impunity.”

Now, if it be desired that children should form good habits, and exhibit that which is correct and lovely in their intercourse with their associates, they should be carefully impressed with that which is really correct and amiable. But, instead of that, mothers take another course: they appeal to the Love of Approbation of their children, by telling them that “People will not love them, unless their conduct is so and so,” and ask, “What will Mr. A. or Mrs. B. think of you.” The effect of this treatment can be seen at a glance. The children draw their conclusions that the rule of right is the opinions of others; that they must conform in their practice to those opinions, and must never dare to be singular, as other persons would think unfavourably of them, which would be the greatest calamity that could befall them. Such stimulants to LOVE OF APPROBATION cannot but be seriously injurious. The intellect is not at all enlightened as to the fact, that the opinions of people in general are of very little importance, being often grossly erroneous, and especially so on moral subjects. Self-esteem, in its proper sphere of activity, the cultivation of proper self-respect, personal dignity, and independence, is quite over-topped by the hot-bed culture of its next neighbour, Love of Approbation; and a spirit both vain and servile is generated.

There is another practice of training Love of Approbation, which has a most pernicious influence on the character of children. It is a common practice with many a mother, that when a child happens to utter a sentence which appears to her indicative of talent, she treasures it in her memory, and repeats it to her friends in the presence of the child. The feeling is also stimulated by the absurd and irrational practice of calling

to a child to make a display of his attainments, by repeating to every stranger who may call, his hymns and catechism, and a knowledge of his various school studies. All these, and many other practices, are only so many modes of training the child to the love of display, and to believe that the use of knowledge is to make a show of it to ensure praise.

Parents can have little idea of the injury done by such injudicious training of Love of Approbation on the present and future character of their child, or they never could be guilty of the practical sin they commit. In the first place, such training destroys all truthfulness and simplicity of character, and the child is taught *to be*, not what he really *ought to be*, but only to *appear* what is deemed right according to the fashionable opinions of certain people. The child thus trained only acts a part, which he assumes from selfish motives. He has been trained under the administration of incessant flattery, which has become essential to his happiness, and almost to his existence, and as that can be secured by some outward act, that act is performed. But it is, after all, not an act of obedience, for it is not performed from a sense of duty, which is essential to true obedience, but from the desire of self-gratification, the hope of procuring praise which follows the performance of the act. From this kind of motive he complies with the wishes of his parents, when they present him with the motive, that others will not think well of him if he shall refuse compliance. He loves their good opinion; he can secure it by compliance with the wishes of his parents or friends; he must lose their favour if non-compliant; he, therefore, yields, not because it is *morally right*, and a *moral duty* to which he is *urged*; not because his parents can *justly claim his obedience*; but because the gratification of his Love of Approbation will be thereby promoted. Yet he passes for an *obedient* child, and is praised for obedience. He knows

that credit is given him for obedience; and he also knows that he is not actuated by the motives ascribed to him, but by others which are not suspected. Who then can fail to see, that he has been trained in lessons of duplicity, and deceit, by the education given to his LOVE OF APPROBATION.

In this mode of training, a false standard of morality is set up before the child, and he is practically taught a false rule of duty, and that he must regulate his conduct to the opinions of others. But with this he is also taught that his course must be a good and right one. The child, as a matter of course, comes to the conclusion that the opinion of others is the rule of right, which conclusion is as irresistible to him as the axiom that "things equal to the same thing, are equal to one another." But in time he is undeceived, and finds that, while the opinions of persons are fluctuating and uncertain, the principles of morality are immutable; yet, such is the ascendancy of the opinions of others over his conduct, that he dares not openly act against it, even in a case of plain moral duty, if those whose good opinion he desires to secure shall subject him to the loss of their favour, their ridicule, or contempt. His mother's early lesson, "*What will people think of you,*" has been too well learned by him, to set the opinion of such people at nought. But the great founder of our religion perfectly understood the magnitude of the obstacle in the way of Heaven presented by a perverted Love of Approbation, when he said to certain persons of his own day, "How can ye believe who receive *honour one of another*, and seek not the *honour which cometh from God only.*"—John v. 44.

The proper way to educate Love of Approbation is, through the medium of an enlightened intellect in connexion with Veneration and Conscientiousness. Strongly impress upon the mind of the individual, that the *correct rule of duty* is the *will of God*; and all that He commands is good in itself, and

good in its tendency. That if he wishes to secure the Divine favour, he must sometimes be prepared to forego the favour of men, even to endure ridicule, envy, and contempt. By this means Love of Approbation is trained to act in the highest sphere of which it is capable, and is led, by seeking the honour of God, to regard the approbation of his fellow-mortals at no other price, than, it can be secured by obedience to His will.

This mode of educating Love of Approbation, accords with the nature of man and the will of God. It treats it according to its nature, as a *mere blind feeling*, and not of the highest order, and therefore not entitled to dominion; but being guided by an enlightened intellect, and associated with the moral and religious feelings, it does not act blindly. This education of Love of Approbation aims not at the impossibility of annihilating the feeling, but in giving to it a right direction, in harmony with the higher feelings of our nature. Thus directed and controlled, the feeling, however strong in an individual, and however sensitive it may be to the opinions of others and desire their approbation, he will feel that there is a higher object of pursuit than that, and that the controlling principle of his actions must be the desire of "the honour which cometh from God only."

The false morality too frequently cultivated in the nursery, by pampering Love of Approbation, leads to much evil. The ingenuity that will be exhibited by children in whom this feeling is stimulated, to secure to themselves some desired privilege, will be familiar to every close observer. Who has not seen a child officiously attentive to discover and anticipate its parents' wants and wishes; fetching, unbidden, what may be wanted, and picking up what may have accidentally fallen—such as a pair of scissors, or a thimble—and this, not for the sake of doing good, or being useful, but merely that it may



receive the coveted praise. In proof of this, express simple thanks, in a cool and indifferent tone and manner; and, without seeming to do, observe the effect of disappointment and uneasiness in the child; the *compliment* she expected is withheld, and she no longer shows a desire to be useful. Now, if she were really what she desires to appear, actuated by respect and filial affection; prompted by Adhesiveness, Benevolence, Veneration, and Conscientiousness, the very presentation of simple thanks, which have been wholly unexpected and undesired, instead of being undervalued, would be considered more than a sufficient reward. Thus, the morality which Love of Approbation originates, is a false morality. It is *vanity morality* — constituting vanity benevolence, vanity charity, vanity honesty, and vanity duty. It is morality that cannot be relied on.

While the individual, who has been educated under its influence, is at home, he may appear everything that is desired so far as external conduct is concerned; but suppose he is removed from home, his circumstances changed, and surrounded with numerous and powerful temptations: What will be the result? The ruling principle in his character is not changed, by this change in his situation and connexions; but he is now surrounded by those who approve of evil, and the conduct which he practised at home will now expose him to censure or ridicule. It is not, therefore, to be expected, that he will practice it, and incur a penalty which he has been well taught to regard as the most severe that he could suffer—the disapprobation of his friends and associates. He is the same character as before; he still desires praise, and feels that it is necessary to his happiness. But to secure praise in the new circumstances he must practice evil; and as he is under the dominion of Love of Approbation, he will, of course, willingly yield to temptation. Now, cases like this, we are sorry to say,

are too frequently met with in our large towns; youths who have left home for business, and whose general conduct previous to the change, had led their parents to expect that they would pursue a course of worthy conduct; but instead of that, they appear to fall victims under a powerful impulse to the practice of every evil to which they may be solicited. The parents view the change in the conduct of their sons with calamity, and will probably refer it all to the will of God; when, in fact, they may trace in every step, and learn, that they are only reaping the fruits of the seeds which they themselves had sown, and most diligently cultivated, by instilling into the mind of the guiltless child—"What will people think of you."

In some children there is a tendency to deviate from the truth, caused by bad training. A child may have a high degree of Conscientiousness, who will, under the influence of an over active Love of Approbation and large Cautiousness, utter untruths to conceal a fault, from dread of punishment; not that the child is insensible to the evil of falsehood, but because it dreads the censure and the forfeit of Approbation, and fears the punishment which the declaration of the truth would bring upon it. Now children, of this class, have not had their Self-esteem so cultivated as to make them feel the *meanness* of falsehood, nor Combativeness so trained as to feel its cowardice, nor Conscientiousness its wickedness. No; they are the slaves of a blind Love of Approbation.

"Let parents, then," observes the Rev. J. A. Warne, "beware how they educate Love of Approbation in their children. Teach them to estimate human approbation at no more than its proper value, and not idealize it. They will then learn that it is often valueless; and, indeed, worse than even that—then will they never sin, in order to secure it. Let

Conscientiousness, Veneration, and Benevolence, be stimulated by religious truth, their proper aliment, that they may overpower a too active Love of Approbation. Then the accusation and reproaches of conscience will be accounted a greater evil than the censures of fellow-creatures ; and the loss of Divine approbation by equivocation or falsehood, will be accounted a vastly greater evil than the loss of a parent's smile, which loss might follow from utterance of undisguised truth. And in order to lessen the temptation to disguise or equivocation, let the censures which parental duty requires to be administered, be uttered without needless asperity, and even with studied gentleness, remembering that a child with large Love of Approbation is cut to the quick by a censure so gentle, that one differently constituted would scarcely feel it ; and that when such a child equivocates, it is often only to avoid the anguish he would suffer from a severe rebuke—an anguish, which his sense of justice tells him ; and, therefore, he dissembles, or equivocates, or lies, to hide it."

#### CAUTIOUSNESS.

The advantage of positive knowledge, over mere speculative views, is obvious in everything we undertake, and certainly in educating the various faculties, is conspicuously manifest. How often must the parent be puzzled in the management of a child naturally timid ; particularly if it be regarded as an accidental occurrence, or the result of want of courage. The very means that may be employed may tend to aggravate the symptoms, and render it permanently inconvenient to the child.

