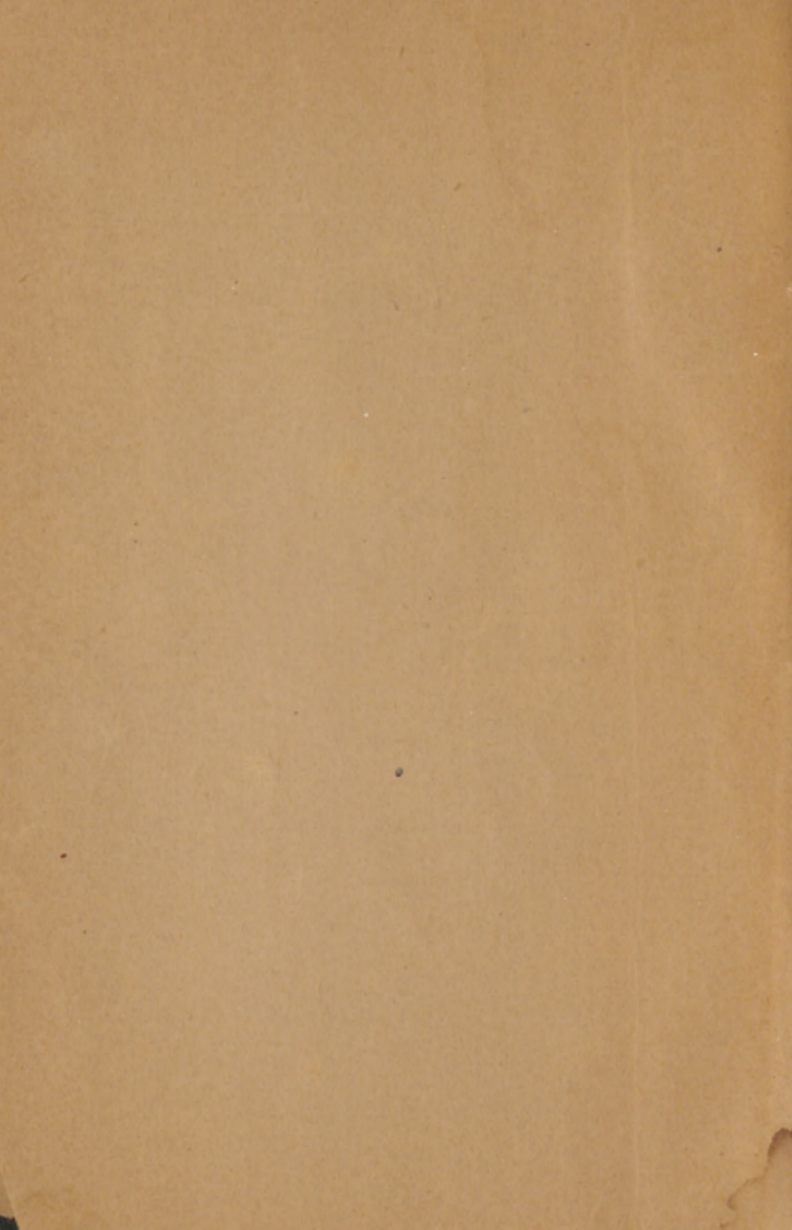




OUR BODIES

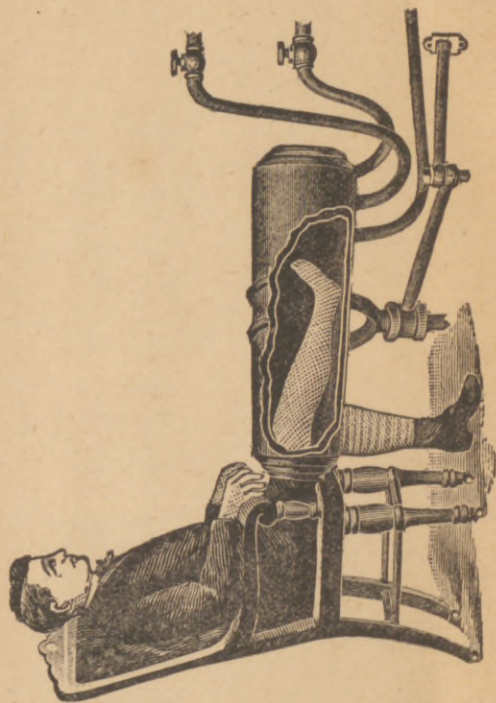




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VACUUM TREATMENT OF PARALYZED LIMB.

THE
HUMAN BODY
IN
HEALTH AND DISEASE

A TREATISE.

BUFFALO, N. Y.
THE ERIE MEDICAL COMPANY.

1893.

NLM

THE HUMAN BODY

IN HEALTH AND DISEASE.

As long ago as the sixteenth century, that wise physician and philosopher, Bischat, taught his disciples that the lamp of life was suspended on a tripod, the legs of which were circulation, respiration and nervous enervation. Any serious disease or injury to one of these caused the lamp to fall, and the blessed light was forever extinguished. Modern physicians, while accepting the truth of the axiom, have learned that many of the accidents and diseases that would have baffled the skill of the ancient brethren, under the light of science are amenable to treatment, and the person that under the old regimen would have been given over to the dark cold shadows, may have the lamp so steadied and strengthened that the traditional limit of three score and ten years may be passed in comfort.

Why this is true is, without doubt, due to the fact that we of the present day better understand the organs concerned, the functions they are to perform, and the changes that take place in the vital economy when they have fulfilled the duties they were intended to perform.

In considering the subject of circulation, we propose to speak of the fluid to be circulated, the changes that take place in it during the circulation, and the apparatus or system that carries it to every part of the body.

THE BLOOD varies in different parts of the body from a brilliant scarlet to a dark purple or nearly black color, alkaline in reaction and of a specific gravity of 1055, taking water as a standard of

1000. It consists of the watery portion, or the plasma, containing fibrin, albumen and salts and a large number of distinct cells or corpuscles swimming freely in the plasma. It is the natural movement of the blood in the vessels that keeps the globules thoroughly mingled during the entire period of life. They are of two kinds, white and red and found in proportion of about 300 of the latter to 100 of the former.

The red corpuscles of human blood are different in size from that of most animals, and by means of the microscope have been definitely measured, as well as those of most of the domestic animals, so that when an object that has a blood stain upon it, is given to an expert for examination, he may readily determine if it be the blood of a human being or one of the inferior animals.

The red globules of the blood serve mainly as the carriers of oxygen, which they receive from contact with the air in the process of respiration, and as they pass onward through the tissues in the vessels of the circulation, they part with it and in turn become loaded with carbonic acid, return again to the lungs and throw it off with the expirations of vitiated air from the lungs.

The precise physiological functions of the white corpuscles has not yet been determined, but it is evident that they do not play as important a part in the vital economy as the red.

Human blood contains 902 parts of water per 1000, and the balance is made up about as follows: Albumen 75, fibrine 3, fatty matter 2, mineral salt 8, other organic matter 9.

These are all intimately mingled in the blood plasma, in a fluid form by mutual solution and remain in about the same fixed and definite proportions during the time of health. The estimation of the whole mass of the blood in the human body is surrounded with many difficulties, but enough experiments of a nature to make the

tests reasonably satisfactory have been made, and the results show that for the average man weighing 145 pounds, the amount will not be far from eighteen pounds of blood.

GROWTH AND REPAIR are conditions that begin at the earliest moment of embryonic life and continue without cessation until the great battle of life is over. To meet these requirements this life giving fluid, the blood, enriched with the products of digestion, must at regular intervals be presented to each bone and sinew, nerve and tissue, and as it gives off to them its richness, it receives in return the waste and effete products and bears them away to part with them again to the emunctories (kidneys, liver, &c.,) whose office it is to cast them out of the body as no longer fitted to hold a place in the human economy.

This is accomplished by the circulatory system, and this is, first, composed of the heart, the great propelling organ; secondly, the arteries and arterioles, the vessels that convey the blood onward and in their course present it to the tissues; thirdly, the veins and capillaries that take it up again and return it to the heart and lungs for the unloading of its worn out materials.

THE HEART is a hollow muscular organ of conical form, placed between the lungs in an oblique position, the broad end attached to the great vessels by which it is held in position, the lower point extending to the space between the fifth and sixth ribs. It measures about five inches in length, three and one-half in breadth in its largest part, and is two and one-half inches in thickness.

ITS WEIGHT. In the adult male it weighs from ten to twelve ounces and about two ounces less in the female. It continues to increase in weight, length, breadth and thickness up to an advanced period of life, but this condition is more marked in men than in women. It is divided by a muscular septum into two

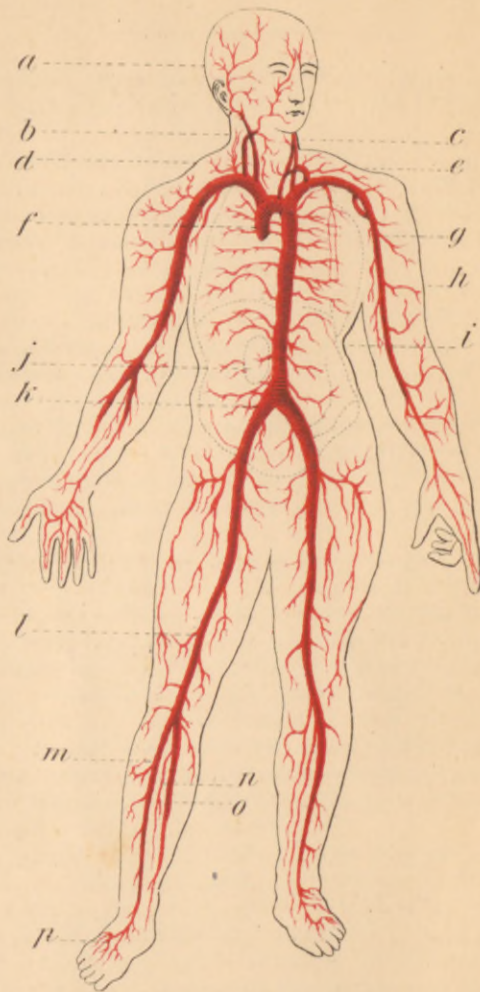
lateral halves, the right and left, and again by a transverse constriction, which divides it into the auricle and ventricle.

The right side receives into its auricle all the venous blood from the entire body. From this it passes in to the right ventricle, from thence it passes into the lungs through the pulmonary artery. The blood altered and changed by its passage through the lungs is received again into the left auricle by the pulmonary veins. From this it passes into the left ventricle, and from there is distributed by the aorta or great artery, and its subdivisions through the entire body. This constitutes the circulation in the adult.

THE CAVITIES of the heart are guarded by valves to prevent a regurgitation or backward flow of blood, and are named respectively tricuspid and semilunar. The former guards the opening between the auricles and ventricles, while the latter performs the same office for the pulmonary artery.

A NORMAL HEART BEAT consists of the filling and emptying the cavities of the organ, and in the healthy adult is accomplished from seventy to seventy-five times each minute, sleeping or waking, and yet many variations occur within the limits of perfect health. Position has something to do with quickening the beats; strong mental emotions, extreme old age, as well as infantile life, all have an appreciable effect on the beats as well as the force of this great engine of life.

The heart is kept at its work by the stimulus of the oncoming current of the blood, and if this is of a vitiated or unhealthy quality, the organ is correspondingly overstimulated or depressed, and when the quality falls below a given standard, it is no longer fitted to carry on the great functions of life, and the heart is said to fail, and as one of the legs of the "tripod" has fallen, out goes the lamp of life.



The Arteries.

a, temporal artery; *b*, carotid artery; *c*, vertebral artery; *d e*, subclavian artery; *f*, aorta, or great artery, leading from the heart; *g*, axillary artery; *h*, brachial artery; *i*, celiac artery; *j*, renal artery; *k*, iliac artery; *l*, femoral artery; *m*, posterior tibial artery; *n*, anterior tibial artery; *o*, peroneal artery; *p*, pedal artery,

SOME INTERESTING EXPERIMENTS have been made to determine the rapidity of the circulation, and within a short time it has been clearly demonstrated that the blood entering the right side of the heart in the adult male, will pass thence to the lungs, return to the left side of the heart throughout the entire circulation, and be returned to the original place of examination in the almost incredible short space of twenty-six seconds.

Physiological experiment has also proved that the normal heart with its every beat, exerts a force on the circulation of fifty-four pounds to each and every pulsation.

THE ARTERIES serve to convey the blood from both ventricles of the heart to every part of the body. These vessels were named arteries from the belief entertained by the ancients that they contained air.

The distribution of the arteries is like a highly ramified tree, the common trunk of which is formed by the aorta, commencing at the left ventricle of the heart, and extending to nearly every portion of the body and its members.

The larger trunks occupy the most protected situations that are least exposed to injury. *

Through the body generally the larger arterial branches pursue a perfectly straight course. They are found empty after death, as in their last contraction they force the blood into the veins. All arteries except the largest, have muscular tissue in their middle coat.

THE CAPILLARIES, or arterials, are the minute terminations of the arteries and the beginning of the veins having but a single coat. These intermediate vessels can have no office but to subdivide into fine network the blood, so it may afford nutriment by passage of the plasma through their walls, or in the glands allow secretion, or in the lungs expose

the blood to the air. Capillaries contract only by elasticity, so after being dilated, to return on withdrawal of pressure, to their ordinary dimensions. Yet two powers have been pointed out in them, contributing to the movement of the blood. One of these is common to plants, animals and some materials of an inorganic nature, viz., capillary action.

The other agency is the attraction which the tissues of the organism have for the nutritive materials circulating in its vessels. This vital or nutritive affinity is a *vis a fronta*, (the power in front,) which, as it constantly takes in nutrition from particles in the blood and the capillaries, must diminish pressure in resistance and favor the onward flow.

NATURAL AIDS.—Along the course of nearly all the veins, valves are found opening only towards the heart, economizing the power used in returning the blood through them. The pressure of the muscles during exercise contributes to the same end, so does inspiration by lifting the ribs, lessen the pressure of the heart's surface, exerting the same suction.

The larger veins have an appreciable amount of muscular tissue; the smaller ones none. The velocity of the blood movement is greater in the arteries than in the veins, while their capacity is about three times as great as that of the arterial system.

CIRCULATION.—Although hardly necessary we may recapitulate the round of the circulation: Beginning at the aorta the blood is distributed by its branches to all parts of the body. The smaller arteries terminate in capillaries, these subdivide the blood and supply the different organs. Then the capillaries unite to form the veins until finally all combine and end in the descending *venae cavae*. This empties into the right side of the heart, which by the pulmonary artery sends it to the lungs, thence by the pulmonary

veins it is brought to the left side of the heart, whence it is thrown again into the aorta.

RESPIRATION.

This function has for its purpose putting air into blood (aeration.) It is accomplished by the exposure of the venous blood brought from the right half of the heart to the air received into the air vessels of the lungs. The immense number of these vesicles (estimated at 600,000,000) provide a very large expansion of surface. Air and blood both periodically enter and pass through the lungs, although the blood is entirely confined within the capillaries. The heart sends a new supply of venous blood with every beat, the lung receiving a fresh quantity of air with each inhalation.