The feeling of timidity or fear, is the result of large and excited Cautiousness. If the organ is large and excitable, it is liable to spontaneous activity, and morbid fear, from unfounded apprehension. It is wisely arranged in the order of

nature, that this feeling shall be active in children ; because, as they are exposed to numerous dangers, its activity contributes to their safety. But the happiness of children greatly depends upon this feeling being properly educated. When misdirected, it entails a life of suffering on the individual, for the feeling is in such cases entirely involuntary, and when excessive, the child is really unfortunate.

To educate this feeling aright, we must take into account its nature. It is therefore necessary that we bear in mind that its nature is animal, and that it is increased in its action like all the other feelings of the same class, by direct and forcible means to suppress it. Hence, special care must be taken never to afford it excitement. Its modes of manifestation are various. The indications of excess of Cautiousness are marked very strongly ; sometimes by a painful hesitation of speech and manner ; sometimes by an agonizing timidity at the approach of strangers, or at being alone, or in the dark ; and sometimes by an inveterate want of decision in doing any task, from the groundless fear of not succeeding, But the effects of all these modified states of the feeling on the mind of a child are similar, they all paralyze the natural energies of the moral feelings and intellectual faculties, and, if not counteracted by judicious treatment, become, at last, the means of rendering the whole character mean-spirited and cowardly.

Cautiousness, when very large and much stimulated in early life, gives rise to melancholy, anguish, and anxiety, rendering life extremely miserable. Many suppose that suicide is the result of error of judgment. It proceeds, however, from a diseased brain, and the misery and torments which are felt, cannot be conceived by one whose brain is in a healthy condition. When Hope is small and Cautiousness large, the present cannot be enjoyed from fearful forebodings. The

future seems dark and cheerless, and evils are suffered by anticipation which are never realized.

When Cautiousness is small, the person is extremely imprudent; he acts without circumspection; and if engaged in business, he is liable to run to ruin. He never looks before he leaps; he acts first and thinks afterwards. In fact, such persons are a constant source of anxiety and trouble to those connected with them, as their whole conduct is marked by recklessness, and experience teaches them little.

How important, then, it is in the education of children, that all should know whether this feeling should be carefully and constantly excited, or habitually checked; and, of course, it is equally necessary to know how to effect either of these objects. No system of metaphysics teach this. Phrenology is the only sure guide, and points out what ought to be done in such cases.

In the treatment of an over-active Cautiousness, the plans usually adopted are highly prejudicial, and should, therefore, be abandoned. Many parents endeavour to force a timid child to do what they desire by assuming a mysterious manner and tone of voice, for the purpose of exciting its fear; or they knock with the hand on the cupboard; or look up the chimney, appearing to address some being who is asked to come down and take the naughty child. The child by this means becomes stilled, but it is suffering a silent agony, at once destructive of the health of the brain and the body. In weak children, or in those of a nervous temperament, fits and convulsions, and sometimes idiocy, are the result of such injudicious and cruel proceeding. There is another mode of treatment liable to produce effects nearly as bad. Instead of frightening the child with some nonentity, the parents or nurse threaten it with corporeal punishment, insisting on its doing the things desired, passively; and when the poor, little, trembling

creature still hesitates, he is beaten, or turned out of the room. But this does not allay the excitement. For hours after the anger of the parent hath subsided, the child's little heart palpitates, and the tremour is increased by the painful fear of a repetition of the act. Thus, unintentionally, parents sow the seeds of disease, which seldom fail in producing hypochondriasis, melancholy, and all their train of horrors ; and sometimes the unhappy victim of this false treatment, in childhood, sinks beneath the intolerable load, and rushes into the arms of death in a frenzy of desperation.

We have met, in our time, with many persons who appeared to find pleasure in exciting terror in children ; such conduct, however, to say the least of it, is disgraceful. But it is more—it is highly criminal, as disease and death may result from it. Such persons appear to suppose that darkness, the stories of ghosts, &c., cannot really injure the child, because none of its bones are broken ; but this is an error. Injury is done, in such cases, far greater and more serious than if the limbs were broken. During the last thirty years, numerous well-authenticated cases, have come under our own notice, of absolute idiocy being the immediate and permanent consequence of shutting up children in dark closets, to say nothing of the multitude of other cases where fits and death resulted from the same or similar causes.

The proper mode of educating the Cautiousness of a timid child may be learned by asking the cause of his timidity. It is Cautiousness too active. The course, then, to be pursued, is to allay its excitement ; and the best way to do that is through the medium of the intellect. Enlighten this, and you do much towards counteracting fear in the child. The following fact, in an Infant School Report, shows what may be done in that way:—"A gentleman was crossing a churchyard, not altogether without the habitual dread of ghosts, witches, &c.,—which, from

his youth, he found it impossible to separate from the place—and met in his way a little girl of five years old, marching all alone through the same place. He asked her if she was not afraid to go through the churchyard alone? “Not a bit,” was her reply; “we learn at the infant school, that ghosts, and all that, is nonsense.” Here we have intellect enlightened; and the same can be done at home. A child, in whom Cautiousness is large and over active, when in a calm and confiding state of mind, introduce, judiciously and kindly, in conversation, the subject of his constitutional infirmity. Inform him, and impress on his mental faculties, that darkness is nothing more than the absence of light; that the objects in the room are the same; that chairs, tables, &c., are nothing more in darkness than what they are in light. If the pupil be very timid, it perhaps may be wise to stop here for the present, and allow him time to digest it at leisure. On the next occasion, resume the subject by asking him what darkness is; whether it changes, diminishes, or increases the objects in the room? and show him how you and he can make darkness, by closing the shutters, that he may see what the effect is. If his terror appears to come over him, bid him think, and open the shutters; it is most likely that, at the next lesson, he will be willing to close the shutters himself. Assure him that the darkness he has made is exactly like the darkness of night; and that it is just as safe, so that he never need fear being in the dark. This kind of training will lead him step by step to see the groundlessness of his fears of being alone.

If your child labours under the apprehension of seeing ghosts, spectres, &c., it will be well to explain to him the cause of many mysterious things; which course will insensibly lead him to understand, that there is no effect without a cause, and that there are intelligible causes for many mysterious effects. This will guard him against supposing that there is a super-

natural cause for every strange thing he sees. Procure for him a magic lantern, for his amusement and instruction. Induce him, by daylight, to examine the slides, on which are painted skeletons and bloody heads. Explain to him the use of the lens, and how it operates on the figures in the slides to enlarge them. Now light the lamp of the lantern, and then close the shutters of the room, and let him with his own hand make ghosts, &c., &c., on a screen on the wall. Inform him, that many persons who have seen such things as those he has made on the screen, without knowing how they were produced, have really thought that they saw the objects themselves instead of mere pictures, and have been very much alarmed; but as he now can make them himself, there is nothing to fear. At first, it may not be without some feeling of terror at the sight of the goblins he has called up; but that will soon be counteracted by the knowledge of the fact, that he can lay them at pleasure.

We may, however, observe, in concluding our remarks on Cautiousness, that in educating a morbid action of this feeling, the utmost patience is of the greatest importance by those under whose care such children are placed. In all the intercourse held with them by parents or teachers, the utmost blandness and gentleness are indispensable; as the exhibition of such feelings and dispositions has a powerful influence in keeping quiet the too susceptible Cautiousness of the child, or to sooth it if excited. While on the other hand, if parents or nurses be impatient and irritable, or nervous, as well as ignorant of the nature of the feeling with which they have to do in the training of such children, they will do great injury, by incessantly leading them to apprehend some punishment from their displeasure. This treatment will augment the intensity of the feeling, already excessive in the children, and render the cure of the evil hopeless.



## FIRMNESS,

Or tenacity or fixedness of purpose, is another feeling which is early manifested in children. Sometimes it shows itself with great energy in children who are said to have a "*will of their own.*" The abuse of the feeling is shown in obstinacy and stubbornness. The education of this feeling is highly important; still, there is great difficulty in educating a child naturally stubborn. Some parents, however, foreseeing the evil which will arise from its prevalence, determine on overpowering it as soon as it is exhibited, and accordingly adopt strong measures for that purpose; but the application of force, as a means to counteract such natural impulse, defeats the intention, by giving rise to a more inveterate disposition to be obstinate. It should be remembered, that it is an innate feeling, and cannot be eradicated or annihilated; it is therefore useless to attempt force, because where the feeling is particularly strong in a child, it cannot be overpowered. The attempt to overpower it will be productive of an increase of its strength, and especially so if COMBATIVENESS be also large, for both these feelings are excited by opposition.

The stubborn child may appear to be broken in spirit when treated with harshness and cruelty; but we must not suppose that by so doing we render him more flexible in temper; all that is gained by such proceeding is, that he will ultimately become more head-strong in proportion as he acquires an indifference to bodily suffering.

The savage often presents a strange picture of the brutalizing consequences of giving Firmness an animal bias, in the manner with which he bears the most horrid and sanguinary tortures, when made a prisoner of war.

Whatever habits may be adopted in childhood, when Firmness is very large, they are apt to hold through life; it is,

therefore, of the greatest importance, that their first impressions should be of the proper kind. If they once acquire vicious habits, it is difficult to reform them ; threats, punishment, or entreaties, are often ineffectual.

The endeavour to correct the stubborn temper of a child, whilst we exhibit precisely the same temper and conduct ourselves, is practical folly. And is not this the usual method adopted in the treatment of an obstinate child ? For example : a child of this kind is told by his parent to do something ; he does not obey. The command is repeated in a more determined and peremptory tone ; still he remains immovable. The parent displays more impetuosity ; the child still disobeys, with a look of defiance. Now, if such acts be often repeated, it becomes fatal to parental authority, and to filial respect and obedience ; for ultimately, the child will not care whether he is remonstrated with or not.

In educating this feeling, the conduct of the mother should be regulated accordingly. It is impossible to address the intellect and moral sentiments of the infant on account of its tender age ; and until this can be done, it is better silently to yield your preference. Now in this, as in other animal feelings, the great point to be accomplished is, to weaken the feeling by keeping it inactive. Be careful then, how you take your ground, for to take it and afterwards to relinquish it, would be to give a conquest to Firmness ; and you may rest assured that your child will know how to improve it another time. Therefore, the wise and careful course is, to prevent his taking ground.

It should be remembered, that a child, with Firmness naturally large and active, feels an irresistible inclination to gratify it ; we should therefore address it in connexion with the moral feelings, and thus use it for some specific and good purpose. Let the child be told “ that he has the power of

resisting any action that he has been forewarned of as improper ;” or, “that it is a sign of a good and noble being, to show a determination to be good himself, and to endeavour to do good to others.” The child’s reflections would give a response to such maxims ; and even if he could not comprehend their philosophy, yet he would understand that he felt something within him like a determination to be good, and do good.

## CHAPTER XVII.

### THE EARLY EDUCATION OF THE SUPERIOR SENTIMENTS.

#### BENEVOLENCE.

A SUPERFICIAL view of society will be sufficient to prove, that the sentiment of Benevolence is instinctive, and cannot be attributed to education, or of accidental circumstance. Still, education and circumstances have great influence in different individuals, and it has been stimulated or retarded imperceptibly, through the lapse of ages, in various nations. And we can trace different degrees of this noble sentiment, conspicuously distinguishing their laws, manners, and customs; their religious institutions; their forms of government; their treatment of strangers; their modes of warfare; and their conduct towards their prisoners. So that, from an acquaintance with the laws and institutions of any people, we might infer the national development of Benevolence. However, among all people there may be great extremes, and even in civilized society there will occasionally be found *monsters* who appear to delight in cruelty; who seem deficient in all kindness and sympathy, or in whom the dictates of Benevolence, from having been in early life disregarded, has become ineffective. But in contrast to these examples, we may refer to those noble specimens of humanity, whose lives are spent in doing good; and who not only bless the country of their birth, but, as far as they can, all other countries. The Benevolent person cannot feel happy as long as misery, famine, disease, and suffering are the

bitter portion of any fellow-creature. Of all the sentiments, there is not one so completely disinterested as Benevolence. It is the spring of all actions that can mitigate distress, or ameliorate the condition of man. Liberality will invariably characterise those in whom it is large, and there will be no luxury sweeter to them than that of doing good ; and they will feel the full force of that declaration, " That it is more blessed to give than to receive." Some children manifest the feeling at a very early period, and never seem so happy as when they are giving to all around them their sweet-meats and toys. It urges the possessor to the performance of humane actions, without thinking of the claims of the individual, and without calculating the claims of present or future remuneration. It excites the emotion of pity, and tends to the exercise of mercy and forbearance, even when injured in person or possessions, and opposes itself to all vindictiveness by the mildest demeanour and most charitable behaviour ; and it is the true source of all philanthropy and tenderness. When Benevolence is small, the individual will exhibit great indifference to the weal or woe of others ; and if this deficiency be accompanied with large propensities, inveterate selfishness will be the ruling passion.

When this feeling is low in children, every means should be taken to practically train them to habits of kindness and benevolence. Many suppose, that instructions in good precepts, and learning by heart moral lessons, are sufficient for this purpose ; but we have before shown the great difference between instruction and training. It should, however, be remembered, that *instruction* is simply communicating knowledge ; while *training* implies repetition of certain modes of action in the mind, until they become habits. It is a law of our nature, that any organ accustomed to repeat a certain mode of action, acquires strength and facility in so doing ; and from this arises

the force of habit. If we wish children to be kind and benevolent, we must not be content with telling them, but induce them to act. We should never lose sight of the vast difference between training and instruction. In training, the mind is active ; in receiving instruction, it is passive. A child brought up in a family where Self-esteem, Combativeness, and Destructiveness are very active, and made the object of their manifestations, the same feelings would be roused in resentment, and its manners would become coarse, harsh and vulgar ; but if trained under the influence of a family where Benevolence, Veneration, Conscientiousness, and Love of Approbation are all active, and where every one was treated with kindness and respect, we should readily recognize the difference betwixt the children. When children lose the moral essence of their character, the parent may be certain that all real respect and devotion to their wishes will be wanting ; as true filial piety must be warmed by the moral sentiments of our nature before it can be matured ; and, therefore, will never be manifested by one whose lower feelings have been principally addressed.

In educating Benevolence, we must invariably treat a child with mildness, and address it in the language of love ; for even when faults are committed we should chide with kindness, and let our voice be mellowed with tones of pity and regret, and in this manner soften the feelings, and make it susceptible of good and benevolent impressions. We cannot conceive a more interesting picture than that of a parent pointing out to the little culprit, in the mildest possible manner, the consequences of wrong conduct, instead of looking angry when describing the offence. But by impressing him with the fact, that his bad behaviour is improper and offensive to God, we are certain that it would awaken within him a sense of piety and adoration, and be the best means of fixing his attention upon the necessity of acting rightly.

In thus conducting the moral education of a child, we use two powerful moral motives of our nature—our duty to God, and our sympathy for mankind ; but we should, at the same time, appeal to his sense of justice. When the Benevolent sentiment is feeble in a child, and he is so strongly imbued with selfishness as to become indifferent to the sufferings or inconvenience of others, so long as it ensures his own gratification, means should be taken to lead him to comprehend right from wrong. In order to effect this, we should ask him “ whether he would like to have pain, to be nearly naked, and be starved ? ” and as he would reply “ I should not,” we should then excite Conscientiousness, and make it instrumental to arouse benevolent sympathies, and a feeling of gratitude to God. The use of these powerful motives, from infancy, will counteract the manifestations of selfishness, and his actions will be practical illustrations of the moral precepts taught him.

#### VENERATION.

The sentiment of Veneration seems to induce us with an instinctive deferential feeling, but requires the assistance of enlightened intellect to give this innate respect a proper direction. Without such guidance, it may lead to venerate anything *animate* or *inanimate*, just as circumstances of country, birth, and education may influence the predilection. For instance : the Persian worshipped fire ; the Chaldean the serpent ; the Sabeans the stars ; the Egyptian the Nile. In these examples, and numerous others, we could trace each species of worship in some fancied good or evil influence which the serpent, the stars, the fire, and the Nile communicated to the people of each country, either directly or indirectly. Hence, people have been led, under the blind influence of Veneration, Marvellousness, and Hope, to practice, in the *name* of religion, some of the most senseless superstitions, the

most sanguinary rites, the most absurd and indecent ceremonies ; while the same feelings, under the guidance of enlightened intellect, dignified by the most sacred truths, have led to the purest morals. In all the systems, bearing the name of religion, we find the operation of the sentiment of Veneration ; because, in all of them, *something* is actually venerated. But the Veneration of the idolater, crouching before the serpent, or any other material object, is not to be compared to the delightful emotion experienced by the well-cultivated mind of him who bends his knees in the worship of God, the creator of all things. In the idolater, the sentiment of Veneration acts blindly and passively ; but in the true Christian, it springs from principles, and gratitude for the blessings constantly dispensed.

The difference of the manifestation of this feeling is very striking in children. Some are naturally more respectful than others and show strong filial piety, and look upon their parents with placid reverence, even before they have received instruction of the deference due to others ; whilst others appear almost proof against all instruction in this way, and cannot be either persuaded or beaten into a proper sense of respect.

The religious and moral sentiments are so intimately connected, that it is difficult to offer any hints as to training them individually and separately, as it is in the case of the other sentiments. We have before observed the difference between the higher and lower sentiments ; and there appears good ground for this in the very nature of the sentiments themselves.

Benevolence, Veneration, and Conscientiousness are called moral and religious sentiments ; not because their actions, to the exclusion of the activity of the other sentiments, constitute religious emotion, but because there is something in their nature which strikingly corresponds with the essence of religion—*disinterestedness*. These three are the only unselfish



feelings in our nature ; and as religion is an unselfish principle, the truth of the statement is obvious.

That there are errors in the moral and religious training of children no one will doubt ; and that the so-called religious training too frequently excites a strong prejudice against religion and its duties. There are many religious parents who are actuated by the best of motives in their desire to implant religion, at an early age, in the minds of their children, and under the influence of these motives take measures to form in them habits of devotion, and frequently retire with them and pray. So far, there is nothing improper ; and yet, where such a practice prevails, it is not at all uncommon to find it unsuccessful. The child may confess, in his simplicity and confidence, to his mother—and almost break her heart by the confession—“ that he does not love prayer.” But let us pause and inquire what he understands by “ prayer.” Perhaps an answer to this enquiry may so explain his meaning, as to render it by no means so wicked as it first appears. Perhaps he has had his mind filled with *terrible* images of the character of God ; and when he is told that prayer is intercourse with this terrible Being, can we wonder that he does not love it ? It should be remembered that such a child has scarcely any other conceptions of God, than such as are precisely calculated to terrify him ; and yet parents wonder and are broken-hearted, because the poor child does not love to be terrified. We think that no reasonable parent will consider this a *wise course* of religious training.

The parents of such a child, though pious, and perhaps intelligent on many subjects, may be really ignorant of the being on which they operate ; and hence, as might be expected, do not act in accordance with its nature. Now, in this case, parents may not know, or they may forget, that activity is indispensable to a child's enjoyment ; and consequently, that still-

ness or inaction can be commanded only for short periods, without producing uneasiness and restlessness; and through this forgetfulness, may lengthen the devotional duty with the child to the point where weariness begins, and perhaps even much beyond it. This he does not like; and he associates confinement and inaction with prayer, and, as a natural consequence, says that he does not love prayer.

The mother, when she retires to her closet with her child, may not only close the door, but the windows and shutters also. The consequence of this is darkness; now, almost all children dislike darkness, and some positively dread and are terrified in it. Suppose a child with morbidly active Cautiousness and Marvellousness, who has been trained and educated, with regard to the character of God, as to see only the terrible. Suppose such a child taken into a dark room, to worship this dreadful object, how can it be expected that the duty should be pleasant to him. He *says* that he does not like prayer; but it is obvious that it is solitude, confinement, and darkness, that he dislikes and dreads.