THE LUNGS are conical, with the apex above, and concave base lower behind, than in front. The right lung is the larger. It has three lobes, the left but two; together they weigh about forty-two ounces, less in the female. Their color is pinkish white at birth, mottled with slight patches in the adult, the patches growing darker with age.

The lung substance is light, spongy and crackling under pressure and floating in water. Removed from the chest the lungs collapse.

MOVEMENTS CONCERNED.—There are two movements concerned in respiration. Inspiration and expiration. The first is accomplished by expanding the chest so as to take pressure from the outside of the lungs, while the mouth and nostrils are open to allow the entrance of air. The expansion of the chest is effected in two ways; elevation of the ribs by the muscle concerned; second, depression of the diaphragm by its own contraction, in violent inspiration, as in asthma or croup. Other accessory muscles assist the intercostals and diaphragm. Ordinary expiration follows the cessation of the muscular

act of inspiration, not requiring any positive effort of muscular contraction. The weight of the ribs cause them to fall, the elasticity of the diaphragm makes it ascend, and the same property in the lungs induces their contraction and the expulsion of the air. The elasticity of the costal cartilages also assists with each respiration. A man changes about thirty to thirty-five cubic inches of air by forced respiration. One can expel a much larger amount, still a quantity will remain in the lungs which cannot be driven out.

THE VITAL CAPACITY.—A healthy man, five feet seven inches in height, can on an average expel from his lungs two hundred and twenty-five cubic inches of air. This is called his vital capacity. Women have about half the breathing capacity of men. The usual number of respirations in a healthy adult is from fourteen to eighteen per minute. The force of a full deep inspiration is calculated to be equal to a weight of four hundred and fifty pounds lifted.

CHANGES IN THE AIR BREATHED.

Common air consists of nearly seventy-nine volumes of nitrogen and twenty-one of oxygen, with about four parts in 10,000 of carbonic acid, a smaller amount of watery vapor and some non-essential gases. After passing through the lungs it becomes warmer, its oxygen is diminished, its carbonic acid and watery vapor increases.

From eight to thirty years of age in males, the amount of carbonic acid exhaled increases; from thirty to forty it is nearly the same; after that time it diminishes gradually. In females it is less than in males of the same age. It increases from eight years until puberty, and then remains stationary through the menstrual and child-bearing period of life.

An atmosphere containing five to six per cent. of carbonic acid gas is not capable of long sustaining life; ten per cent. produces immediate danger to life, and after

increasing that amount of carbonic acid in the air, it becomes fatal to breathe. Alcoholic drink diminishes it, exercise increases it, sleep diminishes it.

During sleep more oxygen is absorbed than in the waking hours, and is probably utilized at that time in construction and repair of tissue, not in consumption of fuel in the blood to generate force, in which the greatest amount of carbonic acid results. Nearly a pint of watery vapor is exhaled from the lungs in each twenty-four hours.

CHANGES PRODUCED IN THE BLOOD BY RESPIRATION.

The color of the blood is altered in the lungs from dark crimson or purple to bright scarlet. The blood also is one to two degrees warmer. It contains more oxygen and less carbonic acid and more fibrine. The introduction of oxygen gas and the elimination of carbonic acid gas, are, as already observed, the two great purposes of respiration; venous blood is that which has been by various influences, during its flow, rendered unfit for the support of the vital energy. Arterial blood has been revived by its purification and oxygenation.

When these changes are prevented, as in strangulation, drowning, or asphyxia by gases, the dark blood is unable to maintain the vitality of the nerve centres; and the blood ceases even to flow through the vessels. Drowning occurs, therefore, not from any direct injurious effects of the water in the lungs, but from the simple exclusion of air. So in some of the deaths from inhalation of chloroform. The cause, probably, has been the deficient admixture of air with the anaesthetic. That substance, however, is capable of causing fatal arrest of respiration, apparently by its toxic (poisonous) influence on the *madulla oblongata*, the nerve centre of respiration.

The process of respiration consists accordingly in an interchange of gases between the blood and the lungs, the blood coming to the lungs, poor in oxygen and

charged with carbonic acid, the former gas is absorbed from the air in the pulmonary vessels, while the latter is discharged by exhalation in breathing.

The office of the respiration apparatus is, therefore, to afford ingress and egress of the two substances which enter and leave the body in the gaseous form. They represent the beginning and the end of a series of internal combinations and decompositions, which are among the most essential of the changes contributing to the maintenance of life.

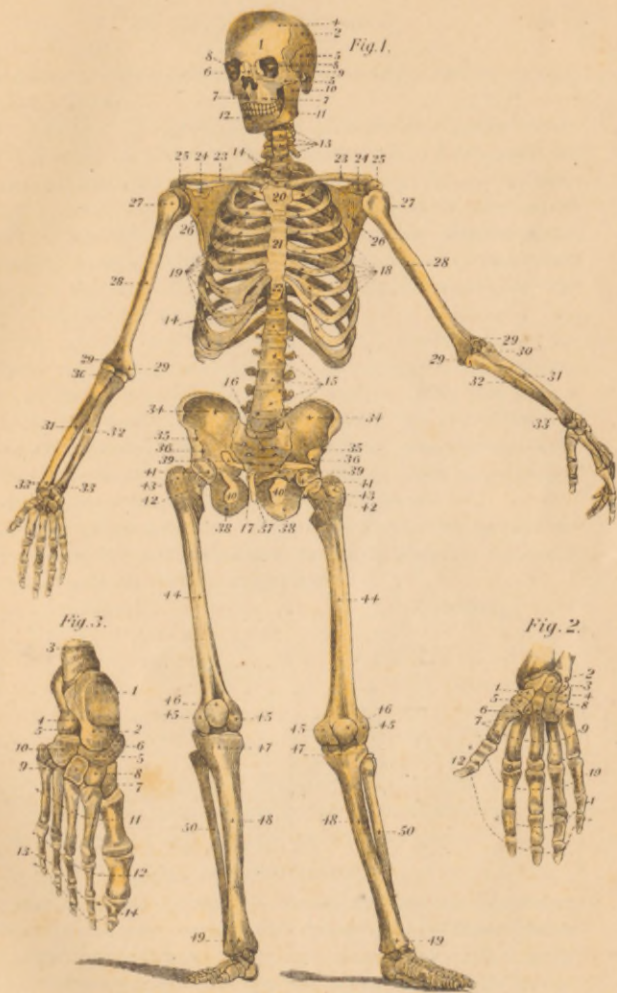
THE SKELETON.

In the bones of the skeleton, earthy and animal constituents are combined. Of the former there are 66.7 parts, and 33.3 of the latter. Phosphate of lime is the most abundant mineral material; being about 51 parts in the 100. The animal matter of bone is gelatinous, allied to cartilage; originally every bone is developed from cartilage by ossification. The mineral matter of bone increases with age, making the bone of the old more brittle. There is more of it also in some bones, and parts of bones, than in others.

The nutrition of the bone is secured by the blood plasma or lymph passing through these canals and cells, from the branches of the artery or arteries, which do not penetrate to nearly all its parts. The holes upon the surface of the bones are for their vessels.

By the shafts of the long bones being of a compact substance and hollow, while the ends are cellular and enlarged, the greatest strength is obtained with economy of material; while the articulations (joints) are thus adapted for motion as well as support. The principle of the hollow shaft is illustrated elsewhere, in nature, by the stems of the grasses, in science by the tubular bridge.

Bones are covered closely and lined by an external and internal periosteum. This is a delicate and yet firm membrane, supplied with blood vessels and of great



importance to the development, nutrition and repair of the bone itself.

GROWTH OF BONES.—In the foetus, bones commence their formation in temporary cartilages; in these as they grow, bony matter is deposited at and around the points or centres of ossification, which are different in number according to the complexity of the bone. Short bones may have but one such centre. The long bones may have one for the shaft and one for each terminal end.

The union between the end and shafts occurs at puberty, or during adolescence. Some flat bones, as the frontal, and those of the pelvis, are in early life bones of separate parts, which afterwards are consolidated together. Bones continue to undergo absorption and renewal of their particles to the end of life, as interesting experiments upon animals have shown.

In the adult skeleton there are 206 bones exclusive of the sesamoid and wormion bones, which are not uniform in number. They are of the

Cranium.....	8 bones.
Ear.....	6 “
Face.....	14 “
Os hyoids and sternum.....	2 “
Ribs.....	24 “
Vertebral column.....	26 “
Upper extremities.....	64 “
Lower “.....	62 “

The most convenient classification of the parts of the skeleton is into the head, trunk and extremities. The divisions of the trunk are the thorax and pelvis.

THE NERVOUS SYSTEM.

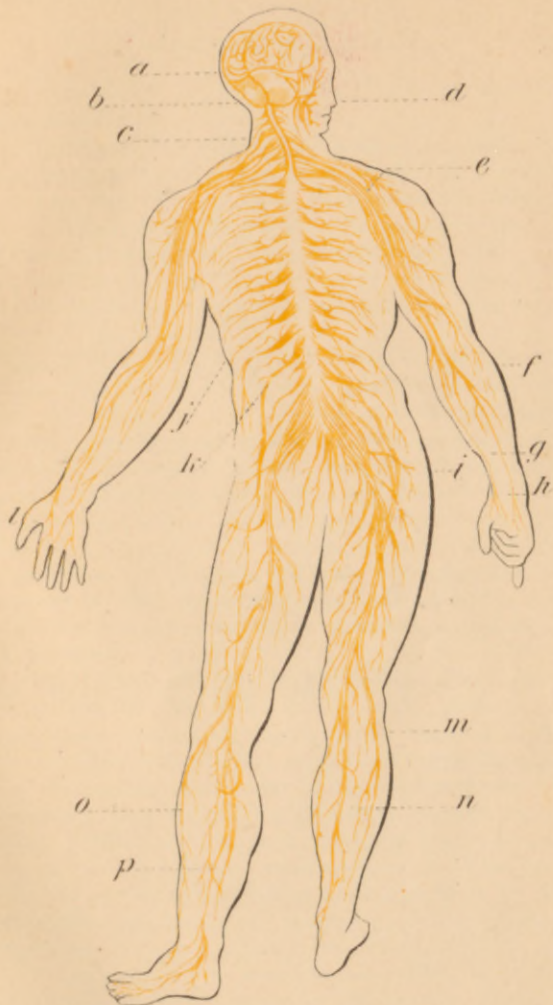
The nervous system is an apparatus of intercommunicating fibres and cells, disseminated throughout the body, and standing in anatomical connection with the various organs of the animal system. It has properties which are different from those of the other organized tissues, and the effect of its operation is to

bring the active phenomena of various parts of the body into a definite relation with each other, and with those of the outside world. It is therefore a medium of communication, by which the different animal functions are associated together in harmonious action, and are stimulated or modified according to the demands of the system itself or the varying influence of external conditions.

The nervous system consists of two kinds of nervous tissue, differing from each other in appearance, structure and physiological endowments. One of these is the *white substance*, composed of nerve fibres alone; the other is the *gray substance*, which contains, in addition to the nerve fibres, interstitial matter and nerve cells.

THE NERVE FIBRES are cylindrical filaments, arranged in bundles or tracts, in which they run, for the most part, in a direction parallel with each other. The structure of the nerve fibre, in its most complete form, presents three distinct elements, namely: an external tubular sheath, an intermediate medullary layer, and a central axis cylinder.

The nerve fibres are organs of communication. They serve as connecting filaments between the nervous centers on the one hand, and the peripheral organs of sensation and motion on the other. For this purpose they are endowed with a power of irritability by which, when excited at one or the other extremity, they transmit the nervous impulse throughout their entire length, and produce a corresponding effect at their opposite termination. Thus, the nerve fibres distributed to the skin, when excited at their outer extremities, produce in the brain a sensation corresponding to the external impression. On the other hand, those which are distributed to the muscles, when excited at their origin by



The Nervous System.

a, brain; *b*, cerebellum, or lower, or little brain; *c*, spinal marrow; *d*, facial nerve; *e*, brachial plexus, formed by the union of several nerves proceeding from the spinal marrow; *f*, internal cutaneous nerve of the arm; *g*, mesial nerve of the arm; *h*, cubital or ulnar nerve; *i*, sciatic plexus, giving rise to the principal nerve of the inferior members; *j*, intercostal nerves; *k*, femoral plexus; *l*, radial and muscular cutaneous nerve of the arm; *m*, *o*, external peroneal nerve; *n*, tibial nerve; *o*, external saphenous nerve.

the impulse of the will, produce a contraction in the muscular fibres.

The immediate effect of dividing or seriously injuring the nerve fibres is a suspension of their physiological function. The physical communication being cut off between their extremities, the sensitive fibres can no longer transmit an impression from the skin to the nervous centre, and the motor fibres can no longer convey the stimulus of voluntary motion from the nervous centre to the muscles.

THE NERVE CELLS. which form the characteristic anatomical element of the gray substance, are rounded or irregularly shaped bodies, consisting of a soft, semi-transparent, finely granular, albuminous matter, and containing a rather large, distinctly marked nucleus and nucleolus.

The nerve cells, and the gray substance of which they form a part, act as centres, in which the nervous impressions are received, and from which a stimulus is sent out through the motor fibres to the muscles. Every collection of gray substance is therefore called a "nervous centre."

MEDIUM OF COMMUNICATION. The nervous system thus stands as a medium of communication between different parts of the living body, so that a stimulus applied to one organ may excite the activity of another. This communication between adjacent or distant parts is never direct, but always a circuitous one. It passes invariably through an intermediate nervous centre, which receives the impression conveyed to it by nerve fibres from one organ, and reacts by sending out a stimulus which calls into activity the other. This is called the "reflex action" of the nervous system, because the stimulus is first sent inward to the nervous centre and then returned or reflected in the opposite direction. In this process, the intermediate act between the inward

and outward passage of the nervous stimulus is accomplished in the gray substance of the nervous centres.

IRRITABILITY. The property possessed by nerves of being called into excitement by an appropriate stimulus is termed their "irritability." This property is not confined to the elements of the nervous system, but exists in other tissues and organs. Thus a glandular organ, when excited, exhibits the phenomena of secretion; a muscle or a muscular fibre, that of contraction.

The irritability of the sensitive nerve fibres is most directly manifested during life, by the production of sensation. This sensation, however, does not exist in the nerve itself, but in the nervous centre where its fibres terminate.

ACTION. It is a matter of conscious experience that the operations of the nervous system require a certain time for their accomplishment. The action both of the senses and of the will is exceedingly rapid, but still is not absolutely instantaneous. Between the mental decision to perform a voluntary movement and its actual execution, there is a short but real interval of time, during which the nervous mechanism is called into activity.

In man and the vertebrate animals, the nervous system may be divided into two secondary systems, or groups of nervous centres with their fibres and nerves. These are the ganglionic or sympathetic, and cerebro-spinal systems.

THE GANGLIONIC or "sympathetic" system occupies mainly the great cavities of the body. It is connected by its nervous branches and ramifications with the internal organs concerned in the functions of nutrition, and more especially with the heart and blood vessels, and the organs of reproduction.

THE CEREBRO-SPINAL system, as its name indicates, is made up of the

brain and spinal cord as the great nervous centres, with the nerves which originate from them and which are distributed to the voluntary muscles and integument, the organs of special sense, and the commencement and termination of the internal passages of the body..

The spinal cord is a nearly cylindrical nervous mass, inclosed in the cavity of the spinal canal, commencing by a slightly enlarged extremity at the brain above, and terminating below in a conical point at the level of the first lumbar vertebra. Its inner portions are occupied by a gray substance, which forms a continuous chain of ganglionic matter, running from one extremity of the cord to the other.

The spinal nerves are given off from the cord at regular intervals and in symmetrical pairs; one pair for each successive portion of the body, their branches being distributed to the integument and muscles of the corresponding regions.

THE BRAIN, or "encephalon," is that portion of the cerebro-spinal system contained in the cranial cavity. It forms a more or less rounded mass of nervous matter, consisting, as in the spinal cord, of right and left lateral halves which remain connected with each other by their central parts.

The construction of the brain, as a whole, may therefore be represented by considering it as a double series of nervous centres or deposits of gray substance, of varying size and position, connected with each other and with the spinal cord by transverse and longitudinal tracts of white substance.

In man, the development of the cerebral hemispheres reaches its highest point, so that they preponderate completely over all other nervous centres in the cranial cavity.

THE SPINAL CORD is that part of the cerebro-spinal system which is contained within the spinal canal, and which sends its nerves

to the muscles and integument of the trunk and limbs. It consists externally of white substance, forming longitudinal tracts of nerve fibres, the continuations of which make connection with those of the brain above; and internally of gray substance arranged in two symmetrical bands occupying the central portions of its right and left lateral halves. It is so constituted, therefore, as to act in a double capacity: first, as an organ of nervous communication between the brain and the external parts; and secondly, as an independent nervous centre, with endowments and functions of its own.

The spinal cord, as a medium of nervous communication between the brain and the external parts, exerts a crossed action. That is, the sensitive impressions received by the integument on one side of the body are conducted through the cord to the opposite side of the brain; and the voluntary motor impulses which originate on one side of the brain pass to the nerves and muscles on the opposite side of the body.

So far as the spinal cord is concerned in the phenomena of sensation and voluntary motion, it acts as a medium of communication between the brain, where consciousness and volition reside, and the integument and muscles of the external parts.

Another important action of the spinal cord, as a nervous centre, consists in its control over the sphincters and the organs of evacuation.

While the small intestine, the cæcum, and the colon are supplied exclusively with nerves from the abdominal plexuses of the sympathetic system, the lower portion of the rectum receives branches from the sacral plexus of spinal nerves, which are distributed both to its mucous membrane and its muscular apparatus. The lower part of the large intestine acts in a great measure as a temporary reservoir, in which the feces, brought down from above by peristaltic movement, accumulate until the time arrives for their evacuation. The rectum,

in man. is usually empty, or nearly so, until shortly before evacuation; and when the fæces begin to pass into it from above, it is still capable of retaining them for a certain period. Their retention and discharge are provided for, in this part of the alimentary canal, by two sets of muscular fibres; namely, first, the *sphincter ani*, which keeps the orifice of the anus closed; and secondly, the *levator ani* and the circular fibres of the rectum itself, which by their contraction open the anus and expel the fæces. Both these acts are regulated by the reflex influence of the spinal cord.

THE URINARY BLADDER is also an organ both of reservoir and evacuation, which is protected by the circular bundle of muscular fibres at the commencement of the urethra, known as the *sphincter vesicæ*. While the nerves distributed to the kidneys are derived exclusively from the *cæliac plexus* of the sympathetic system, those of the bladder consist partly of sympathetic filaments from the mesenteric ganglia, and partly of cerebro-spinal filaments from the lumbar portion of the spinal cord, both of these sets having united in the abdomen to form the hypogastric plexus.

Diseases or injuries of the spinal cord which cause complete paraplegia, also usually produce a paralysis of the bladder. So far as regards contraction of the bladder itself, therefore, this act is under the influence both of the sympathetic and cerebro-spinal systems; but its most energetic stimulus is derived from the spinal cord through the sacral nerves.

THE BRAIN.

The brain, or encephalon, comprises all that portion of the cerebro-spinal axis which is contained within the cavity of the skull. It consists of a variety of nervous centres, or collections of gray substance, connected with each other and with that of the spinal cord by tracts of

nerve fibres. The results of experimental investigation leave no doubt that each one of these different nervous centres has a special function, more or less independent of the others in its immediate action, though necessarily connected with the rest in the production and external manifestation of the nervous phenomena. The largest of these nervous centres forming in man nearly four-fifths of the mass of the entire brain, are the two masses known as the "hemispheres" of the cerebrum or front brain.

The importance of the hemispheres, in connection with the higher manifestations of nervous action, is sufficiently indicated by their excessive development in man, as compared with the other portions of the brain. For while in the lower animal they are of medium size, and in reptiles and fish are sometimes hardly larger than the other nervous centers of the brain, in man they acquire such an extension as to cover and surround almost completely every other part.

Notwithstanding the evident importance of the hemispheres as special parts of the nervous system, the first act certainly known in regard to them is that they are not, even in man, directly essential to life. That is to say, they do not hold under their immediate control any of the physiological acts, like those of respiration and circulation, which are necessary to the continuance of vitality. They often influence these acts, in an indirect manner, by the sympathetic connections of the nervous system; but life will continue for a certain period under the influence of other nervous centres, without the aid of the cerebral hemispheres.

The cerebral hemispheres as a whole are therefore evidently the centres in which the nervous mechanism of mental action is accomplished. The mental endowments which are concerned in the manifestations of the intelligence are mainly the memory, the reason and the judgment.

MEMORY is the simplest and most essential of these faculties for the due performance of intelligent acts. The recollection of names, and of the objects to which they belong, is indispensable even to the use of language; and a deficiency of memory seems often to be the immediate condition upon which the incapacity of idiotic children to talk depends.

THE REASON may be considered as the faculty by which we appreciate the character of the nervous impressions received, and are enabled to refer them to their external source. This is quite different from the simple power of perception, which continues, as experiment has demonstrated, after the removal of the cerebral hemispheres. The mental action which is excited by an impression coming from without is one which transfers the attention from the internal sensation to its external source; and when this action is prompt and effectual, we at once acquire an idea of whence the impression originated and what is its significance. The perfection of this quality consists in the certainty with which it appreciates the relation between an effect and its cause, and the relative importance of different phenomena. This capacity is deficient or absent in idiots, and consequently they cannot avoid dangers or provide for their necessities. For the same reason it is useless to punish an idiot, because, although he may feel the pain inflicted, he does not refer to it as a consequence of any previous action of his own. A deficiency of the same quality in the insane, or in those in whom it is naturally imperfect, produces a want of power to comprehend the importance and connection of different events. They are said to be "unreasonable," because they expect results which are unlikely to follow from certain causes, and because they assume the existence of causes which are not really indicated by the results.

THE JUDGMENT is the faculty by which the appropriate means are selected for the

accomplishment of a particular end. Its exercise requires the existence of reason and memory, which supply the necessary conditions upon which it is based; but its own action is one which looks to the future rather than to the past. An individual in whom the judgment is well developed employs, under the guidance of experience, means which are well adapted to attain the end he has in view; one who is deficient in this respect resorts to means which are insufficient or inappropriate, and is consequently unsuccessful. Whether the act performed in this manner be a simple mechanical operation, like that of shutting a door to exclude the cold, or a complicated plan involving many parts, the mental process is the same in kind, and differs only in degree; its essential character being that it is an intelligent act, based upon an understanding of the previous conditions, and intended to accomplish a definite result.

It is evident that all such manifestations of intelligence, taking place through the brain, are reflex actions. Their starting point is a sensation coming from without, which gives rise in the mind to a succession of internal operations, terminating in an intelligent impulse. This is reflected from within outward, and thus finally calls into action the nerves or voluntary motion. There can be little doubt that the intermediate process, between the sensation and the impulse, takes place in the gray substance of the brain.

There is no question that the power of language resides somewhere in the hemisphere of the brain.

The *medulla oblongata* is the seat of reflex actions which are directly or indirectly connected with the immediate preservation of life, since it maintains the movements by which air and food are introduced into the interior of the body. It also presides over the immediate muscular combinations concerned in the production of the voice and articulation, and by this means establishes an intelligible communication with the external world.



Diagram of the Sympathetic Nerves.

THE SYMPATHETIC NERVOUS SYSTEM.

The sympathetic system of nerves, when compared with the cerebro-spinal system, presents anatomical peculiarities of arrangement and distribution so distinct and noticeable, that it is naturally regarded as occupying a place by itself. The slender double cord of its main trunk extending throughout the great cavities of the body, the number and scattered position of its ganglia, which are united with each other only by filaments of small size, the frequent and plexiform arrangement of its branches, and the distribution of its terminal fibres to the organs of circulation and nutrition, all form a well marked group of features by which it is easily recognized. But notwithstanding the general importance of these characters, the sympathetic nerves and ganglia do not constitute a separate and independent nervous system. Neither the minute structure of their anatomical elements, nor their external connections, are essentially different from those of the cerebro-spinal nerves and nervous centres.

THE SYMPATHETIC SYSTEM consists of a double chain of nervous ganglia, running from above, downward along the front and sides of the spinal column, and connected with each other by longitudinal filaments. Each ganglion is reinforced by motor and sensitive fibres from the cerebro-spinal system, and thus the organs under its influence are brought indirectly into communication with external objects and phenomena. Its nerves are distributed to glands and mucous membranes, many of which are destitute of general sensibility, and to muscular parts which are removed from the control of the will. The sympathetic ganglia are situated successively in the head, neck, chest and abdomen; and in each of these regions are connected with special organs by their fibres of distribution,

IN THE ABDOMEN the continuation of the sympathetic system consists mainly of the aggregation of ganglionic enlargement situated upon the coeliac artery, known as the semilunar or coeliac ganglion. From this ganglion a multitude of radiating and inosculating branches are sent out, which, from their common origin and their diverging course, are termed the solar plexus. From this other plexuses originate, which accompany the abdominal aorta and its branches, and are distributed to the stomach, small and large intestines, spleen, pancreas, liver, kidneys, suprarenal capsules, and internal organs of generation.

THE INFLUENCE of the sympathetic nerve undoubtedly serves as a medium of reflex action between the sensitive and motor portions of the digestive, excretory, and generative apparatus; and it is certain that it takes part in reflex actions in which the cerebro-spinal system is also interested.

THE LYMPHATIC SYSTEM.

In addition to the connected series of canals by which the blood passes in continuous round through the arteries, capillaries, and veins, there is also a system of vessels, leading only from the surfaces toward the centre, and discharging into the great veins near the heart the fluids which have been absorbed in the solid tissues of the body. The fluid contained in these vessels is nearly or quite colorless, especially in thin layers, and from its transparent and watery appearance is called the "lymph," and the vessels themselves constitute what is known as the lymphatic system.

As the blood circulates through the capillaries under the pressure of the arteries, certain of its ingredients pass out through walls and penetrate the tissues. In the normal state of the circulation, this fluid, which is the real source of nutrition for the solid parts does not stagnate in contact with them, but is renewed by a continual



Lymphatic System.

change. As fresh supplies need to be drawn from the circulating blood, the older portions are removed by absorption and return to the centre of the circulation by the lymphatic vessels. The blood, containing the red globules, requires to be rapidly and abundantly returned to the lungs by the veins, in order to retain the oxygen necessary for its continued vitality; while the lymphatic collect more gradually the fluids which have served for the slower process of nutrition and growth.

IN STRUCTURE the lymphatics do not essentially differ from the blood-vessels, their peculiarity being that their walls are more delicate and transparent. They are more abundant in organs which are fully supplied with blood-vessels, and are absent in tissues where blood-vessels do not exist.

FROM THEIR ORIGIN the lymphatic vessels pass inward toward the great channels and cavities of the body, uniting into larger branches and trunks, and following generally the course of the principal blood-vessels and nerves. Along their course the lymphatics pass through hard pinkish little bodies of all sizes from that of a hemp seed to an almond. These bodies are called *glands*, and often enlarge by disease so that they may be felt.

During the passage of the blood through the capillary blood-vessels a variety of actions take place, by which some of its ingredients are given up to the tissues and are at the same time replaced by others derived by absorption from the adjacent parts.

SECRETION AND EXAMINATION OF THE URINE.

The worn-out products of tissue and the useless matter of the food are thrown off from the body in the breath, the fæces, and the urine. The carbon of the tissues is exhaled from the lungs, the insoluble and unavailable portions of the food are excreted by the intestines, while urine contains essentially the nitrogenous and other soluble products of tissue change.

Hence it is that examination affords the means of estimating the nature and degree of the waste and change going on from time to time in the various organs and tissues of the body. No other product of the body, therefore, possesses such interest to the medical practitioner, as no other can throw the same light on the organic processes of the diseased as well as the healthy body.

The quantity of urine passed in twenty-four hours by a healthy adult, eating and drinking moderately, may be estimated at from forty to sixty ounces.

In health the secretion of urine is increased during hours of mental and physical activity, and is diminished during sleep. If these conditions be reversed, it usually means chronic rectal trouble or diabetes.

Healthy urine gives a light foam, which disappears quickly; but in saccharine urine and in most urines of a high specific gravity the foam remains for a considerable time.

Urine sometimes shows, in cases of urethral or prostatic inflammation, besides a few puscells, a number of thready fibres floating through it. These are the so-called "gonorrhœal threads" which, though very common in chronic gonnorrhœe and gleet, are seen in many other inflammatory lesions of the deeper part of the urethra.

Urine has a characteristic aromatic odor in health, which varies in intensity, being usually stronger when the percentage of solids is high. Diabetic patients often exhale a peculiar ethereal odor.

The color of urine is normally golden or amber yellow, but may vary in health from very pale yellow or colorless to red or reddish-brown.

Dark urine usually indicates the presence of some abnormal pigment, and suggests further examination.

The specific gravity of the mixed urine of twenty four hours is normally about 1.020, but is of course influ-

enced in health by all causes that affect either the quantity of water or the quantity of solids excreted by the kidneys.

The chief abnormal substances that are held in solution in urine are: Albumen and allied proteids, blood, sugar, acetone and allied substances, biliary constituents, fat, cystin, leucin and tyrosin, abnormal pigments. Under urine sediments may be classed chiefly those substances that are carried from the body suspended in the urine, such as epithelium, mucus, shreds of tissue, casts, spermatozoa, parasites, fungi, etc.

Spermatozoids, when present in quantity, form a light flocculent cloud, but there is rarely anything to indicate their presence. A high power microscope (400 diameters) is necessary for their recognition. They are seen as small oval bodies with delicate tails. Their recognition is often of great importance in medico-legal cases.

Urine may be preserved in hot weather, by adding to the bottle a little salicylic acid, about one grain to the ounce. This in no way alters the microscopical appearance of the sediment or interferes with the chemical reactions of the fluid.