There is also another source of uneasiness in the child. The voice of the mother, in prayer, may be so dissimilar from her voice at other times—it may be hollow and sepulchral, or in half-weeping tones from one end to the other of a long prayer—and thus, to the affectionate child, is presented the distressing object of a beloved mother in distress. It was precisely so with a child who expressed his dislike to prayer, and assigned as a reason, that “it always makes dear mamma so sorry.” Now, let it be understood, that we have distinctly said, that retirement with children for prayer is proper; but the act of shutting out the light, and uttering prayer in tones of distress, and continuing the duty till the child’s position becomes uneasy—it is these things which we consider injudicious. Prayer with children, especially when very young,

should be short, and uttered in a serious and yet perfectly natural tone of voice; not differing more from that of common speech than reading does, and it should be performed in a light room. As a preparation for prayer, the child should be judiciously educated relative to the character of God, as to his power, wisdom, goodness, love, and mercy, so as to inspire in the child admiration, gratitude, and trust.

#### CONSCIENTIOUSNESS,

Or the instinctive sentiment of justice, may be compared to a censor, appointed by the Creator to guard us against acting from the mere impulse of the propensities; or it may be regarded as a moral balance by which we should weigh all our motives, so that we may not infringe the rights of others, or gratify personal desires by compromising our dignity.

Much difference of opinion has been expressed by metaphysical writers on instinctive sense of justice; some asserting that we have no such sense naturally, while others contend that various mental phenomena prove that we are endowed with it. The latter opinion accords with our views; and facts and observations prove, that the sentiment is not acquired. Common experience shows, that there is a marked difference in reference to the manifestation of this sentiment, not only in children, but also in adults. In children, this diversity is strikingly marked, long before their judgment can direct them to regard the dictates of justice, or experience inform them that it is most politic to act rightly. Education, as we have before observed, cannot create a single power, or confer a new principle; all that it can effect is, simply to modify, stimulate, or retard the primitive faculties according to the mental laws. It will, therefore, no longer seem paradoxical why children of the wealthy and cultivated are sometimes guilty of moral delinquencies, as well as the offspring of the needy and neglected;

because, being originally weak in Conscientiousness, and their moral education confined to precept, the sentiment was not trained to a healthy moral condition. All social institutions are the result of man's necessities, or induced by his desire of pleasure; and they are all directed either to the one or the other object suggested by his own ideas, which depend on his innate faculties. Hence, all rules, laws, or enactments, intended to secure his rights, or provide for his wants, must be regarded, not as accidental, but as immediately and necessarily dependant upon the nature of those faculties themselves.

The innate sense of justice may be observed in the indifference with which some persons commit the most flagrant acts of dishonesty, invidious slander, perjury, and lying; whilst others suffer the greatest compunction for slight omissions of duty, and the most intense remorse for anything partaking of the nature of crime.

The greater or less Conscientiousness of each may mark the natural distinction of character; yet, sometimes the bad conduct is induced by the potent force of early example, and by the entire neglect, on the part of parents, to adopt means of stimulating this feeling.

There are persons, however, who consider it absurd to suppose that we possess a natural sense of right and wrong; and that which is called conscience is produced by education and the laws, as that which is called justice has been very different in different ages and countries. It might as well be contended that the sense of smell is a mere result of circumstances, and that, because each person has some preference, there is no such thing as a positive law of smell; that odours are merely regarded as pleasant or unpleasant by caprice; and that the aromatic effluvia have no positive meaning, and should only be deemed arbitrary terms. If such unphilosophical principles be admitted, we must regard every operation as accidental.

But he, who has observed the uniform order of the works of creation, and the fitness of things everywhere displayed, will conclude that they are governed by invariable laws; however modified the same laws may be in every individual of a species, the effects are consequential and definite. Now, the supposition that the principle of justice, which is the strongest bond of society, is the product of caprice, involves a physical impossibility, and is in itself a moral absurdity. If man has abused his prerogative of moral liberty, and given a preference to the degrading abuse of his propensities for selfish gratification, it is a libel on his Maker, and in contradiction to experience, to assert that he can contemplate a violation of rectitude in the same light as the performance of actions strictly just. As well might we suppose that cruelty can be deemed kindness, or that pain is pleasure; for the sentiment of justice, like the unchangeable Being who has conferred it upon us, is immutable in its principles, although it has been perverted in all ages. But when Conscientiousness acts in unison with enlightened intellect, the results in every age have been similar: "he has done unto others, as he would they should do unto him" — which beautiful aphorism is the emanation of the natural promptings of the organs of Conscientiousness. The converse of this has also invariably resulted, whenever men have sought their own gratification, in defiance of the moral laws.

#### HOPE.

This sentiment is innate, and is essential to our happiness. Some persons may not be willing to allow that Hope is a separate faculty of the mind, but an act of the whole mind. But whatever may be the opinions of writers on mental philosophy, relative to the feeling of Hope, poets have

recognised its existence. Hope is by them considered an element of human nature, as thus described :

“ O Hope, sweet flatterer, whose delusive touch  
Sheds on the afflicted mind the balm of comfort,  
Relieves the load of poverty, sustains  
The Captive, bending 'neath the weight of chains.”

Hope is the “ good angel,” which hovers around the couch of the pious : it holds out eternal felicity, and frequently makes death a pleasure. But the Christian religion does not produce this sentiment, it is only adapted to it ; for the superstitious savage also has the same feeling, although it has not been directed by Revelation, where the “ longing after immortality” will be realized, as thus expressed by Pope :

“ Lo ! the poor Indian, whose untutored mind  
Sees God in clouds, or hears him in the wind ;  
His soul proud science never taught to stray  
Far as the solar walk or milky way.  
Yet simple nature to his Hope has given,  
Behind the cloud-capt hills an humbler heaven ;  
Some safer world, in depth of woods embraced ;  
Some happier island, in the watery waste,  
Where slaves once more their native land behold,  
No friends torment, no Christians thirst for gold.”

This feeling is active in childhood and youth ; and much may be made of it in the work of education ; and considerable attention should be given to its training. It prevents us from being overwhelmed by the disappointments with which we meet, and in connexion with other faculties, enables us to overcome the obstacles we have to encounter in climbing the rugged steeps of daily life. But while the sunshine of Hope renders, if not beautiful, yet bearable, the desert we tread—while its influence is so powerful in stimulating us to attempt, and, we may say, enabling us to achieve the conquest of difficulties—it is, however, liable to numerous errors ; for it is but a *feeling*, and, as such, is *as blind as the merest animal*

*propensity.* If not properly trained to act under the guidance of enlightened intellect, it will lead to the most unfounded expectations, and thus reap painful disappointments, in the vain attempt to grasp that which is shadowy and unreal.

In educating this feeling, the child should be well informed of cases of the disappointment of extravagant expectations, as well as of cases of success of vigorous and wisely-directed efforts to conquer difficulties and surmount obstacles. He should also be shown the causes of failures, where, and how they have been made, and the cause of success, where the results have been favourable. By these means the reflective faculties are cultivated in the training of Hope. The child thus acquires positive knowledge and learns by definite examples what is meant by "wisely directed efforts to overcome difficulties," in the way of attaining any object of pursuit.

The advantage of calling to our aid the intellect of the child in the education of Hope, whether there is a deficiency or an excess of its activity, is very important; for the intellect will exert a powerful influence, either in exciting or repressing its activity, as the case may require. If Hope be weak, unhappiness is the consequence. The individual is low-spirited, magnifies real evils, and creates imaginary ones; he is discouraged by the merest trifles, and cannot muster courage sufficient to undertake anything in which failure is possible. If his abilities are good, he will often succeed better than he expects. But if Self-esteem, Firmness, and Combativeness be also low, he will repeat again and again the same round of despondencies of success. Now, in cases like this, stimulus is required, which should be done by a repeated exhibition of facts, of instances of successful efforts even under discouraging circumstances, and the most valuable of all such instances will be those of his own success. He should be induced to undertake at first, some small enterprise, in which success is certain, and from

this led on, step by step, to overcome one difficulty after another, which will, by degrees, inspire him with more and more confidence in himself. The utmost patience must be exercised by the parent in all such cases, as well as steady perseverance.

In cases the reverse of the preceding, where large and active Hope fills the future of the child's life with the brightest visions, the aid of the intellect will be found of great importance in leading him to view matters with sober expectations. Individuals in whom this feeling is powerful and active, difficulties that are almost impossible of attainment appear to them easy; and hazardous ones certain. They are sanguine, cheerful, lively, and buoyant, feeding always on the bright prospects of the future. Now, his intellect must be taught that he cannot accomplish everything, that there is a limit to his powers which is easily reached. He must be practically made to feel that there is such limit by being left, in difficult cases, to his own resources. He must be shown that disappointments follow those who even cherish reasonable expectations, and that his character will suffer from the extravagance of his expectations, and that he will be pointed at as the boy "that began to build, but was not able to finish; he has undertaken so many things, that he has accomplished nothing." Love of Approbation, through the intellect, will be painfully affected, which may probably rouse Cautiousness and the reflective faculties to a sense of the practical folly that excessive and over-active Hope leads him. Conscientiousness should also be addressed, and he should be shown that his extravagant expectations leads him to promise and undertake engagements that he cannot fulfil; and by such promises he is guilty of falsehoods, and that it is morally wrong for him to excite expectations which it is impossible for him to fulfil. He should be further shown that in the affairs of life, where there is so much uncertainty, and where so little is under our control,



that we can rarely be certain of results, however fair the prospect, and that we should never give an absolute promise, except the result depends only on ourselves. Benevolence may be appealed to by showing him that disappointments inflict pain on others, and that by promising what he does not, and cannot perform, he gives pain where but for his promise none would have been experienced.

#### MARVELOUSNESS.

This sentiment influences our ideas, in matters of religion, in a much greater degree than that of Veneration ; as it induces faith. That such a feeling as this belongs to our nature can scarcely be questioned by any one who has carefully observed human nature. It prompts to credit, as real or true, things invisible, which cannot be submitted to the examination of the senses, or made comprehensible to the mind in its present state. If the belief in things invisible be an involuntary feeling, and not the result of any process of reasoning, it must be dependant on some impulsive principle, which may be observed even in infancy, of the great difference in this respect. While some children are very credulous, others evince an early scepticism ; and even these extremes are found in the same family. The wisdom of endowing man with this sentiment is very obvious, as it adopts that remedial system of morality and religion which is presented to him in the Bible. It is, therefore, indispensable to man, in his present condition ; for, without it, he would have been incapable of religious faith. Such "faith is the realization of things hoped for ; the confident expectation of things not seen."

This sentiment is generally very active in children ; and nothing is more remarkable than the pleasure that they manifest

in everything that is marvellous and new. It urges to discover what is not known or understood ; hence, the wisdom of its early activity, when all knowledge is to be acquired. It prompts children to rely with perfect confidence in the statements of their parents, and to believe the most extraordinary things on their bare statement ; hence, the eagerness with which they will listen to novelties—to whatever is new, surprising, and marvellous. Injudicious domestics and associates are pleased with the excitement of the feeling in themselves and others, and frequently carry it to improper lengths, by the narration to children of supernatural stories of faries, witches, ghosts, &c. This cannot be too severely reprehended, as it is fraught with consequences often very injurious, and sometimes calamitous. We frequently meet with persons at mature age, and beyond the middle period of life, who have not overcome the injuries they sustained in the nursery, though they possessed good natural parts, and which had been carefully cultivated. It is the over-activity of this feeling that produces the belief in omens, signs, lucky and unlucky days, dreams, &c. ; and to its combined activity of Cautiousness, may be attributed that undefinable dread which some persons suffer in darkness, burial-grounds, and the death-chamber. It might be supposed, that the intellect was unenlightened ; but such is not always the case. The intellect, no doubt, was unenlightened when these feelings acquired the dominion ; but when once acquired, it is with the greatest difficulty that they can be overcome, even after the understanding is convinced that the terror is the result of injudicious treatment when young. This feeling should always be placed under the instruction and guidance of enlightened intellect ; or serious and dangerous consequences may be expected from improper excitement. For this reason, it should never in childhood be excited, except in relation of what combines truth with novelty.

One ignorant, superstitious nursery-maid—one teacher, who understands no mode of governing but by fear—one associate or acquaintance, who has been subject to the evil influences of such domestics, or such teachers—or one hook of an improper character, may inflict an injury that may be impossible, subsequently, to repair.

Works of fiction should not be read by children until the intellect has acquired a vigour to prevent the illusions and creations of fiction gaining dominion over the mind ; because, when such is the case, there is a distaste, and frequently disgust for the sober realities of life. The mysterious truth of religion should not be presented to the mind of a child till the intellect has acquired considerable strength. Particular care should also be taken that fables and legends, bearing on religion and the spiritual world, be kept out of sight ; otherwise, superstition may be expected to occupy the place of religion, and gloom, and perhaps terror, give their tinge to the mind, instead of hope, confidence, and joy. It is a fact that should never be lost sight of, in educating children, that *evils such as these*, when *once incurred*, can scarcely ever be cured ; therefore, the great object is, *prevention*. We cannot prevent the activity of this feeling, that is impossible ; but we may prevent its abuse by watching and guiding its activity, and by care that no other than a *healthful* stimulus is presented to it. This requires a vigilance which never sleeps, and parents cannot be too careful as to what they utter, or allow to be uttered to their children, on subjects which may excite this feeling. We have pointed out the importance of this feeling in man, as a moral being, and the dangers to which children are exposed from its mis-directed activity. The arduousness of the parents' duty, in educating it, is *indeed* great ; but we must not be discouraged with the magnitude and importance of a duty, from the *obligation* to perform which, we cannot escape.

## IDEALITY.

This faculty is recognized under the name, "Imagination." But what metaphysicians call the "imagination," is not what we mean by Ideality. It is not a power of mental creation, but a sentiment or feeling of ideal perfection, beauty, finish, elegance, which may belong to all the objects of the external senses and of the perceptive faculties; and its function is, to adorn and beautify all such objects, and to refine and elevate all the feelings of which man is rendered capable. Without it, man would have continued a savage; he could hardly have advanced to the stage of barbarism, and much less to those of civilization and refinement. But it exists, to some extent, in all human beings; and, in all, it should receive appropriate education.

This sentiment distinguishes man from the lower animals, as much, and perhaps more, than any other. He not only continues to accumulate knowledge, and to improve in the skill and beauty of his performances from infancy to manhood, but from age he is capable of progressive improvement. Let children, then, be trained to have an eye for the beauties of nature, and to a knowledge of the fitness of things throughout creation; and to understand, that at every step they take, there is a rich feast in the contemplation of mightier and more beautiful things than ever entered the palace of the monarch, or hung on the walls of the Society of Arts. What painting equals the plumage of the birds, and the foliage of the trees? What is there in man's productions that is not copied from nature? Yet, the majority of the great mass of society neglect this fertile source of knowledge, and highest of enjoyments, and devote their lives to the sordid gratification of the lowest feelings of their nature. When the love of the beautiful, and the desire of perfection in all things are rightly

developed and directed, the world is seen and regarded with totally different feelings, than when blinded to the beauties which everywhere surround us.

But important as this feeling is—indispensable as it is to the excitement of the other faculties to action on their appropriate objects, so as to help and urge man forward to that perfection of his mental and moral nature of which he is capable—we must not forget that it is a mere feeling, and requires to be educated and placed under the guidance of enlightened intellect. In different individuals it will require different discipline. In some, it will require restraint; in others, stimulating. This feeling is so weak in some children, that they are coarse and vulgar in their tastes, feelings, and pursuits; and these do not always belong to the lowest walks of society. Such children show little taste for improvement, politeness, and elegance. What is called “taste,” they cannot conceive; hence, the cultivation of it, in them, is difficult. They are satisfied with things as they are. The beautiful in Nature, and Art, has for them no charms. The varieties of hill and dale, wood, and waterfall, produce no more emotion in their contemplation than would a sandy desert. Works of art either please or not at all; and if they do, it is not those of the higher walks of it. The poetry of painting, engraving, or sculpture, they never recognize. Coarse and worthless prints are, as highly valued, as the most breathing creations of genius. Poetry is regarded as unnatural, and an out-of-the-way mode of saying common things, that the writer may appear very fine, and be very ridiculous. Now, in such cases, cultivation of the feeling should be carefully attended to. Nothing coarse, vulgar, or grovelling should be allowed in the presence of such a child, and his associates should be carefully chosen. Ignorant and vulgar servants must, on no account, have charge of him, as he would take them for his models to imitate. The beauties

of Nature should be pointed out to him, and explained in a pleasing manner. Beauties of style, and expression, should be remarked upon, and coarseness, and all inelegances censured. The best specimens of works of Art should be carefully sought out for him, and his attention directed to them. By steadily pursuing such a course, beneficial results will follow.

Now, the excessive activity of this feeling requires a different course of treatment, and especially so, if Marvellousness be also active. Children with these feelings very active, are liable to give way to rampant fancy, and *revel* in scenes of fiction and romance. They may have a passion for poetry, and with little talent to make it. Inanimate nature will be viewed as possessing a sort of life and consciousness, of which all its varieties and changes will be supposed to be the result. The seasons of the year, day and night, echoes and winds will be personified by the imagination ; and all nature crowded with the fabulous beings to which the fancy of the poet has given birth. Such children can never be satisfied with things as they are ; they are too low, too coarse, too remote from their conception of perfection as taught by writers of fiction. With real life they have little sympathy ; and live in the region of fancy. A state of mind like this is far from desirable. The intellect of such a child must be instructed to be satisfied with the sober realities of life ; and practically taught that sound wisdom consists in enjoying what is within our reach, and aiming at what may be attained ; and not in rejecting what he may enjoy, because it is not invested with ideal perfection ; nor in sighing after what cannot be reached, because it has no existence except in his own imagination. Show him that his false notions will be the fruitful source of disappointment and sorrow instead of enjoyment, and that this world is not the desert that he fancies it to be ; that there are forms of beauty, tints of loveliness, and strains of melody which

he overlooks ; that in real life, love can be found as pure, and friendship as disinterested, as those of which novelists dream, and poets sing. Such children should, as much as possible, be prevented from reading works of fiction ; and the poetry that they read should be of the chaste and sober character, not the creations of fancy, but that which discovers and displays the beauties of nature, and clothes them in the pure garb of morality and religion.

#### IMITATION.

This sentiment is generally very active in children, and it is very necessary that it should be so ; because much, which is the object of education to teach, must be learned through its means. Imitation may be excited by all the feelings and sentiments ; and, however indispensable to our well-being, it is liable to abuse, unless controlled by a good, early, and well-regulated education. Hence, the principal effort of parents should be, to see that it is properly associated with the activity of other faculties, and under the control of the moral sentiments ; because, should it be active alone, and free from the restraint of those sentiments, and the intellect unenlightened, the child would merely play the part of a monkey. If active, in connexion with Humorousness, he would be only a buffoon.

The sphere of the activity of Imitation is very great. Almost all the actions of life require its exercise. It is by its aid that we learn to speak and write our own language or any other ; for though acquainted with the words by means of another faculty, it is Imitation which enables us to utter them, so as to render ourselves intelligible. In writing, drawing, &c., this sentiment is necessary to give facility and effect. It enables the deaf and dumb to express, by the powerful aid of natural language, the various feelings and sentiments, and this with a relative degree of correctness in a nice discrimination of the many shades of affection which the different faculties are sus-

ceptible of expressing, under various degrees of excitement ; as it is far superior to the parrot-like repetition of words which most people express some sentiments and feelings. The words loathing, nausea, disgust, used indifferently, but which, nevertheless, are accurately distinguished by the speaking features of the deaf and dumb. With significant signs, by a species of animated hieroglyphics, very excellent pictures of most tangible objects, with relative degrees of correctness, in proportion to the natural intelligence of each individual, acting with the Imitative faculty, are variously developed.