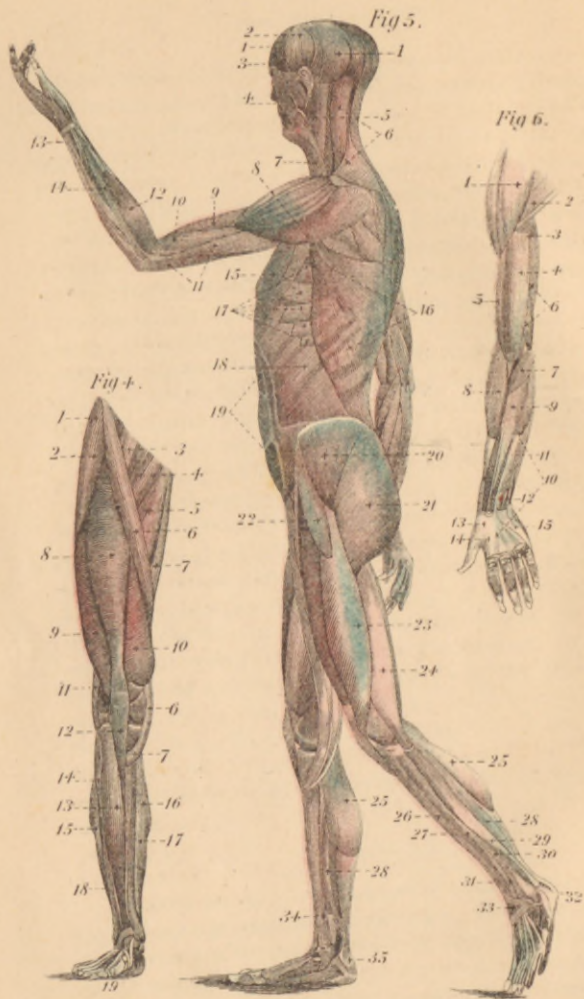
REGULAR AND SUFFICIENT ACTION of the kidneys is as important to health, nay, even more so than irregularity of the bowels. The kidneys remove from the blood those effete matters, which, if permitted to remain would speedily destroy life,—uric acid, urea, urates, etc. It may likewise contain various other matters, the result of certain abnormal changes taking place in the system, as phosphates, oxalate of lime, grape sugar, pus, albumen, etc., the presence of which, affords the practitioner a true indication of the peculiar character of those changes. When the functions of the kidneys become imperfectly performed, or suspended, the above matters, urea and urates, are retained in the circulation, giving

rise to affections of the kidneys, dropsy and many other serious diseases. A total suspension of the urinary discharge will occasion death in from thirty-six to forty-eight hours. When the urine is voided in small quantities at a time, or when there is a disposition to urinate more frequently than natural, or when the urine is high colored, or scalding, these are indications of some derangement in the system, and means should be employed to stimulate the kidneys, or cause them to excrete an increased quantity, or proper quality, of urine. If the cause of the difficulty be not known, an attempt may be made to regulate the action of the kidneys by an infusion of parsley root, or of queen of the meadow root, or of hair-cap moss, etc.; the use of many fruits, as whortleberries, watermelons, grapes, apples, etc, will frequently restore the organs to a healthy condition.

Should these simple means fail to effect any relief, the difficulty then assumes a more serious aspect, as it may be connected with certain acute or chronic affections of one or more of the organs of the body. Under such circumstances the difficulty should not be trifled with by delay or self-treatment; a physician should at once be consulted, who if he be thoroughly versed in his profession, and a skillful practitioner, will not only make a minute inquiry relative to all the various symptoms of the case, but will subject the urine itself to a careful chemical and microscopical analysis, that he may, from its constituents, understand the character of the changes taking place.

THE MUSCLES.

The skeleton is the image of death. Its unsightly appearance instinctively repels us. We have seen, however, what uses it subserves in the body, and how the ugly looking bones abound in nice contrivances and ingenious workmanship. In life, the framework is hidden by the flesh. This covering is a mass of muscles,



The Chief Muscles.

which not only give form and symmetry to the body, but also produce its varied movements.

The peculiar property of the muscles is their power of contraction. It does not cease at death, but, in certain cold-blooded animals, is often noticed long after the head has been cut off.

The muscles are nearly all arranged in pairs, each with its antagonist, so that, as they contract and expand alternately, the bone to which they are attached is moved to and fro.

There are two kinds of muscles, the *voluntary*, which are under the control of our will, and the *involuntary* which are not. Thus our limbs stiffen or relax as we please, but the heart beats on by day and by night. The eyelid, however, is both voluntary and involuntary, so that while we wink unconsciously, we can also control the motion.

Each muscle is composed of a multitude of tiny fibers.

The binding of so many threads into one bundle confers great strength. We see this illustrated in suspension bridges, where the weight is sustained by small wires twisted into massive ropes.

The ends of the muscles are generally attached to the bone by strong, flexible, but inelastic tendons.

EXERCISE.

By use, the muscles grow larger, and become hard, compact and darker-colored; by disuse, they decrease in size, and become soft, flabby and pale. Exercise also sets every organ in the body at work. The lungs, skin, and kidneys—the scavengers of the body—hasten to remove waste matter, and a healthful glow succeeds.

Violent exercise, however, is injurious, since we then tear down faster than nature can build up. Feats of strength are not only hurtful, but dangerous. Often the muscles are strained or ruptured, and blood-vessels burst in the effort to outdo one's companions. Even so

simple an amusement as jumping the rope, carried to excess, has been known to cause sudden death.

Do not exercise when very hungry, nor immediately after a full meal. Only the strong and healthy should exercise before breakfast, as in early morning, the pulse is low, the skin relaxed and the system susceptible to cold. Weak and delicate persons, therefore, need to be braced with food before they brave the out-door air.

WONDERS OF THE HEART.

This marvelous little engine throbs on continually at the rate of 100,000 beats per day, 40,000,000 per year, often 3,000,000,000 without a stop. Its vitality is amazing. Lay upon the table the heart of a freshly-caught sturgeon, all palpitating with life, and it will beat for days as if itself a living creature. The most tireless of organs while life exists, the heart is one of the last to yield when life expires. So long as a flutter lingers there, we know the spark of being is not quite extinguished, and there is hope of restoration. During a long life it will propel half a million tons of blood, yet with unflinching labor repair itself as fast as it wastes, patiently keeping up the play of its valves and the rhythm of its throb till "the wheels of life stand still."

WONDERS OF RESPIRATION.

The perfection of the organs of respiration challenges our admiration. So delicate are they that the least pressure would cause exquisite pain, yet tons of air surge to and fro through their intricate passages, and bathe their innermost cells. We yearly perform at least 7,000,000 acts of breathing, inhaling 100,000 cubic feet of air, and purifying over 3,500 tons of blood. This gigantic process goes on constantly, never wearies or worries us, and we wonder at it when science reveals to us its magnitude.

THE SKIN.

The skin with which the whole exterior surface of

the body is covered, is a dense, thick, membranous layer, composed of stout fibers, that are interlaced or plaited together somewhat in the manner of a woolly substance of which a hat is made. Numerous nerves and blood vessels, called, from their very small size, capillary or hair-like vessels and nerves, fill the skin so thoroughly, that it is not possible to pierce any part of it with the finest cambric needle without causing one or more drops of blood to flow out, and at the same time producing more or less pain.

Besides the nerves or blood-vessels, there are numerous other vessels, terminating upon the surface of the skin in minute openings, commonly known as the "pores of the skin," whose action is to remove from the blood an oily substance, together with the matter of which perspiration is formed, thereby not only keeping the surface of the skin soft and moist, but likewise removing from the blood an immense amount of decomposed or used up particles, which would give rise to serious disease, were they not purged out, as it were, from this fluid by these perspiratory vessels.

THE PERSPIRATION passed off through the pores of the skin is of two kinds, one termed the sensible, and the other the insensible perspiration. The insensible perspiration is that which passes off in such minute amount as to be hardly noticed by a person. It is constantly passing from the skin, when this is in a healthy condition, as may at any time be known by placing the hand in a glass vessel which has been wiped quite dry, and then closing the open end by winding a cloth or towel around the wrist and mouth of the vessel. In a short time the inner surface of the glass vessel will become dimmed by the condensation of the insensible moist perspiration of the skin upon it.

Sensible perspiration is that which stands upon, or flows from the skin in drops, and is usually known by the name of "sweat." Persons sweat when they are much

warmer than usual, during hot seasons, and when there is a great excitement of either the mind or body, from any cause whatever. It is often so profuse in quantity as to completely saturate the clothes of those from whom it issues.

It may be a matter of astonishment to many to be informed of the great amount of used-up matter that passes from the system. According to experiments made by Carpenter, Cruikshanks and others, from eleven to forty grains is thrown off every minute, or from thirty-three to one hundred and twenty ounces per day. And this, it must be recollected, has only reference to the insensible perspiration, the sensible being of course much greater.

REPRODUCTION.

The essential condition of reproduction is the union of two opposite polar or sexual cells, the germ cell and the sperm cell. In the higher animals, as in man, these are always the products of the different bodies having concomitant sexual peculiarities. Among the lower forms of animal and vegetable life true hermaphroditism is sometimes met with as in the tape worm. Still, even if the united cells do not exhibit any palpable differences, the principle of duality seems to be universal in reproduction. Apparent exceptions exist to this law in several instances.

SEEMING EXCEPTIONS occur in reproduction without impregnation and the alternation of certain animals whose off-springs are quite different from themselves. Careful examination, has, however, shown that while it may sometimes be deferred for several generations sexual unions at intervals always occur. This is not necessarily in the bodies of the animals, as in the case of the fishes. The spawn or milt meet in the water outside of both parents. Parasites within the cavities of the human and other animal bodies were once a serious puzzle to scientists.



Testicle exposed.



Vertical Section of the Testicle, to show the Arrangement of the Ducts.

It is now well understood, however, that all of them must be and can be shown to be, derived from other like or unlike forms, whose germs enter the body through the skin, in food or drink, or after being variously deposited as eggs. So the tape worm comes from the *cysticercus* swallowed while very small in food.

SOME FACTS have often suggested the idea of spontaneous generation. That is, of the springing up of life in previously inanimate organic matter. Vegetable and animal life do certainly appear often on the surface of decaying liquids and solids without visible source of origination. Any infusion of organic matter left exposed to the air for some days in warm weather will display under the microscope a number of minute but distinct growths. These, at least those whose motions give the idea of animality, are called infusoria. Do they ever begin to exist without previous germs?

OF WOMAN the ovary is the primary organ of reproduction. In it the ova are produced and once a month an ovum is thrown off by the fallopian tube into the uterus. The graafian vesicles are the minute sacks or cavities in which the ova are formed. Each undergoes certain changes before and still more after its rupture and the discharge of the ovum. There is then left a small mass called the corpus luteum. This is the larger and persists considerably longer when pregnancy occurs, but the difference is not sufficiently marked to afford certain evidence of impregnation, if not impregnated by sexual intercourse. The ovum is then carried out by the mucus and bloody menstrual discharge from the uterus or womb.

THE ESSENTIAL ORGANS of reproduction in man are the testicles. In the seminal fluid are multitudes of spermatozoa on which its generative potency depends. These are microscopically minute bodies 1-600 of an inch long, each with a

triangular head and elongated tapering tail, moving incessantly, while their vitality continues. This motion, suggesting the idea of animality, gave rise to their name, but they are well understood to be cell filaments, with a motility like that of some other reproductive forms, vegetable as well as animal, but not animalcular themselves.

Each spermatozoa may be a ciliated cell with but one cilium or tail. When the spermatozoa become dry and are subject to extreme heat or cold, or to disorganizing agents of any kind, they cease moving directly. Otherwise, it is probable that sometimes (in the genital organs of female, for instance after coitus) they may retain their vitality for hours and even days.

THE FORMATION of the spermatozoa is as follows: At and after puberty there are formed in the seminiferous tubes of the testicles, certain vesicles, each containing from one to twenty nuclei with nucleoli in them. In these vesicles, probably from the the nuclei, the spermatozoa are developed in bundles, then the vesicles give way and disappear and the spermatozoa are set free in the ducts with a very small amount of fluid.

This mingling of the spermatozoa occurs in the head of the testicle. Passing through the organ a glary mucus is added, and the material is accumulated in the seminal vesicles.

When the sexual orgasm takes place contraction of surrounding muscular fibres expels the semen from the seminal vesicles into the urethra; there it receives the secretions of the prostate gland, the glands of Cowper, and of mucus follicles of the urethra, all of which are excited together by the act of coition. Entrance of the seminal fluid into the uterus is necessary for impregnation. Sometimes certainly, perhaps usually, a portion of it passes through the fallopian tube to an ovary.

MALE ORGANS OF GENERATION.

The male organs of generation are the penis and testes, with their appendages.

The *Penis* contains in its interior the larger portion of the utera, and is divided by anatomists into a root, body and extremity, or *glans penis*.

The root is broad and firmly connected to the rami of the pubes by two fibrous processes, termed the *crura*, and to the front of the symphysis pubis by a fibrous membrane, the *suspansory ligament*.

The *extremity* or *glans penis*, resembles an obtuse cone, with a verticle slit in its apex, termed the *meatus urinarius*, orifice of the urethra. At the back part of this orifice is a fold of mucus membrane passing backward to a depressed raphe, termed the *froenum preputii*. The rounded projecting border of the base of the glans is termed the *corona glandis*; behind the corona is a deep constriction, the *cervix*. On each of these parts are numerous lenticular glands, the *glanduloe tysonii seu odoriferoe*, which secrete a sebaceous matter of a peculiar odor.

The body of the penis is covered by integument remarkable for its thinness and the absence of adipose tissue. When erect it becomes somewhat triangular in form, with rounded angles, the broadest side called the *dorsum*, being upward. At the neck of the glans the integument leaves the surface of the penis and becomes folded on itself forming the *prepuce*.

The penis is composed of erectile tissue inclosed in three cylindrical fibrous compartments. Two of these compartments, the *corpora cavernosa*, are arranged side by side along its upper part; the third, the *corpus spongiosum*, is placed below and encloses the urethra.

The *Corpora Cavernosa* consists of two fibrous cylindrical tubes, forming the chief part of the body of the organ, separated by a *fibrous septum*.

The *septum* between the two corpora cavernosa forms an imperfect partition; it is thick and complete behind, but in front it is incomplete, and consists of a number of vertical bands which are arranged like the teeth of a comb, whence the name which it has received, *septum pectiniforme*. These bands extend between the dorsal and the urethral surface of the corpora cavernosa.

From the internal surface of the fibrous envelope, as well as from the sides of the septum, are given off a number of bands or cords which cross the interior of the corpora cavernosa in all directions, subdividing them into a number of separate compartments and giving the entire structure a spongy appearance. These bands and cords are called *trabeculae*, and consists of white fibrous tissue, elastic fibres, and plain muscular fibres. In them are contained numerous arteries and nerves.

The component fibres, of which the trabeculae are composed are larger and stronger round the circumference than at the center of the corpora cavernosa; they are also thicker behind than in front. The interspaces, on the contrary, are larger at the center than at the circumference, their long diameter being directed transversely; they are largest anteriorly. They are occupied by venous blood and are lined by a layer of flattened cells similar to the endothelial lining of veins.

The whole of the structure of the corpora cavernosa contained within the fibrous sheath consists, therefore of a sponge-like tissue of areolar spaces freely communicating with each other and filled with venous blood. The spaces may therefore be regarded as large cavernous veins.

The arteries bringing the blood to these spaces are the arteries of the corpora cavernosa and branches from the dorsal artery of the penis, which perforate the fibrous capsule along the upper surface, especially near the fore part of the organ.

These arteries on entering the cavernous structure

divide into branches, which are supported and enclosed by the trabeculae. Some of these terminate in a capillary network, the branches of which open directly into the cavernous spaces; others assume a tendril-like appearance, and form convoluted and somewhat dilated vessels, which were named by Muller *helicine arteries*. They project into the spaces, and from them are given off small capillary branches to supply the trabecular structure. They are bound down in the spaces by fine fibrous processes, and are more abundant in the back part of the corpora cavernosa.

The blood from the cavernous spaces is returned by a series of vessels, some of which emerge in considerable numbers from the base of the glans penis and converge on the dorsum of the organ to form the dorsal vein; others pass out on the upper surface of the corpora cavernosa and join the dorsal vein; some emerge from the under surface of the corpora cavernosa, and receiving branches from the corpus spongiosum, wind round the sides of the penis to terminate in the dorsal vein; but the greater number pass out at the root of the penis, and join the prostatic plexus and pudendal vein.

The *Corpus Spongiosum* is situated in a groove on the under surface of the corpora cavernosa, is largely composed of erectile tissue, which consists essentially of an intricate venous plexus, capable of receiving a large amount of blood in states of excitement or congestion. The arteries of the penis are derived from the internal pudic; its nerves from the internal pudic nerve and the hypogastric plexus. The organ has two sets of lymphatic vessels, one superficial and the other deep.

The male *Urethra* extends from the neck of the bladder to the *meatus urinarius*. Its length in the adult is usually eight or nine inches; its course has a double curve in its flaccid state, but in the erect condition it forms a single curve, the concavity of which is

directed upward. It is divided into three portions, the prostatic, membranous and spongy.

The *Prostatic portion* is the widest and most dilatable part, and passes through the prostate gland. It is about an inch and a quarter in length. Upon the floor of the canal is a narrow ridge, the *veru montanum* or *caput gallinaginis*, formed of mucous membrane and its subjacent tissue. When distended it serves to prevent the passage of the semen backward into the bladder. A fossa or depression on each side of the *veru montanum* is called the *prostatic sinus*, the bottom of which is perforated with numerous apertures, the orifices of the prostatic ducts.

The *Membranous portion* of the urethra extends between the apex of the prostate and the bulb of the corpus spongiosum.

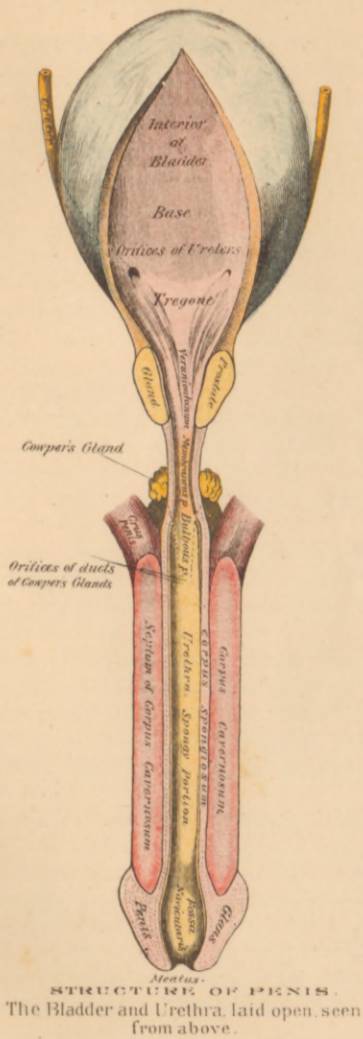
The *Spongy portion* is the longest part of the urethra and is contained in the corpus spongiosum. It is about six inches in length, and extends from the membranous portion to the meatus urinarius.

The *Meatus Urinarius* is a vertical slit about three lines in length, and is the most contracted part of the urethra.

The *Urethra* is composed of three coats, a mucous, muscular and erectile.

The *Prostate Gland* is a small glandular body surrounding the neck of the bladder and commencement of the urethra. In shape and size it very much resembles a horse chestnut. Its secretion is a milky fluid, having an acid reaction, and presenting, on microscopic examination, molecular matter. This gland is frequently enlarged, and its ducts filled with concretions, especially in old age.

Cowper's Glands are two lobulated bodies of a yellowish color, about the size of peas, situated beneath the forepart of the membranous portion of the urethra, between the two layers of a deep perineal fascia, and lying



STRUCTURE OF PENIS.

The Bladder and Urethra, laid open, seen from above.

close behind the bulb. The excretory duct of each gland is nearly an inch in length, and passes obliquely forward beneath the mucous membrane, opening by a minute orifice on the floor of the bulbous portion of the urethra. They diminish in size in advance age. These glands and the prostate are accessory organs, and produce mucus mainly.

The *Testes* are the glandular organs which secrete the semen. They are situated in the scrotum, being suspended by the spermatic cord. Lying upon the posterior border of each testis is a narrow flattened body termed the *epididymis*. Attached to the upper end of the testis or the epididymis, is a small, pedunculated body, the use of which is unknown.

The *Scrotum*, which contains the testes and part of the spermatic cord, is a cutaneous pouch, divided into two lateral halves; by a median line or raphe, and consisting of two layers, the integument and the dartos muscle.

The *Tunica Vaginalis*, the serous covering of the testis, is a pouch of serous membrane, derived from the peritoneum during the descent of the testis in the foetus, from the abdomen into the scrotum.

The *Tunica Albuginea* is the fibrous covering of the testis. It surrounds the glandular structure of the organ, and at its posterior and upper border, is reflected into the interior of the gland, forming an incomplete vertical septum, called the *corpus Highmorianum* or *mediastinum testis*.

The *Tunica Vasculosa*, or *pia mater testis*, is the vascular layer of the testis, consisting of a plexus of blood vessels, held together by delicate areolar tissue.

STRUCTURE OF THE TESTES—The testes are compound tubular glands with numerous lobules, estimated at 250 to 400. Each lobule is of a conical shape, the base being directed toward the circumference of the organ, the apex toward the mediastinum. The tubes may be separately

unraveled by careful dissection under water. Their diameter varies from one two-hundredth to one one-hundred and-fiftieth of an inch. They consist of a basement membrane, lined by epithelium, consisting of nucleated granular corpuscles, and are enclosed in a delicate plexus of capillary vessels. In the apices of the lobules the tubuli become convoluted, and unite together so as to form 20 to 30 larger ducts, of about one-fiftieth of an inch in diameter, which from their straight course are called *vasa recta*.

The *Vasa Recta* enter the fibrous tissue of the mediastinum, and pass upward and backward, forming a network of tubes with very thin parieties, constituting the *rete testis*. The vessels of the rete testis terminate at the upper end of the mediastinum in a number of ducts, varying from 12 to 20, which are termed *vasa afferentia*. They carry the seminal fluid from the testis to the epididymis.

The *Vas Deferens*, the continuation of the epididymis is the excretory duct of the testis. It ascends along the inner side of the testis and epididymis, through the spermatic canal, to the internal abdominal ring. Its walls are thick and dense, but its canal is very small, measuring but half a line.

The *Spermatic Cord* is composed of arteries, veins, nerves, lymphatics and the vas deferens, connected by areolar tissue, and invested by its proper coverings. It extends from the internal abdominal ring to the back part of the testicles. The left cord is usually longer than the right, which occasions the left testicle to hang somewhat lower than the right.

VESICULAE SEMINALS—The seminal Vesicles are two membranous pouches between the base of the bladder and the rectum. They serve as reservoirs for the semen, and secrete a fluid which is mixed with that of the testicles.

Each vesicula consists of a single tube coiled upon itself, and giving off several irregular diverticula.

The *Ejectulatory Ducts*, one on each side, are formed by the junction of the duct of the vesicula seminalis with the vas deferens.

The *Semen* is a thick, whitish fluid, having a peculiar odor. It consists of a fluid portion called the *liquor seminis*, and solid particles termed seminal granules and spermatozoa.

The *Seminal Granules* are round corpuscles, measuring one-four-thousandth of an inch in diameter.

The *Spermatozoids* are the essential elements of impregnation, and deserve more than a brief notice.

They were discovered in the male semen in 1677, by a German student named Von Hammen, and he first showed them to Leeuwenhoek, who made as thorough a study of them as he could with the imperfect microscopes of that period.

For a long time the spermatozoa were regarded as living animalcules, though at present they are considered as peculiar anatomical elements composed of protoplasm, endowed with life and capable of motion. They are very similar in form in different animals. We shall describe them as they are found in man.

If we place a minute quantity of the seminal fluid taken from the seminal vesicles of a healthy man who has died suddenly, or of ejaculated semen, on a glass slide, cover it with a thin piece of glass and place it under a microscope we will find innumerable bodies moving over the field of the microscope with a serpentine, wriggling motion, with considerable, apparent rapidity. They present a flattened, conical head and a long filamentous tail. If the glass be kept warm this motion continues for some time, but finally ceases, when they are supposed to be dead, in which condition they would be incapable of fecundating the ovum, even if it were possible to bring them in contact with it. Under favorable

conditions, and especially in the generative passages of the female, these movements no doubt continue for several days.

FREQUENCY OF SEXUAL INTERCOURSE.

On this question there is as much diversity of opinion as on any other that can be named. The only data on which a philosophical answer can be predicated is normal instincts, and these, unfortunately, we do not know where to look for. It is easy to lay down a rule by which all may approximate as nearly as possible to physiological propriety—a life in obedience to the laws of life. The more nearly the parties live in accordance with physiological habits, especially in the matters of food, clothing and exercise, the more nearly normal will be their sexual inclinations, and the less need have they of subjecting their desires to the restraints or control of reason. For those who live riotously; who are constantly goading their sexual passions to abnormal intensity by means of gross food, stimulating viands and obscene associations, no better rule can be given than the less indulgence the better.

DR. R. T. TRALL SAYS :

“ Let not sexual love be confounded with sexual lust. The former is always gratified and completely satisfied with legitimate indulgence. The latter is like the appetite of the glutton or the drunkard, each indulgence aggravating but never satisfying.

“ Those who study this subject in the light of physiology, and who practice conscientiously according to the light that is in them, will have no occasion to envy the libertine and debauchee. They will not fail to be convinced that here, as everywhere, ‘the ways of wisdom are ways of pleasantness and all her paths are peace. Those persons whose lives are more simple and pure, who are temperate in all sensuous gratifications, and who indulge the sexual passion moderately, will find the

happiness resulting unalloyed, and in the course of a lifetime, correspondingly more pleasurable and satisfactory. And besides, such persons maintain the integrity of the sexual instincts, with the capacity to enjoy, at a much later period of life, than do those whose indulgencies are premature or excessive. Many persons are sexually, as young at sixty years of age as others at thirty. Some maintain their virility beyond the age of three score years and ten, while others exhaust it in half the time.

"Sexual intercourse should never, under any circumstances, be indulged in, when either party is in a condition of great mental excitement or depression, nor when in a condition of great bodily fatigue, nor soon after a full meal, nor when the mind is intensely preoccupied; but always when the whole system is in its best condition and most free from disturbing influences."

There is good sense and sound philosophy in the words which Sterne causes his hero, Tristram Shandy, to utter: "I wish my father or my mother, or indeed both of them, as they were in duty both equally bound to, had minded what they were about when they begot me; had they duly considered how much depended upon what they were then doing; that not only the production of a rational being was concerned in it, but that possibly the happy formation and temperature of his body, perhaps his genius and the very cast of his mind, and perhaps the fortunes of his own house, might take the humors and dispositions then uppermost. Had they duly weighed and considered all this, and proceeded accordingly, I am verily persuaded I should have made a quite different figure in the world from what the reader is likely to see me. Believe me, good folks, this is not so inconsiderable a thing as many of you think it."

FEMALE APATHY.

The majority of women (happily for society) are not

very much troubled with sexual feelings of any kind. What men are habitually, women are only exceptionally. There can be no doubt that sexual feeling in the female is in the majority of cases in abeyance, and that it requires positive and considerable excitement to be aroused at all; and even if roused (which in many instances it can never be) it is very moderate compared with that of the male. Many persons, and particularly young men, form their ideas of women's sensuous feeling from what they notice early in life among loose, or at least, low and immoral women. There is always a certain number of females who, though not ostensibly in the ranks of prostitutes, make a kind *cà* a trade of a pretty face. They are fond of admiration, they like to attract the attention of those immediately above them. Any susceptible boy is easily led to believe, whether he is altogether overcome by the syren or not, that she and therefore all women, must have at least as strong passion as himself. Such women, however, give a very false idea of the condition of female sexual feeling in general. Association with loose women (who, if they have no sexual feeling counterfeit it so well that the novice does not suspect but that it is genuine,) seems to corroborate such an impression; and as I have stated above, it is from these erroneous notions that so many unmarried men imagine that the marital duties they will have to undertake are beyond their exhausted strength, and from this reason dread and avoid marriage.

Married men—medical men—or married women themselves, would if appealed to, tell a very different tale, and vindicate female nature from the vile aspersions cast upon it by the abandoned conduct and ungoverned lusts of a few of its worst examples.

There are many females who never feel any sexual excitement whatever. Others again, immediately after each period, do become, to a limited degree, capable of experiencing it; but this capacity is often temporary,

and may entirely cease until the next menstrual period. Many of the best mothers, wives and managers of households, know little of, or are careless about sexual indulgences. Love of home, of children and of domestic duties, are the only passions they feel.

As a general rule, a modest woman seldom desires any sexual gratification for herself. She submits to her husband's embraces; but principally to gratify him; and, and were it not for the desire of maternity, would far rather be relieved from his attentions. No nervous or feeble young man need, therefore, be deterred from marriage by any exaggerated notion of the arduous duties required from him. Let him be well assured, that the married woman has no wish to be placed on the footing of a mistress.

DR. JOHN COWAN ON INVOLUNTARY NOCTURNAL
EMISSIONS.

“ This disorder, so wide-spread, occurs generally at night during sleep, when there is an involuntary erection of the organ, followed by a general genital excitement and a discharge of semen. It is the general prevailing opinion that if these involuntary emissions do not occur oftener than once in two or three weeks, no harm to the individual is done, the emission acting as nature's safety-valve. Notwithstanding all that physicians and others may say to support this assertion, it is a great error—an error that entails on the individual, sooner or latter, serious constitutional effects. Should the emissions occur oftener than this the symptoms of impairment of the health are more pronounced. The morning after the emission the first noticeable symptoms of the harm done the body are a pain above the eyes, or on top or back of the head; eyes sensible to light; ringing in the ears; tenderness of the spine; weakness of the back; pain in the legs, from the knees to the ankle, and coldness of the hands and feet. He gradually grows into

vascillating habits of thought and action, weakening his will power; continually possessed with doubts and fears as to the future, irritable in temper, and unhappy in all his social relations.