The utility of Imitation must be obvious ; for in every transaction between human beings, when the natural expression is exercised without dissimulation, the mental faculties under excitement are more strongly delineated by the countenance and action, than they can possibly be by the evanescent sounds of artificial languages ; because, in mere verbal language or composition, without the assistance of Physiognomical expression, there is a want of what might be called a living commentary, and which speaks a universal language illustrative of our different emotions. The instruments used for this purpose, by Imitation, are those of all the external organs : the head, the face, the eyes, nose, mouth ; and the body with its members, the hands, arms, and legs, which are moved with magic quickness, and by the varied action of these exterior indices we trace the rapid and peculiar changes of our innate faculties, each of which is marked by the most astonishing accuracy.

It is a general remark, that example is better than precept ; yet how rarely the maxim is acted upon, although it comprehends the very philosophy of moral education. To understand why there exists so much contradiction between theory and practice, or why there is insufficiency in mere precept, we have only to reflect, that ideas are fleeting, and that words which represent them are, to the understanding of a child, mere



unintelligible sounds. Still, the great part of mankind act as if they thought that mere verbal instruction could exert moral influence, forgetting that the only *efficient models* by which the conduct of a child can be *properly formed*, consists of *moral actions*, which present to Imitation materials for good character, and which the little actor will study to copy and to emulate. It is deeply to be regretted, that most persons appear to be contented with communicating good precepts, or correct modes of thinking ; while, by a strange infatuation, they neglect to regard the more salutary means, their own personal rectitude in all things. For stimulating the noblest faculties of the child, precepts are useless, unless practically illustrated ; for precepts are as evanescent as thought ; but example is a living, working representation of them, which the child should daily observe and contemplate in the virtuous conduct of his parents, and in this manner, by the force of example, his moral character is influenced.

It may be asked, whether actions are observed by very young children ; and, even if they be so, how they can be affected by the observation, when probably they do not comprehend their nature and import. We do not suppose that a child reflects on the fitness or impropriety of such actions as it witnesses ; but by the force of experience we find, that by far the greater number of a child's ideas, both as regards manners and conduct, are acquired at a very early period. This fact being in strict accordance with truth, and confirmed by observation, deserves the serious consideration of every candid mind ; and upon reflection, it becomes more apparent that there is great responsibility attached to those who may have the care of children, who in the least neglect, or deviate from moral duty— or who by any species of affectation of manners, dress, or speech, under the absurd pretence of fashion, since any error of conduct is sooner learned than unlearned.

## HUMOROUSNESS.

The existence in human nature of this feeling, few will be disposed to question. There may be persons who consider that it does not belong to man ; and that all manifestations of its activity are the result of miseducation, and instances of impertinence. To such persons we have little to say, as we do not expect to meet with many of them, and as they form a fraction of mankind, it will not be expected that we write for their benefit. But there is a larger class who require respectful attention, and who cannot but admit, that Humorousness is an element of our nature.

Now, the various peculiarities of our nature have a legitimate sphere of development and exercise, and in that sphere they are intended to be employed. Man is the only reflecting being upon earth, and there is an appropriate sphere in which his reflective faculties are to act. He is also a moral being, and capable of appreciating moral subjects, and feeling the influence of motives to moral action. His Creator designed that he should reason and reflect, and also be a moral and religious being. In like manner, it was the design of God, that man should be capable of appreciating the humorous, the mirthful, the ludicrous, and incongruous ; and, as laughter is the natural and involuntary expression of a sense of the incongruous, it was designed that man should laugh as well as reason.

We have, however, in our time, met with well-meaning religious people who considered laughter a sin, and that the Scriptures did not sanction it. It would be easy to show, if this was the place, that they do recognise it, and that they address it to ; but we must distinguish between the use and the abuse of the feeling. The evil lies in the excessive activity, or the uncontrolled activity of the feeling, and not in the activity itself. In certain children there is danger of one

or other of these, which is greater or less, in proportion as the directing and controlling organs are more or less developed, or more or less perfectly cultivated. The natural impulse of large and active Humorousness, is to give ludicrous conceptions ; but the subject will depend on the other faculties, and their culture and restraint. For example, with small and uneducated Marvellousness and Veneration, there will be danger that things sacred will be thus treated, as well as parents ; or, teachers or superiors will perhaps be the butt of his ridicule. With small Benevolence, he will probably turn to ridicule the misfortunes and infirmities of others ; and, with small Conscientiousness, ridicule others on matters of right, and the principles of morals.

It will be then obvious to the thoughtful parent, that the excessive activity of this feeling must be guarded against, and a right direction given to it. If large, it will act ; but it should be trained to act under the control of Benevolence, Veneration, and Conscientiousness : and the child should be taught that, whenever by ridicule he inflicts pain wantonly, he does wrong.

Humorousness, Imitation, Wonder, Ideality, Tune, and Time, are the recreative group of faculties, and are an added gift of God, bestowed on man for his hours of recreative enjoyment ; and they do afford glorious means for that benevolent end. They are fitted for a world exuberant with their joys—full of poetry, beauty, and beauty's reflex, art ; endless in wonders, gay with mirth and laughter, song and dance, grace and melody, " all beauty to the eye, and music to the ear," lavished gratuitously. For all this extra beneficence, as it may be called, might have been withheld, and man been grave but never gay, to make him happy with purer joys than those of *sense*, and *sensuality*. These faculties combine to produce refined and elegant pleasure. Look at the scope of the entertainments of the theatre ; which exists by

providing for Ideality, Wonder, Imitation, Humorousness, Tune, and Time. Laughter itself is the gift of God. How sad to mistake His design, to inculcate gloom, and to clothe His character with terror. An innocent child said that which ought to silence the gloomy ascetic for ever, when admiring a nosegay, it asked, "mamma, did the *cheerful God* send these beautiful flowers?" Yes, the "cheerful God" sends all flowers that garland life. He it is who, by planting an organ of *Tune* in man's brain, and a relative instrument of music of surpassing excellence in man's throat, hath said to him "*sing*." By conferring on him an organ which gives vivid perceptions and enjoyment of measured time, prompting to graceful movement, hath said to man "*dance*." By enriching his mind with Ideality, and clothing the lily with glory to delight it, hath said to man "*adorn*." While by constituting a distinctive faculty to perceive, enjoy, and even create, the endless combinations of incongruity, from which we draw enjoyment, hath said to man, as plainly as if He had written it with His own light on the sky, "*Laugh, and be happy*." Scenic personations, pictorial similitude, the mimic canvas, the breathing marble, are all one beautiful family, the offspring of Imitation; and were all willed when that faculty was constituted part of man. Beauty, in its infinite varieties of grace, elegance, adornment, splendour, expression, is of God: beauty in "day, and the sweet approach of even and morn"—beauty in "flocks and herds"—beauty, ah! what beauty in the "human face divine!" Nature is gorgeous with beauty, and God fitted man by his Ideality to revel in its luxury. But for man, it had existed in vain; for while a benevolent God called into existence a beautiful world, he created man the happy witness of His handiwork; to attract the gratitude of his favourite creature, man, for all His mercies and bounties in food, air, labour, sleep, health, the joys of virtuous love,

infant cherishing, gentleness, brotherly love, thrilling piety, and filial prayer. But when we look yet beyond, and see that the stream still flows onwards from the depths of those substantial blessings, and sparkles in the region of gaiety and mirth, and poetry and pastime, that God is indeed the "cheerful God," our venerative love, restrained by awe and not unmingled with fear, seems to assume a more confiding, child-like character, and to become in every deed, the love of the whole soul.

## CHAPTER XVIII.

### EARLY EDUCATION OF THE INTELLECT.

THE intellect, in childhood, begins to develop itself very early. Every faculty of the mind rejoices in exercise ; it is requisite to our happiness that every faculty should be duly and properly exercised ; and our Creator has therefore furnished each faculty—animal, moral, and intellectual—with its appropriate object, for that purpose. The intellectual faculties of a child require for their exercise their appropriate objects ; and the claim is strong in the degree in which the organs of the faculties are developed. We need not expect, then, that the plans of the Creator can be frustrated, for the intellectual faculties *must*, and will have exercise in one way or another ; but care should be taken that their exercise be not continued too long, so as to produce weariness ; and that the faculties should not be stimulated to over-exertion, even on right objects, and in a right direction, as there is danger in rendering children precocious.

Parents are delighted with the manifestation of intelligence in their children, and cherish it in proportion as they consider it unusual for their age. They accordingly exercise the intellects of their children to greater and greater exertions ; and suppose that, so long as the children as well as themselves are well-pleased with such efforts, that no injury is being done, but is a real and permanent advantage to the children. But unusual pleasure on the part of a child, in intellectual efforts

beyond his years, does not indicate that it is the duty of the parent to tax the powers which the child exhibits. No ; it more correctly indicates that it is their duty to suppress their activity rather than stimulate it. Stimulus is only required in children with sluggish brains, not in those whose brains are unusually active. But parents are often too anxious that their children should have a knowledge of the alphabet, of spelling, reading, geography, and other branches of school learning, at a very early age. Now, this is worse than tempting them to walk too early ; because, the organ likely to be injured by it is much more important than the muscles and bones of the lower extremities. It may do irremediable mischief to the brain, as it is yet too immature and feeble to sustain fatigue. Until from the sixth to the eighth year of life, all its energies are necessary for its own healthy development, and that of other portions of the system. Exercise is essential to the health and vigour of the brain at that time of life as at any other ; but it should be the general and pleasurable exercise of observation and action ; it ought not to be the compulsory exercise of tasks. It is a fact that should never be lost sight of by parents, that early prodigies of mind rarely attain mature distinction. The reason is plain. Their brains are injured by premature toil, and their general health impaired, from an unwise attempt to convert at once their flowery spring into a luxuriant summer ; but that summer too often never arrives—the blossom withers ere the fruit is formed.

The passion so prevalent for early mental stimulus, is founded on the *want* of a *correct knowledge* of the *human constitution* ; and of the amount of labour its different organs can sustain with safety at the different periods of life. Perhaps we should rather say, it is founded on the fallacious belief, that it is the infant's mind alone that labours in acquiring learning, and not any organized portion of his body. This is

an error, and if not corrected may prove fatal to hundreds of thousands of the human race. It is not the mind, but the brain—the master-organ of the system, essential to the well-being and efficiency of every other part of it—that labours, and is oppressed in the studies of the school. Now, tender and feeble as it is, is it possible for it to endure the labour too often imposed on it, without sustaining irreparable injury.