“There is another class of men—those possessing a preponderance of the vital temperament—in which seminal emissions develop a different train of symptoms, such as dyspepsia, constipation, torpid liver and diseased state of the skin, as shown by the eruption on the face. This class of patients are much easier to cure than the first mentioned, whose nervous system is primarily involved. A noticeable difference in the symptoms between these two types is in the loss of memory—the first scarcely ever showing a loss of memory until the disease has progressed almost beyond hopes of recovery; while in the last, dullness of perception and loss of memory is one of the first indications of impairment of the constitution.

“The causes for seminal emissions are self-abuse at some time in life, and sexual excesses at any time of life, or it may be of a hereditary nature. The disease may be developed in a person who has committed sexual excesses, and who never has practiced masturbation. The prime cause is the practice of self-abuse at some time of life. There are many married men who, although they get what they demand sexually, will yet have seminal emissions while occupying the same bed with their wives.

“Just here I must protest against the often-advised remedy for involuntary emissions and spermatorrhœa—namely, that of marriage. A man having these diseases and following out this advice, will soon sorely repent of the deed, and be tempted to curse his adviser. Marrying as a supposed help to a cure, implies that through sexual excess or legalized prostitution, the disease, or rather the involuntary emissions, will through voluntary action be diverted into a possibly legitimate channel. This is not only a great error, it is a great sin—a sin and wrong

done the man's own body, done the woman he marries, and the children he generates. If he have children they will not only be predisposed to the disease, but will, very likely, when they arrive at a marriageable age, be either impotent or sterile. No man, having seminal emissions, gonorrhæ, consumption, or any other disease, should marry, or even in the remotest way think of it, until he recovers fully from the disease. It is a help to a cure, in the man having this disease, to court the society of females, enjoying their companionship, living purely and chastely in their presence—but no further, until he can lay claim to a perfect manhood."

DR. COWAN ON EXCESSES:

"To enter more into detail; the effects of excesses—and whether they be produced by self, by legalized or unlegalized prostitution, the results are not greatly different—first noticeable is shown in a general weakness of the nervous system, and, through the medium of the great sympathetic system of nerves, this want of nervous vital power is communicated to all the nervous departments of the body. The stomach—the laboratory of the body—first feels the effects, and shows its weakened power by its inability to promptly digest ordinary food. After a time, should the excesses be continued, dyspepsia takes place, which, in connection with the failure of power in other parts of the body, is called general debility, which general debility is very soon followed by consumption.

"The fact that the small brain, in which amative-ness is located, is also the co-ordinating or harmonizing power of the muscular system, explains why sexual excesses are so soon followed by a weakening of the joints, and especially the joints of the knees, a softening of the muscles, a want of strength, and a motion of an unsteady, dragging nature, differing so noticeably from the springing, strong, elastic carriage of the continent individual.

“ Noticeably in many ways do sexual excesses effect the brain. The faculty of memory is weakened and impaired, the person gradually lacking his usual power to remember men and things. The eyes are also affected; disordered vision is almost always a prompt indication of amativeness. The eyes are easily affected by night lights, and any ordinary effort strains and hurts them. The hearing is also in many cases impaired. Paralysis of the lower extremities occasionally results. Neuralgia, affecting any part of the system, is among the frequent consequences. More than half the cases of epilepsy are unmistakably owing either to sexual or self-abuse. Falling of the womb, barrenness, abortion, and cancer of the womb or breast, are directly or indirectly caused by excessive indulgence in married life. Fickleness of temper, irresolution and premature old age, are penalties that attach themselves indiscriminately to all who violate the laws of their organization.

“ It is also noticeable that when any man or woman is affected with any of the maladies, their relatives, friends, and even physicians, ascribe the effect to an entirely different cause. This may not be done intentionally, for in a great measure it is a result of ignorance of the subject.

This list of diseases, the result of sexual abuse, is but a partial one; for in the abnormal exercise of amativeness, the great drain of the nervous fluid, and the loss of semen—one ounce of which is equal to forty ounces of blood in any other part of the body—so lowers life-force as to form the foundation for, and lay open the system to, all manner of contagious, acute and chronic diseases, and in this way—though sexual excesses may not be the immediate cause of sickness and premature death—it in thousands of cases is the remote cause.

“ Any reader, who, with clear and impartial mind, will carefully read and consider these facts, will allow that in and through the perverted use of amativeness,

they depart from the true line of life's object—the securing of strength, peace and happiness, and the successful cultivation of the higher and more spiritual part of their natures. The thinking and reflecting man or woman who, through ignorance of organic laws, has done these things, and who, knowing that the time on earth allotted for the preparation for their appearance in the Great Beyond is so very short, will at once see the great need of adopting a purer line of life ; for it is an unanswerable assertion, that in no other way can mankind so effectually fall from grace, as through perverted animal desires. In no other way can mankind so soil, foul and debase the pure and spiritual that is within them as through the perverted use of amativeness.”

DR. HANSHETT ON SEXUAL HEALTH.

“ A boy should be taught that the privates must not be handled except for washing and passing water. He can easily be shown that the urine is a fluid which carries impurities out of his body that would do him harm if retained, and that handling the privates may result in the obstruction of the flow of urine and thus make him sick.

“ Fuller information than this ought to be given a boy, regardless of his questions, not later than the advent of puberty. This crisis is signalized by the growth of hair at the lower part of the abdomen, and by the change of voice.

“ Teach him that these organs have but one proper use, and were created with but one object—the preservation of the species. Show him that there is but one way in which they can properly fulfill their mission—through marriage.

“ Teach him that his early inclination to seek such pleasure is one of his opportunities to test and strengthen his character ; that the grade of his manhood is established by the amount he can overcome, and that his value in the world depends much on the question as to whether

he will rule his body, or his body him; that by cultivating the mind and the other parts of the body he can hinder these organs, and their desires from becoming too strong for him, while their natural growth will be associated with the development of gentleness, tenderness, unselfishness, and other mental traits which belong to nobility of character, and is intended to remind him in time of the duties of manhood to which he is approaching, in order that he may prepare for parenthood himself, first by the development of his own character, and second by the wise choice of a mother for his future children.

“Moreover, this boy should be taught that no function of his body exhausts vitality so rapidly as the sexual function; that it is one intended to be shared, not only by all the members of his own body, but also by all those of another and different body, and that to drain the distinctively sexual organs in solitude is to abuse them, because it is to imperfectly and incompletely perform a very delicate, complicated, and important act. He should have explained to him also, the nature, strength, and danger of habit, because it is the *habit* of self-abuse that is to be most of all dreaded in this connection.

“But if his state be sad, who has lost his sense of manhood in the vice of self-abuse, how much sadder is his who has sacrificed self-respect, health, strength and money in the house of the “strange woman.” Nothing but shame and remorse wait for him who enters these portals. It is unfortunately true that some physicians advise those who have bound the chains of the habit of self-abuse about their lives to seek to break them by binding over them the stronger chains of the strange woman. Nothing could be more hopeless than to attempt to gain anything in this way. Illicit indulgence must, from the nature of the case be irregular, under the influence of excitement if not of alcohol, degrading and

almost certain to result in diseases loathsome in the extreme, painful, and dangerous through life. That should be enough were it not also true that prostitution strikes at the very root and foundation of society—the family—and does nothing, and can do nothing to help the individual out of the chains of bad habits."

SIZE OF SEXUAL ORGANS.

"Size, I may repeat, is no sign of vigor. One of the first characteristics of the perfect athlete of classic times was unusually small though well-shaped genitals. Indeed, as I have before said, a large, flaccid organ, is not unfrequently a result and an indication of masturbation, having been indulged in to a dangerous extent. Veterinary surgeons, it is true, condemn a horse with an abnormally small sheath, as likely to be delicate in constitution. This rule, however, does not apply to human beings, though undoubtedly, a shrivelled, atrophied condition of the organ may in addition to other signs become a pretty sure sign of the existence of partial or entire impotence.

"There are few questions more frequently put by patients than, "Do I not suffer under a diminished or a diminishing size?" In nine cases out of ten there is no cause for alarm whatever. A nervous patient in bathing has seen another man with a larger organ, or from some other cause fancies that his powers must necessarily be deficient, because he thinks the organ does not possess what he considers the usual dimensions. The size varies greatly, and it has been a source of consolation to many patients to be told that its efficiency bears no relation whatever to its size. A small organ, indeed is often more efficient than a large and massive one. A small organ, it should also be remembered, when in a state of erection often exceeds in size one which is larger while in a quiescent state."—From "*Reproductive Organs*," by Wm. Acton, M. R. C. S.

This writer further states that abnormally small genitals may be developed by increasing the flow of blood to the parts by mechanical means.

UNDEVELOPED AND WEAK SEXUAL ORGANS MAY BE
ENLARGED AND STRENGTHENED.

The quack concerns that have of late sprung up all over the country advertise a score of preparations for increasing the size and power of small, weak genitals. It would be a waste of space to expose these. They change their names, places and methods as often as they are shown up.

The Erie Medical Company, Buffalo, N. Y., exclusively manufacture the safe and improved appliances by which such development may be obtained. The theory of treatment is indicated by the following extract from a recent medical work, *Brain Rest*, page 61 :

“ The physician has usually to do with a flabby, ill-developed muscular apparatus requiring attention of a special kind. In dealing with this latter class of cases it is first necessary to cause a sufficient flow of blood through the ill-developed muscle to facilitate repair of the stunted organ ; and secondly, it is advisable to place the latter in a state of complete repose for a considerable length of time after the blood-current has been thus diverted, so that the processes of repair may be fully realized. The derivation of the blood-current for the benefit of the muscle may be accomplished in various ways. The patient may be urged to employ his muscles, when not at rest, in vigorous exercise, or massage may be recommended, or finally, should neither of these expedients be practicable, resort may be had to Junod's apparatus. This appliance, as is well known, consists of a receiver adapted to the size of the extremities, which it encloses hermetically. By means of an air-pump a certain degree of vacuum may be produced around the enclosed part, and as a consequence the blood

flows into the atrophied muscles, following the direction of the least resistance."

A circular issued by the above named company thus briefly outlines their method of treatment of wasted genitals :

" Athrophy, or loss of natural size, or a failure to develop to a natural and proper size, are conditions to which the male sexual organs are peculiarly liable.

" The abuses of thoughtless and ignorant youth ; the unbridled passions of early married life, bladder, kidney, urethral and other diseases, all have a tendency to retard the growth, or reduce the size of these sensitive organs. From whatever cause produced, the condition alluded to is *abnormal and unhealthy*, and may and should be overcome.

" Our method of treatment for development or restoration of the genitals cannot be illustrated or described in detail in a work for general circulation.

" The organ of which we speak is of a sponge-like formation. When excited the blood rushes to the cells of which it is composed and distends them, causing the organ to assume an erect and enlarged form. On the amount of blood the organ is capable of containing chiefly depends its size.

" We employ an instrument by which a vacuum is created about the parts. This at once brings a vigorous flow of blood to the organ and enlarges it to unusual dimensions. The repetition at regular intervals of this application steadily increases the capacity, having the same effect in developing as the use of the vacuum treatment on the limbs.

" This is no recent discovery, but has been known to and used by eminent surgeons for many years.

" The theme is one of such a delicate nature as to prevent its open discussion, and hence, few have heard of this method, and may therefore be the more ready to suspect quackery.

"In the restoration of atrophied limbs, we depend chiefly upon the vacuum treatment and with almost unvarying success. Legs and arms shriveled till they are almost as unsightly and useless as those of a mummy, are placed into an air-exhauster, the blood brought gradually back through the wasting arteries, increasing their capacity day by day, developing size and strength till finally the once useless limb assumes the vigor and proportions of its healthy mate. Such cases as this are so common that they no longer attract special comment.

"Several shameless quacks extensively advertise lotions or medicines to enlarge the private parts. It is the silliest folly to attempt to produce this development by such means. Almost any portion of the form may be developed by a *proper course of mechanical treatment, but no amount of drugs will have such effect.*

"The time required to fully develop the male organs is from one to six months, according to the increase required, the health, age, care used, etc. We positively guarantee the increase to remain permanent in every case, unless reduced by violent excess or disease.

"The use of this developing instrument does not interfere with any regular habits or employment, and may be followed without the knowledge or assistance of others."

NERVE AND BRAIN FAILURE.

"Loss of memory is an exceedingly frequent symptom of organic brain-disease. It cannot be said to be characteristic of any particular form of brain-disease, but is liable—indeed, almost certain—to occur in organic affections of the cerebral cortex. Its diagnostic importance comes from the fact that, unless due to obvious acute disease or connected with insanity, it is a strong indication of an organic affection of the brain. A degree of failure may, however, arise from simple brain-exhaustion.

Usually the patient or his friends recognize even a

slight loss of memory; but sometimes very careful search is required for its discovery. Under these circumstances the physician must question the patient as to the small events of the last twenty-four hours, and not be misled by that vividness of recollection of the long past which sometimes causes the sufferer to declare that his memory even stronger than normal. In doubtful cases of general paralysis of the insane, failure of the memory is of special value in enabling us to distinguish the organic insanity from functional mental disturbances which may simulate it. According to my own experience, failure of memory which is not accompanied by paralysis for the time being of all the functions of the mind, as in insanity, is of serious import in proportion to its completeness.

"Nervous exhaustion may in the beginning affect the whole of the nervous system, or it may be at first purely local and coexist with general nervous strength. Many cases of spermatorrhœa are instances of a local form of neurasthenia, the sexual centres being primarily affected; but as in these cases, sooner or later, the whole of the nervous system becomes implicated, so in other forms of the disorder the exhaustion, at first local, finally, if neglected, implicates the whole organism. There are not rarely cases of brain-exhaustion in which the symptoms are at first purely local. Almost always the cause of a local neurasthenia is excessive use of the part; thus, cerebral asthenia is usually the result of mental overwork, sexual asthenia of sexual excesses, etc. When to the intellectual fatigue are added the depressing effects of excessive anxiety or allied emotions, the symptoms from the first are more general. The exhaustion may effect chiefly a single function of the brain.

"In pure brain exhaustion, loss of the disposition to work is usually the first symptom, the sufferer finding that it constantly requires a more and more painful effort of the will to perform the allotted task. The basis of this difficulty is largely loss of the power of fixing

the attention, and this by and by is accompanied by weakness of the memory. Disturbances of sleep are frequent."—"*Nervous Diseases and their Diagnosis*," by H. C. Wood, M. D.

"Among the other exciting causes of brain exhaustion may be mentioned excesses, particularly over-sexual indulgence. This, so far as the male sex is concerned, is a frequent source of morbid brain fatigue, the latter condition often terminating in chronic mental inefficiency where there are at the same time any considerable demands upon the mental faculties."—*Dr. Corning, on Brain Exhaustion, page 156.*

DR. H. C. WOOD ON NERVE EXHAUSTION.

"In neurasthenia disturbances of the sexual organs are very common; in women great pain on menstruation ovarian irritation, the so-called irritable uterus of Hobbs, are closely connected with general nerve-weakness. In not a small proportion of the cases of uterine disorders which are locally treated, I believe the local disease is largely the expression of the general condition. It is well known that masturbation and sexual excess in the male may produce an exhaustion of the nerve-centres especially implicated, and also a general nervous exhaustion. This is the common history of spermatorrhœa. It is no less true that a general neurasthenia may produce a local weakness of the sexual centres, with symptoms at least resembling those of spermatorrhœa—namely, great irritability of the sexual organs, with a practical impotence due to immediate seminal discharge whenever coition is attempted. I have certainly seen this condition result from excessive intellectual labor when there has been no sexual excess, and at a time when the muscular strength was still good. Such cases may, perhaps, be distinguished by the fact that unprovoked emissions are not nearly so apt to occur as in true spermatorrhœa.

"Overwork, especially overwork combined with worry, and even continuous emotional depression, unaided by excessive work, are capable of producing a pure neurasthenia. As Samuel Jackson was accustomed to say, in his lectures at the University of Pennsylvania thirty years ago, 'Whenever the expenditure of nerve-force is greater than the daily income, physical bankruptcy sooner or later results.' It is to be remembered that the nerve capital of persons differs almost as widely as does their moneyed capital."

EXERCISE IN SEXUAL WEAKNESS.

"Constant and healthy exercise of the whole muscular system is also of great importance to the preservation of the sexual power. It is true that if a man takes little exercise—particularly if he lives high—he will be apt to exhibit an unusual tendency to amorous indulgence, because, as before remarked, gluttony and idleness lead to licentiousness. This effect, however, is only a temporary one, and sooner or later, the individual finds that he has permanently exhausted his vital energy and that his health and strength are seriously impaired. The vital power that may be safely expended in sexual indulgence, is only the surplus, after every part of the system has appropriated its due amount, and if more be expended, some part must suffer. In other words we may suppose that every healthy man has a certain stock of vital energy, which we will call his capital, to which he keeps adding more or less, by the function of nutrition; this addition may be compared to interest, which may be expended without any loss of capital, and of course, without making him any poorer. If, however, by any excess he expends more than this addition, the capital is proportionately diminished, and permanently too, for it can seldom be made up again.

"Now, the idle man does not expend enough vital energy on his muscular system, to keep it healthy, but

at the same time gives a superabundance of it to the sexual organs, so that they are over-stimulated and suffer from excess. They become habituated to great indulgence, and are constantly causing a drain on the vital power, that soon exhausts both principal and interest, and leaves the individual completely exhausted.

"The philosophy of this has been frequently alluded to in the course of the present work, but it is so important that I wish to present it in a strong light. I am fully persuaded that there is no case of precocious or excessive sexual propensity, unless caused by disease, that cannot be easily subdued by muscular exercise. No matter how vigorously the seminal glands may act, in a state of leisure, they must become less active if the body be exhausted by active exertion, and to this rule there is scarcely any limit. One of the reports of the Massachusetts Lunatic Asylum strongly impresses this truth, and shows conclusively that we have, in hard labor, a certain means of subduing this propensity to its proper limits under any circumstances. The application of this truth to young persons is obvious, numbers of whom are made licentious only by bodily inactivity and over-feeding.

"The invalid, or the man whose powers are impaired, must, of course, husband his strength, because he does not require exhaustion, but only sufficient exercise to ensure health.

"Exercise of the mind is also equally important as exercise of the body. The man who is mentally idle, is nearly certain to experience too strongly the force of the animal propensities, and licentious thoughts are too often indulged merely from the absence of better ones. It must be recollected, however, that too much mental exertion, particularly if attended with care and anxiety, is most destructive to the sexual power, and frequently leads to impotence, as many of our cases have shown. Those who wish, therefore, to show their virility, should

endeavor to maintain a happy medium, laboring with the mind sufficiently for health and utility, and endeavoring to preserve perfect calmness and equanimity."—*Dr. Hollick.*

"The so-called chronic disease is too frequently looked upon as incurable, but this is by no means my view of the position. The do-nothing system, with rest and change, does not find favor with me. Disease once planted by nature is manured and cultivated by nature. Nature's processes may be healing and reproductive, but they are, alas! too often destructive, as most people know to their cost. It is the height of folly to talk of leaving disease to nature; she can be kind, but she is too often cruel, and in reference to disease we are compelled, as physicians, to look at the cruel side of nature. This is our office, our duty, and our obligation to suffering humanity, and nature will often respond to a little persuasion, and aid us in effecting cures, if we call upon her for assistance in a deferential, submissive, and respectful manner. Nature never will be completely subordinate to man."—"*Brain and Nerves,*" by *Dr. Dowse.*

OUR SYSTEM OF TREATMENT

BRIEFLY STATED AND ENDORSED BY THE DISTINGUISHED
MEDICAL WRITER AND LECTURER, FREDERICK
HOLLICK, M. D., AUTHOR OF THE "ORIGIN
OF LIFE," "DISEASES OF WOMEN,"
ETC.

"To effect the enlargement of the male sexual organs, in addition to every means proper to improve the general health and impart stamina, there are certain *mechanical* and *manual* applications, the effects of which, under right direction, are often of the most unexpected and pleasing character. To understand the nature of these, and their mode of action, it is necessary to bear in mind the anatomical structure of the organ, and the requisites for erection. That phenomenon, it will be recollected from our previous description, depends essentially upon the filling up of the vessels and cells of the spongy and cavernous bodies with blood, and of course if there be any fault in their make or mode of connection, or if the blood does not flow into them, erection cannot take place. Now this is precisely the fault that is found to exist in most of the cases of non-development above referred to, and is what requires to be corrected. On dissecting such cases after death we find that the cells and minute vessels have never been congested or filled with blood, and consequently the organ has never been able to attain natural conditions. In the same way, after long continued excess, or debilitating disease, the

artery seems to lose its power of transmitting the blood with sufficient vigor, and the cells, from want of being filled, decrease in size, and eventually grow up more or less, causing the organ to shrink and weaken.

“The object to be accomplished it will be seen is to open these cells, and cause the blood to flow into them, so as gradually to increase their size, and dispose them to fill spontaneously, from natural excitement.”

After citing cases treated with great success by this method and describing the instrument and mode of application, the Doctor continues :

“I have seen some of the most remarkable results follow from the use of this instrument that were perhaps ever witnessed, in a medical way. I have known patients in whom the whole organ was not *half an inch long, and without the slightest tendency to erection*, and yet this appliance has caused it to grow, and has given it power, until perfectly capable for the purposes it was intended for. Sometimes there only appears a simple protuberance, while at other times the organ is long and surprisingly small, and quite flaccid, but still the instrument will impel the blood into the tissues and produce the effect desired. Sometimes, it is true, we cannot gain so much as would be desirable, but nearly always sufficient for nature's requirements, and very often as perfect in condition as if no imperfection had ever existed.

“I have seen instances of persons who had lost the power of erection from sexual and other excesses, from mental anxiety and from the effect of debilitating disease. In a great portion of these the result has been favorable, though in many all vitality had left the organs, and in others the structure was completely disorganized. Many young men, especially victims of evil habits, whose organs had ceased growing, have by these means been rescued from impotency and imperfection. Many a man of mature age also, whose powers were unimpaired, but who could not exercise them, owing to

their particular debility, has been restored to his former capability in the same way."

BEAR IN MIND that we are the exclusive manufacturers of the Improved Vacuum Appliance, the power of which is automatic, or self-acting. An old style made of glass and brass piston is advertised and sold, though physicians condemn its use, except when employed under medical direction.

We make a rubber expander, or pump, having just the power required to create vigorous circulation, open the shriveled arteries and build and solidify the adipose tissue composing the organs, thus creating strength and growth in place of feebleness and non-development; the process corresponding in every respect with the making of new muscle by proper exercise, where strength goes with growth, and vigorous general health attends their creation.

Further description of this mode of treatment will be found in the latter portion of this volume, or may be had by writing to the Erie Medical Company, Buffalo, N. Y.

TREATMENT OF IMPOTENCY.—"Many of the so-called impotents," says Dr. Remondino (*Medical Review*), "are only so in imagination, and the physician should not neglect to attend to their mental condition. * * A French physician, in the early part of our century, acquired a great reputation in the treatment of impotency by using an exhauster into which the penis was inserted and the air exhausted by means of an air-pump. In one case he received a large fee for procuring an heir in an extinguishing family by using his apparatus in a desperate case—the congested penis being transferred immediately from the exhauster into the marital receptacle. This employment would not, however, be considered dignified for a physician. If all these means should fail, I should advise a hermit existence and a purely vegetable diet, preceded by a liberal phlebotomy. When these have all failed, the man can consider himself a eunuch to all intents and purposes."—*N. Y. Med. Record, Feb. 25, 1893.*

RESTORATION.

BY P. W. PHELEN, M. D.

Man's bodily vigor ought not to decrease before he is one hundred years old. I mean it.

But why does it?

Because he weakens his body and shortens his life, by sexual exhaustion and excess.

The only way to attain long life is by economizing essence of life, by keeping the generative organs in healthy vigor and condition, and by the obedience to the laws of nature.

Our civilized races are, in one sense, sick before they are born; and are constantly inducing decay and death by their mode of life. These are matters which every one could control for himself in a great degree, if he only knew the awful dangers to which he is liable, but he does not know, and how can he understand without a teacher? Those who have some gleams of knowledge, are often careless and heedless, where carelessness and heedlessness are crimes against themselves. Political economists deplore this condition of the race, which is constantly decreasing the power of vigor of civilized nations, and making them liable to become a prey to stronger and more savage nations. To help the ignorant and careless who are not wilfully so, is the object of these pages. We seek also to arouse, if possible, those who are reckless and defiant, to a realization of the misery they are laying up in store for

themselves in the swiftly coming future, if they do not seek the means of relief and release possible, before it may be too late. Whether directly interested or not, in the immediate subjects treated, I trust my presentation will, at the least, merit your careful perusal.

The organs of the body are divided into three great centers. These can be named the middle and the two poles on either end. Each of these centers is absolutely necessary to bodily health, and essential to existence itself, while man inhabits his body. The heart with its tireless, life-inspiring energy is the center. The brain, as one pole, through memory and reason, dictates the weaving of the varying web of life. As the other pole the generative organs, masters of the house of life, are nourished by and rule tyrannically over, the other centers. The office of the heart is to maintain vitality; of the brain to inspire thought; and of the generative organs to bring bodies into manifested life. All life, the whole body, in all its complex functions, is but a method adjusted by perfect wisdom, of maintaining and supporting this triple-linked chain of primary force. The digestive apparatus is simply a chemical laboratory, where the atoms taken into the mouth as food, are resolved into a plastic mass, and each atom polarized, so that when placed in position for renewing the body, like the mortar used in building, it will stick, thus repairing, over and over again, the main organs which manifest life, as well as the constituents of the repairing organs themselves.

The circulation of the blood completes the heart's action, and the nerves form the circuit over which the brain force performs its wondrous feats, but the generative organs are so designed and constructed, that they draw with equal force upon both the blood and nervous energy, not only exhausting the carriers themselves, but at the supreme moment, drawing heavily and paralyzingly, on the spiritual essence or life itself, in which all

human existence is centered, thus causing a sudden depletion in those fountains of energy, the heart and the brain. It does not call for the foresight of a very wise man, to figure that the outgo of strength might soon overbalance all recuperative power, and then further use would hopelessly destroy the very substance of the organs themselves.

Thus the generative organs are the rulers and masters of the life forces of the body, when they are in their normal condition. In ancient times they were worshipped as the source of life. It is a duty for every man to maintain them in their highest vigor, against every weakening condition or disease, and to do his best to recuperate or repair them, if through ignorance or excess their power is reduced below the normal standard.

At the very least, it would seem evident, we have no right whatever to despise, disregard or abuse these life-inspiring organs, any more than we should the eye, the heart, or the brain. Because we have banished mention of them from polite society, has not, in one iota, diminished their importance, nor lessened for us, the terrible diseases which are sapping the life of the modern nations. Nor has it made any the less certain, the vengeance which as surely as the night follows the day, nature will visit upon the overtaken transgressor, in the agonies of the hundreds upon hundreds of sufferers, who year after year are painfully dragging themselves toward the grave, the victims of their own ignorance and indiscretions.

Ignorance of the laws has here even less mitigating force, than in the courts of the State. The avenger is pitiless, stern and unrelenting. It would certainly seem the part of wisdom, to take the trouble to learn enough of these laws to understand symptoms, and be able to consult intelligently a medical adviser, whom we are sure is well enough posted on the subject, to prevent irreparable injury being done, either by disregard of facts wrong diagnosis, or improper medication.

This is all the more imperative, because the disease of the generative organs are the most insidious, and fatally destructive of the whole category of man's afflictions. As we have said they depend for the intensity of their action upon the magnetic and electric elasticity of the currents of blood and nerve force. Whatever excess is thus drawn to themselves, is subtracted from the normal amount belonging to all other organs of the body. The action is, as if the generative organs, at one end of the scale-beam, balanced, while in health, all the rest of the body, but when in excitation, or when irritated by disease, they increase their call for support from the other organs, which then must diminish in their power and substance proportionately.

Not only is this absorption literally true, but if sexual excess or personal abuse is continued, the atoms finally lose their power of renewing normal polarity, and that moment destruction of tissue commences, appearing in the body as constipation, cold extremities, ringing in the ears, tenderness of the spine, backache, sleeplessness, a gloomy jealous irascible temper, paralysis, withering of the muscles, rheumatism, feebleness of the sight and hearing, catarrhal affections, and general debility. Nor is this all, the same process of decay, or dry rot eats away the finer tissues of the brain, and other internal organs, until a condition similar to idiocy or insanity sets in.

The body may receive injury by cuts, wounds or loss of blood, or from lack of food or drink, or even from the action of poisons; but so long as the polarizing forces of the atoms, of which it is composed, maintains its hold upon these atoms, vitality will re-assert itself, and in the end, no matter how severe the struggle, will both repel the assailing force, and repair or heal whatever damage may have been done. But once weaken or destroy this atomic polarity, which is the direct response of nature, in matter to the creative act, and the steep downhill path

is entered upon. At this point hesitation to seek help from those competent to give it is suicidal. What shall we say of a person, who willfully and recklessly refuses to inform himself of the symptoms, those guide posts of the dangerous and slippery road upon which he has stepped, thus fixing for himself the hour of his swiftly-approaching and awful death. We can not feel that this picture is at all overdrawn, or too highly colored, although it may seem so to those that have had no experience with the perverted action of the currents that take hold on the very central energy of the universe itself.

If the generative organs alone suffered then attention might be drawn to the cause before it was too late. But because they simply eat up the rations of the rest of the body, they will keep themselves in fair condition and action until the balance of the organism is actually dead. Because virility continues is no evidence that a man as a whole is vigorous, or that his apparent strength is any more than a sham, a hollow mockery, ready to collapse at the first outside pressure. On the contrary sexual action often indicates the waning power of heart, brain or stomach.

Nor is the man who has overstepped the boundaries of equal justice to all parts of himself, to be certain of reckoning simply with his own personality. It is every man's duty to contribute to the world coming after him, as the preceding world contributed to him. That is, every man is bound, morally, at least, to leave behind him worthy children, who can bravely and strongly carry forward the world's work, and so continue the sequence of progress and unfolding. For this purpose he should be able to beget vigorous and healthy physical bodies. But he can never accomplish this if enervated and exhausted by the wasteful drain of life-force, from the abuse of the generative organs.