Were parents fully sensible of this, they would no longer over-load the brains of their mere babes with study, any more than they would their half-organized muscles and joints with unmerciful burdens of stones; they would even know that the latter would be the less destructive practice of the two.

Instructors of youth, and authors of books, for children, would do well to acquaint themselves with human Anatomy and Physiology, before they undertake to cultivate and discipline the mind. The neglect of these Sciences, on their part, is a most lamentable evil. If they had been understood, numerous books for children, which have been highly recommended, would never have been written; which books, instead of being a blessing to the community, have done incalculable injury. Some are announced as purposely prepared “for children from *two to three* years old.” Some, to teach children history and geography; and others, to instruct them in geometry, theology, and metaphysics. “The Child’s,” “The Girl’s,” “The Boy’s” Books have been multiplied on almost all subjects, until they have become a nuisance, as many of them contain little else than slipshod catch-penny trash. Where is the proof that they have ever benefitted a single child? Do the youth now, of the age of fifteen, who have used most of these books all their lives, who have committed to memory innumerable truths, and were taught to reason when at the age of three or four, possess more activity, energy, vigour, and independence of mind than their parents did at the same age? Do their mental



powers *now* show the *good* effect of their early and extraordinary culture? Do not the number of tender, delicate, pale-faced youths who are seen in our colleges, and in boarding-schools for girls, exhibit the bad effect of this system? We again ask, where is any evidence that books put into the hands of children, before the age of seven or eight, are of any lasting benefit, either to the body or the mind?

But apart from the injury such books produce, by too early exciting the brains of children, many of them are objectionable on account of the nonsense and falsehood which they contain. Some, designed for children from two to three years of age, contain such trash as the following: "Englishmen love roast beef and plum-pudding. The Dutchman loves cheese and red herring. The Frenchman loves soup and sallad. The German loves ham and pompernicke." Other "Books," "Lessons," "Manuals," and "Tales for Children," contain much that is not true; much that infants had better not know, and much that is far above their comprehension.

The method of teaching little children varies in different families; but, generally, that is considered the *best* which forces the infant mind the *fastest*. In some families, the memory is chiefly cultivated, and the children are taught innumerable facts. Here we see those who are scarcely able to talk, exhibited as wonderful children. They are declared to be deserving of the highest praise, and prophesied about as giving promise of great distinction in future, because they are able to tell you who was the oldest man, and many other useful and important facts. They are also able to tell us many truths in astronomy, geometry, chemistry, &c., &c., of which the innocent beings know about as much as do parrots of the jargon they deliver.

We, therefore, beseech parents to pause before they attempt to make prodigies of their children; for early mental excite-

ment enfeebles their bodies, and disposes them to nervous affections.

Let parents not lament because their children do not exhibit uncommon powers of mind in early life ; or because, compared with some other children, they are deficient in knowledge derived from books. Let them rather rejoice, if their children reach the age of six, or seven, with well-formed bodies, good health, and no vicious tendencies, though they be at the same time ignorant of every letter of the alphabet. If they are in this condition, it is not to be inferred that their natural abilities are inferior to those children who have been constantly instructed. It is a mistake to suppose that children acquire no knowledge while engaged in voluntary play and amusement. They thus acquire knowledge as important as is ever learned at school, and acquire it with equal rapidity. Many parents think, that the child who has spent the day in constructing his little dam, and his mill, in the brook, or stream, that runs in the gutter—or in rearing his house of clods, or of snow—or in making himself a cart—has been idle, and deserves censure for a waste of time and a failure to learn anything. But this is a great error of judgment ; for, while he has thus followed the dictates of nature, both mind and body have been actively employed, and thereby improved. To him, anything he sees, and hears, and feels, is new, and nature prompts him to examine the causes of his various sensations, and of the phenomena which he witnesses. For him, the Book of Nature is the *best book* ; and if he is permitted to go forth among the wonders of creation, he will gather instruction by the eye, the ear, and all his senses.

For awhile he is ignorant that stones are hard, that snow will melt, that ice is cold, that a fall from a tree will hurt him, and a thousand other common facts, as he is of a “ parallelogram,” or “ Perimeter,” or the “ diameter of the sun,” or the

“pericarpium of flowers,” or of many other similar things, which some think important for infants to know. If his time is constantly spent learning the last, he will grow up ignorant of many common truths, and fail in the best of learning, *common sense*.

The child, when left to himself, manifests a true philosophical spirit of enquiry. The story related of the celebrated Schiller, who, when a boy, was found in a tree, during a thunder storm, trying to find where the thunder and lightning came from, is an instance of the natural tendency of self-education. It is highly important that this tendency should be encouraged, for it involves the cultivation of that spirit of enquiry which is far more valuable than limited acquirements in knowledge; a spirit which teaches us to distinguish what is just in itself, from what is merely accredited by illustrious names; to adopt a truth which no one has sanctioned, and to reject an error of which all approve with the same calmness as if no judgment was opposed to our own. But this spirit will never be acquired when the child is taught from his infancy to depend upon others for all he knows; to learn all he does learn as a task, and not from the desire of ascertaining the truth, and gratifying his curiosity.

Parents should not, therefore, regret that their children have passed their early years out of school; for the knowledge they have gained, while running about in the open air at play, may, in all probability, be much more valuable than any they would have gained at school. They have, at all events, gained what is far more valuable to them than any mental acquirements—a sound body, well developed, organs and senses that have all been perfected by exercise, and a stamina which will enable him in future life to study or labour with energy, and without injury.

We have, in our observations, given an occasional glance at

the means of improving the intellectual condition of mankind ; yet, the importance of the subject is such as to deserve more particular notice. It will not be denied that the education of the reflective and perceptive faculties, on correct principles, is decidedly essential to the moral dignity of man, and to his elevation to his proper and exalted state of an intelligent being. For this purpose, we should first commence with the cultivation of the perceptive faculties. Nature dictates to us the plan to be pursued, and we shall do well to choose those natural periods of tuition which observation proves to be instituted for the best and wisest ends.

The perceptive faculties take cognizance of the existence of external objects and their physical qualities, and the relations they bear in time, place, event, and number. They, in fact, take in the vast, and grand, in the external world, as well as the most minute portions of matter ; and, assisted by the various senses, they are the only source of man's knowledge, and furnish the true data for sound reasoning. Hence, their laws should be comprehended, as also the exact function of each perceptive power and their natural order of development, as we reject the absurd hypothesis of chance in any of God's works ; and we have the testimony of daily experience, that these important faculties do not form an exception to the rule. Now, in the natural history of thought, we may observe in the deaf and dumb, who, in their mental operations, obey, according to our views, the laws of the human mind. They give the noun before the adjective, that is, they perceive and describe the object first, before they notice any particular quality it may possess ; and this seems to be consonant to the order of nature, because we must invariably think of the existence of a thing before we enter into the consideration of any qualities which distinguishes it from any other. If, for example, we write with chalk, on a black board, the sentences " tall man,"

“high tree,” “black dog,” “red cow,” and observe to the children that they must represent to us in pantomimic signs their ideas of these sentences ; it will be seen that, in every instance, they first describe the object, and afterwards the quality by which it is particularized.

The objects in view, in training the perceptive faculties, are two-fold : to give positive knowledge, and to make all information a means of rendering the individual good, useful, and happy. This may be realized by inculcating truths in reference to man’s organization and economy ; his relation to his God, his fellow-creatures, and to the external world : such as the nature and use of mineral substances ; the laws of vegetation, diet, temperance, and cleanliness. The effects of moisture on the body, and its consequences on the organs of digestion ; and all atmospheric influences, either as causes of health or sickness. The laws of animal life, comprehending the circulation of the blood, digestion, and assimilation of food. The action of imperfect functions of digestion in disturbing the mental health, and the re-action of the mental powers in aggravating the primary source of derangement. The principles of natural and experimental philosophy ; and a general knowledge of the mental laws, with all the various phenomena.

If the minds of students be well stored with facts relating to the mineral, vegetable, and animal kingdoms, and their diversified phenomena ; and if they were aware of the advantages of knowing the laws of these grand divisions of nature, we should have the very best guarantee for the respectability of their moral character. In proportion as a man comprehends the laws of God as manifested in the beautiful order of Creation, his moral sentiments are more likely to become the exciting motives of all his actions ; and in a mind well regulated from infancy, there is always uppermost an active desire for the *attainment* of true principles and sound deductions.

## APPENDIX.

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THE readiness with which the natural abilities of children can be discovered, by the aid of Phrenology, the following letters will show :

British School, Wrexham,  
July 27, 1842.

On the morning of the 23rd of June, Mr. Bridges came into the school, accompanied by Mr. Lewis, to examine the phrenological development of some of the children committed to my care.

I was first requested to call out the singing class, which accordingly was done, and they ranged themselves in a semicircle before us. Mr. Bridges was then asked to point out the best singer. Pointing to one (Peter Phillips,) he named him as one who would keep the firmest and most regular time. Mr. Bridges was asked his opinion of another (William Dixon), and he said, that he would be most distinguished for correctness of tune ; these were the two best singers in the school.

Mr. Lewis then asked me to call out a few of the best arithmeticians, geographers, writers, &c., mingling with them some who were not distinguished at all, and some who were distinguished for nothing but dulness. I did so, and we were presently surrounded by about thirty boys. Mr. Bridges passed his opinion on most of these ; and, taking into account that he was a stranger amongst us, he spoke of their peculiarities and talents with astonishing correctness. Laying hold of one little fellow, he pronounced him a gossip ; and it often happens that I have to place him apart from his class in order to keep him from talking : he is, nevertheless, very engaging, and, to use his schoolfellows' phrase, " he talks like a girl." Mr. Bridges pronounced another to be more fond of beefsteaks than multiplication table ; and that boy actually left the school about a year ago and went to another, because he would by that means become

possessor of about two inches of plum-cake. He has since returned, but still retains the same complacent propensity.

Mental arithmetic is taught in the school. On being asked, Mr. Bridges pointed out one whom he should consider as the most expert of those studying this science; and this was the boy who gained the prize for Mental Arithmetic at our last examination. He also singled out one whom he considered as the best calculated for the study of language; the boy, to whom he pointed, has maintained his position as dux in the highest grammar class for more than a year, and carried off the first prize at the examination before alluded to, as well as at one which has just taken place. He afterwards distinguished between one whose powers of ornamental drawing were well developed, and one who possessed great powers for mechanical drawing; the conclusion to which he came, quite accorded with my own experience.

There was one boy in the school about whom I felt particularly solicitous that he should pass an opinion. I brought him out, and Mr. Bridges immediately pronounced him to be quite "a Jim Crow sort of a fellow." I expressed great surprise at this, as I could manage him more easily than any other boy in the school. This, Mr. Bridges said, was owing to his great love of approbation; and I immediately discovered a clue to what was inexplicable before. The boy was one of the most orderly when in my sight, and the most turbulent when out of it, and for this I could not account until Mr. Bridges solved the mystery.

In conclusion, I may be allowed to add, that when Mr. Bridges entered the school, I had many and serious objections to Phrenology; but so correct were his statements, and so true his deductions, that many of those objections have vanished.

J. LANGTON, TEACHER.

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When Mr. Bridges first called upon me, at Wrexham, in order to test his Phrenological powers, I took him straight to the British School, at the Town Hall, containing upwards of 150 boys. Mr. B., at that time, was not acquainted with a single individual in the room. Upon our arrival, I privately desired the master, Mr. Langton, to call out the singing, the mental arithmetic, and the linear drawing classes, and to form them into one class. I then desired Mr. Bridges to tell me which was *the best tuneist*—the best timeist—the best calculator—and the best

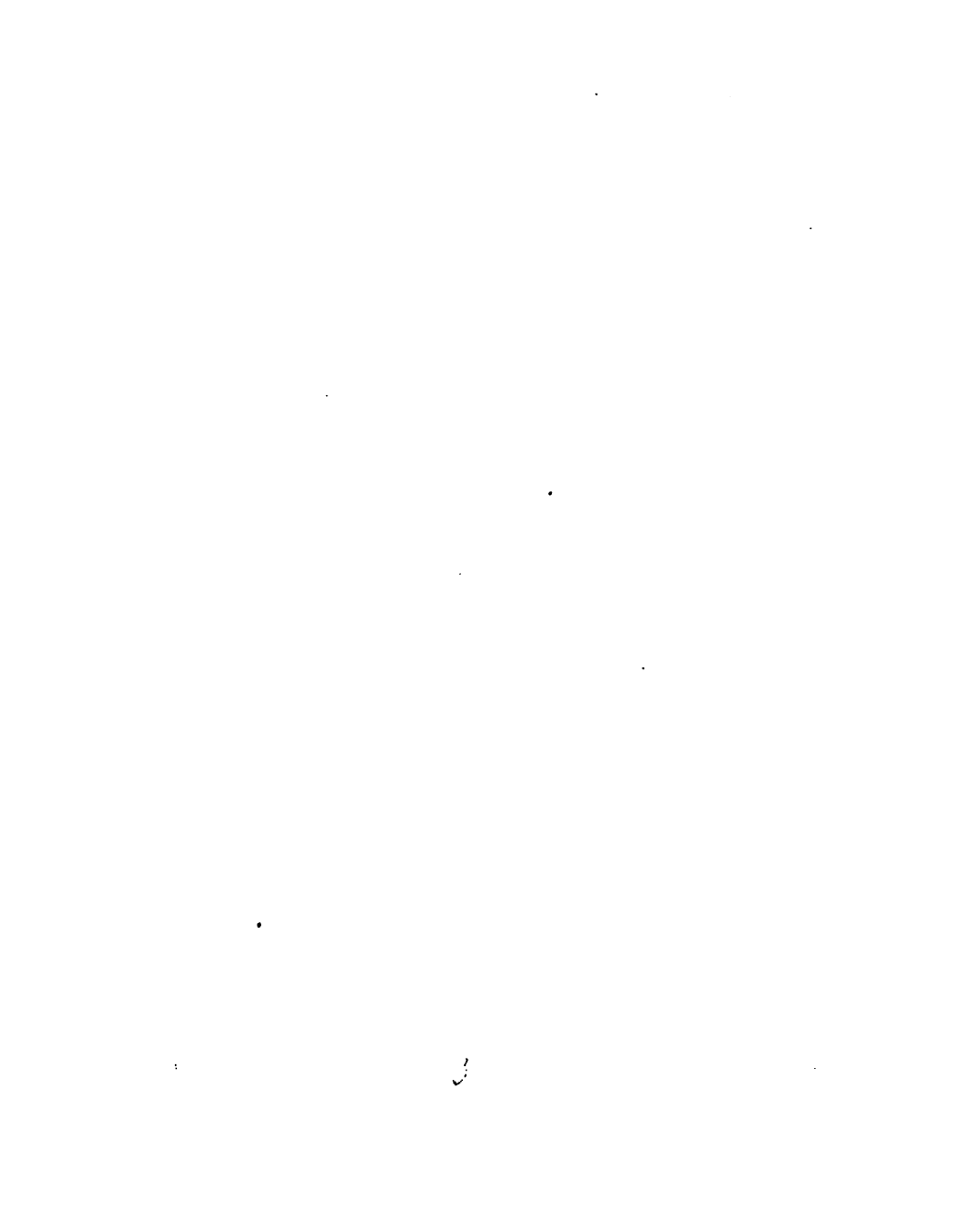
artist in the school ; which he at once did, to the astonishment of the master, who was previously totally unacquainted with the fact of Mr. B. being a Phrenologist. And, in order further to test his Phrenological powers, Mr. Langton quietly slipt a boy into the class who was celebrated for his backwardness in everything, and for his *guttlng* propensities. He asked Mr. Bridges in which of those branches, viz., those mentioned above, he thought *that* boy excelled? Mr. Bridges answered him : “ That boy will excel in digesting a beefsteak, or a can of porridge ! ”

All those boys which Mr. Bridges selected as excelling in the different classes, obtained first prizes at a public examination of the whole school, in the presence of upwards of four hundred persons.

G. LEWIS, SURGEON.

Wrexham, July 26, 1842.





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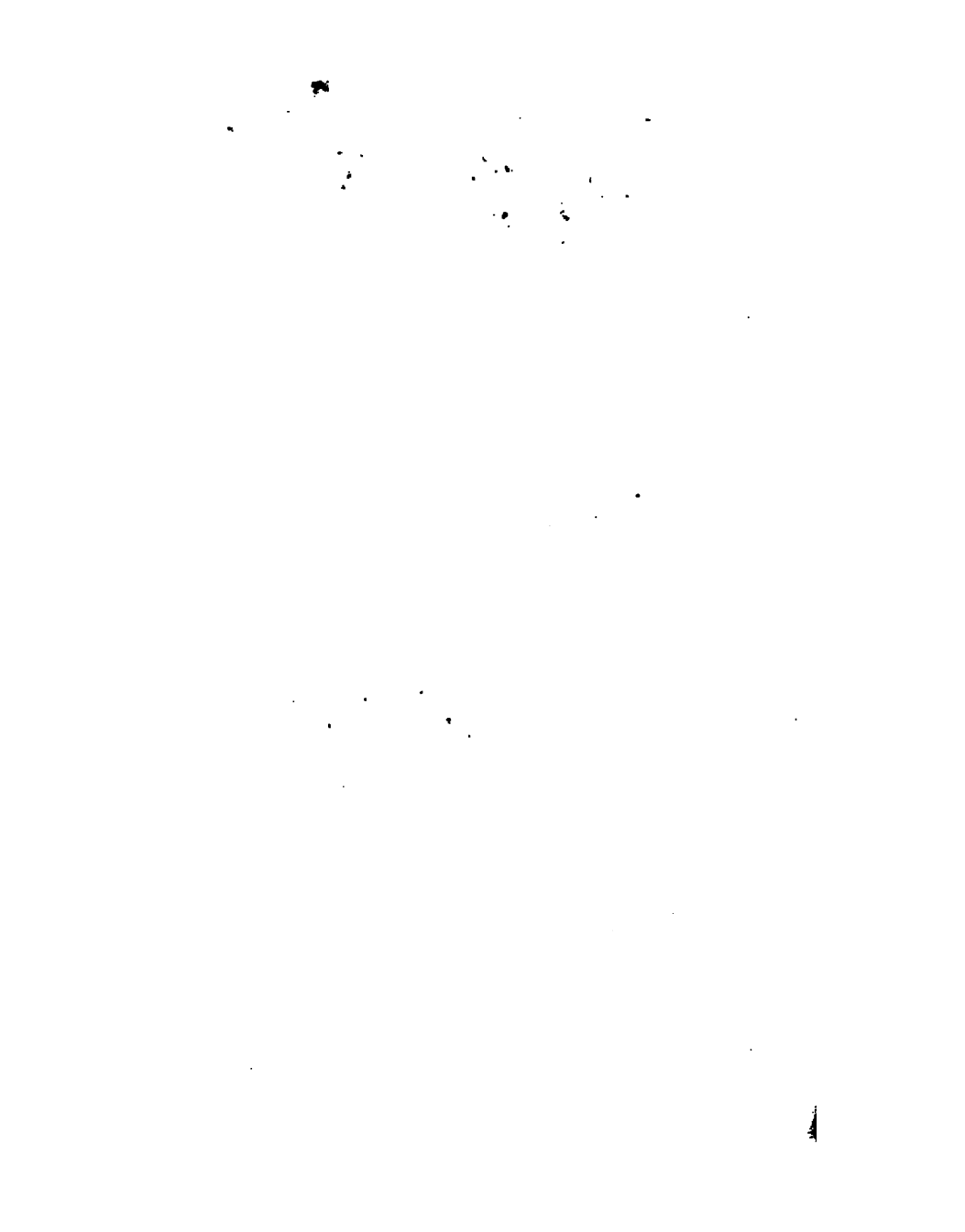
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