If the doctrine of reincarnation are true and invisible

spirits are constantly crowding to obtain use of the physical bodies, for the creation of which, man's whole physical machinery was especially adapted, how much more is dependent upon man's action in this direction, than appears upon the surface. What answer shall such an one as we are contemplating give, when in the unseen, he shall stand face to face with a proud, strong spirit, eager to accomplish in a new life, when that life becomes a miserable failure, through the foisting upon it of a miserable body, a fraud in every particular? What explanation can he offer to satisfy a spirit thus befooled by his own criminality? Will there be any torture in the hells of Dante, that could add to the agonies of a soul already reproaching itself with its voluntary waste of a life?

The loss in this direction is far beyond computation. The point we make is, that every man should know this, in all its bearings and force, on himself and others, for no man can live for himself alone. If he does not know, he ought to consult some medical authority, competent to inform him, and thus save his life and health.

The primary symptoms are often so veiled, so obscure, to all but the trained eye of the medical expert, that everything but the right cause is suggested by those of his unprofessional friends whom he consults, and who in their ignorant kindness, in most cases, are likely to suggest and locate diseases that have no existence.

A large proportion of all the dyspepsia, liver trouble, kidney complaints, congestion of the spleen, heart failures, headache and brain torpidity, are the result of venereal excess. But when the trouble has reached this stage, having become a local injury or weakness, recovery without expert help is little short of miraculous. The trying of this or the other drug, or herb, or method of treatment, is like applying a torch to gunpowder to see if it will burn. The consequence, an extinction of life, is likely to be the same, also, in both cases. But long be-

fore these diseases become apparent to the observer, symptoms annoying to the patient, will betray by the eye, the lip, the hand, the pulse and the temperature, to the experienced medical specialist, a story which the patient supposes is securely hidden in his own breast. If, however, permanent relief is to be obtained, the physician must know this record. If the medical expert cannot read it by his own knowledge, he will by this ignorance wrong his patient and injure himself. The more frankly a patient confides in his medical adviser, the more certain will he be to receive relief quickly.

It will thus be seen that while excess brings punishment, then also abuse and unnatural action will also bring about injuries corresponding to painful strains and lesions of the muscles and softer tissues of internal organs unless attended to at once. In some awful cases, indeed, we degrade the beast by calling the man beastly; here comparison is odious—to the man. The untrained beast when exhausted, never forces reproductive action "just for the fun of it," so his physical strength remains unimpaired.

Continued waste of physical essence, whether voluntary or involuntary, is like the pressing of the harness upon a galled spot upon the muscle; not only is the local injury increased, but sympathetic action transfers the slow torture to all other parts of the body, and the tone of the whole is proportionally lowered.

From what has been said it can easily be inferred that the first signs of decay are invisible to any but trained eyes. It is also true, that a long distance has been travelled away from normal health, before the patient's notice is particularly attracted to such symptoms as a failure to perceive quickly, or to an ever increasing forgetfulness, overshadowing him as a mist creeps up over the valley; nervousness, spells of dizziness, uneasiness of stomach during digestion, headache and backache, general lassitude and weariness. When for

the first time these disagreeable impressions are forced upon his attention, he should not delay a day, no, not an hour, in consulting the very best authorities on this line, that he can reach, and there are none better in the world than the Erie Medical Company, of Buffalo, New York.

It will be in order, here, to demonstrate why this assertion is true of this company; how they prove it, and what is said of their work.

First, as to why they are most likely to be true helpers. No man who owned a valuable watch that needed cleaning would ask a street cleaner to do the job for him, or expect that worthy's shovel and broom would be suitable tools for the cleaning. On the contrary, he would seek out the most skillful and experienced craftsman he could find. Not only that, but he would choose the one best supplied with the most improved and skillfully made instruments, designed for delicate operations upon the sensitive structure of the watch. In this direction, the Erie Medical Company is at the head of associations of experience and talent; an immense business, the direct result of successful methods, both requires and permits them to give a treatment too costly to be afforded by a physician in private practice.

Nor does it require much thinking to decide why they, and not the family physician or the irresponsible advertising doctor under the peculiar circumstances of these cases would be the best medical adviser. The family doctor, even if he is thoroughly posted in the symptoms, (which in nine cases out of ten, from lack of both time, to read up the latest pathological discoveries, and practice, he is not), would dislike to tell you disagreeable truths, about your habits of life and their probable effects on your body and mind. Nor would you desire to go to an unknown advertising "specialist" who might look and talk disagreeably about your unfortunate condition, not only to you, but perhaps to others. We have

known such cases, however monstrous they may seem. You have left then only, the alternative of seeking help from some firm of medical experts, who, like the Erie Medical company, have attained a reputation on this line; whose system of treatment is rational, and not likely to lead to disagreeable consequences, either in the mechanical application, or in the after effects of powerful drugs. It is in this last that most practitioners err, instead of helping nature to mend the crumbling walls, they attempt to drive the already overtasked system to undertake new labors, by administering poisons, whose reactionary effects are worse than the disease for which they are given. This is not done willfully, but because these were the old time remedies, and were used empirically twenty-five years ago, on the principle so ably and wittily stated by the old French physician: "The patient and disease are fighting in the dark; the doctor comes up with a club in his hand; he strikes to kill; if the disease is killed the doctor's skill is marvellous. If the patient is killed, then it is a dispensation of Providence." The Erie Medical Company do not run any risks of that kind, but their remedies, based on reason, always do the work.

This brings us to a description of the strength-saving, remedial methods of treatment which the Erie Medical Company offer all their patients, and the theory upon which they are based.

Holy Writ says, "The blood is the life" of all animals including man. In conditions of health the nerve force suffices to attract sufficient nutriment from the blood to supply all waste. But if the nerves are weakened as we have shown, in any part of the body, and sympathetically, all through the entire system, then necessary supplies are not retained in the weakened organs, and they go from bad to worse, or their own destruction. Reasoning from the effect back to the cause, it must be a correct theory that if the blood could come to

the weakened parts in larger volume, then the deficiency of supply would be made up. Acting upon this theory, the Erie Medical Co. have adopted the vacuum treatment where weakened members are enclosed in exactly adjusted apparatus, and the air being partially exhausted, the blood flows to the weak spots. Then by the perfectly natural process of assimilation, from the increased flow of highly oxygenated blood a healthy condition and action of the diseased organs is restored. In addition to this mechanical, painless treatment, care must be taken to build up the blood, by increasing the proportion of nutriment, and neutralizing any poisons mixed with the life current, while its life flow is being thus stimulated and increased.

The success of the Erie Medical Company, in the cure of their patients proves that both their theory and practice are correct. They number unsolicited written testimonials by thousands.

They do not "guess" you are afflicted with this or that disease; or waste precious time in useless experiment, while the patient is hurrying on meanwhile by lightning express towards ghostland. The Company's experts clearly perceive and promptly point out both cause and cure.

The Erie Medical Company claim that the most rational treatment provides to a certainty for the most immediate as well as the most lasting effects. Their long experience, covering every conceivable case, give them the advantage of knowing just what not to do, as well as what is necessary to be done. They have no need to experiment with their patients, for they know. As the ticking of the telegraph sounder conveys no news to the ignorant, but imparts a definite, intelligent idea to a skilled operator, so do the symptoms of the man weakened by abuse or neglect of his generative organs, tell them a plain, unvarnished story, which they can read "between the lines" from beginning to end.

In closing this appeal to my readers, I must revert to and reaffirm my opening sentence. The length of a man's life, and its condition of health are inseparably connected with the genital organs. The waste of a pound of steam at a central point, will stop the movement of a 500-horse power engine. So the waste of an ounce of "the vital fluid," by voluntary or involuntary act, may, under certain circumstances, cut off years of life, and at once fix the hour of death. If you desire to get the most possible out of the longest life you can attain, then conserve your life force by every means of which you may be master.

If you wish to live to be a hundred years or more of age, you will not linger nor dally, when you are certain there is even a slight irregularity, but will apply to the Erie Medical Company, of Buffalo, N. Y., for a new lease of your life. Remember above all things if you would live long you must be vigilant in preventing the slightest inroad upon your system of insidious disease. "A word to the wise is sufficient, the foolish pass on and are punished."

SEXUAL HEALTH IN THE MALE,

AND HOW IT MAY BE

RESTORED BY NATURE'S FORCES.

ALL MEDICAL TREATMENT derives its true power and efficiency from the forces of nature, and so far as it assists nature by removing obstacles from her path, or applying the natural resources of the system to the accomplishment of the work in hand, it is judicious, rational and proper. As soon as it departs from this rule, it becomes injudicious and improper.

THE GREAT LIFE FORCE of nature is the blood. This is the store house from which the materials are brought forth to build new tissues, or to repair those that are wasted. This is the subtle medium through which the vital influences pervade every nook and corner of the system; by which the life and strength of the various tissues are kept up.

The effects of depriving any portion of the body of a proper supply of this fluid are felt at once. If it is only a diminution of the proper quantity, the affected organ wastes away, and its natural functions are interfered with. If a total stoppage of the blood current occurs, the absolute death of the part soon follows.

SO NECESSARY is the blood supply, that nature has made provision in nearly all parts of the body against the occurrence of a total loss of life-giving fluid of any part, even though the artery

supplying the part be stopped up or destroyed by any cause. This is done by the branches of different arteries anastomosing, or uniting with each other, so that if the main artery supplying a part be occluded, a small supply of blood will still reach the part, in an indirect way.

A RULE OF NATURE is that the greater the blood supply of a part, the greater will be its nutrition, its strength and development. This is shown by the fact that muscles which are much exercised, increase in size and power, because the exercise they are subjected to increases the blood supply of the parts. In the child, before birth, during the earlier months of its development, the head and upper extremities largely predominate in size over the lower extremities, which is caused by the greater supply of pure blood received by the upper part of the body at that time. When from any cause there is a wasting of any organ of the body, or if from some congenital defect there has been an imperfect and insufficient development of any part so that it fails to fulfill in a perfect manner the functions for which it was intended, the only rational remedy is to increase the supply of pure and wholesome blood to the part. By this means its nutrition is improved, the wasted tissues regain their normal size, or those which have been always imperfect are stimulated to increased growth and may thus be brought to the natural size and condition.

THERE IS ONLY ONE method by which this theory can be safely and successfully carried out and that method is by creating a partial vacuum around the affected part.

When this is done the blood rushes into the part treated, distending its arteries, increasing their capacity, supplying every tissue with the materials needed for its growth, and stimulating the regenerative and constructive processes of nature.

The tendency which nature has to immediately fill

any vacuum, either partial or complete, may be easily illustrated by pouring half a cup of water on a plate, lighting a piece of paper, and thrusting it into a cup which is at once placed, bottom up, on the plate. The flame is extinguished from lack of oxygen, the heated air in the cup quickly cools, occupies less space than before, leaving a partial vacuum. This the water rushes into the cup to fill, because it is the only liquid available in that locality. In the same manner, when any organ of the body is placed in a partial vacuum, the blood being the only available liquid, rushes into and distends the part, in nature's effort to fill the vacuum, or vacant space.

THE PRINCIPLE IN USE.—We have devised appliances by which a partial vacuum may be produced around any part or organ of the body. The frontispiece shows such a device applied to the treatment of a paralyzed leg. By removing air from the large cylinder shown, the leg becomes surrounded by a partial vacuum, and subject to a largely increased blood supply, in accordance with above principles. This method when practiced for a length of time, will restore the wasted tissues to their normal size and vigor.

THE MOST IMPORTANT application of this principle that we have yet made, and that to which we wish especially to direct the reader's attention, is our vacuum appliance for the treatment of diseases and defects of the male sexual organs. We cannot illustrate or fully describe this apparatus in a pamphlet intended for general distribution, but the method of its working may be readily understood by reference to the illustration of the apparatus for the leg, and the foregoing description of the principles involved.

OUR APPLIANCE for the treatment of these diseases and defects is constructed on the most scientific principles, in accordance with our

long experience in the treatment of diseases of this class. It has been improved from time to time, until we consider it now as near perfection as it is possible to attain. It can be used by the patient himself with absolute success and perfect safety. It is not possible for the patient to injure himself by the use of the apparatus, as it is automatic in its action, and cannot be operated beyond a safe limit. It can be used without interfering with the occupation of the patient, and without the knowledge or suspicion of any other person. The instrument is only used for a few minutes at each time, and can only be used in the right manner.

NO MISTAKES are possible. No method of treatment has ever been introduced that has been at all comparable to this in its successful results in any of the cases to which it is applicable. And in those cases in which there is a natural deficiency in the size or form of the parts, there is not, and cannot in the nature of affairs, be any other successful method of treatment at all. The diseases and conditions to which this method of treatment may be properly applied, will be briefly enumerated.

SPERMATORRHOEA. - This term means an unnatural loss of the vital fluid. It may occur in different ways and at different times. The most common of these is from emissions occurring at night, in connection with dreams of sexual indulgence. It may also occur in daytime, when urinating, or when at stool. It is sometimes excited by lascivious conversation, or even by being in the presence of an attractive person of the opposite sex. It is a deplorable evil, the loss causing a constant and heavy drain on the patient's strength and vitality. For this fluid is the most highly organized of any in the whole human body, being in fact the very essence of life.

"LIKE A CHARM."—A favorite expression of patients reporting to us is that

our vacuum appliance acts "like a charm" in the cases, restoring the sexual organs to proper tone and vigor. As soon as this is done the losses cease. We accompany the appliance with remedies for both internal and external use, prepared to suit the individual case for which they are to be used. These remedies are prepared by physicians of skill and experience, and are the choicest that can be obtained; but they are only given as adjuncts to the vacuum treatment, which accomplishes results that cannot be obtained from any merely medical treatment.

SEXUAL IMPOTENCE.—This is a condition in which the subject of the disease is unable to perform the natural sexual functions, or to procreate or reproduce his species. It may be divided into two varieties, impotence proper, in which sexual intercourse cannot be performed, and sterility, in which intercourse may be had but cannot result in offspring. The first is more immediately distressing, as it deprives the victim of all sexual pleasures and privileges. But even the milder form which we denominate sterility, inflicts a deep and lasting injury by making it impossible for the victim to become possessed of heirs and descendents. The commonest causes of sexual impotence, as well as spermatorrhœa, sexual weakness, etc., are well known to be sexual excesses, masturbation and dissipated habits of life in general. But all cases do not arise thus, and it is not our purpose at this time to dwell at any length upon the causes of the diseases in question. Our main object being to point the sufferer to a means of cure.

OUR PAST EXPERIENCE leads us to say with the utmost confidence and sincerity, that we believe no case of impotence or sterility will fail to yield to the faithful use of our appliance and the remedies with which we accompany it.

The great importance of the blood supply to the sex-

ual organs is shown when during sexual excitement the organs of generation become distended with blood, assuming the condition known as erection. This is caused solely by the change of the blood supply, the arteries becoming relaxed, allowing all the vessels of the part to become filled with blood; and muscular fibers surrounding the veins of exit contract, thus retarding the passage of blood away from the distended organ. There can be no power or action of the organs involved unless this distension by excessive blood supply occurs. Many hundreds of cases of impotence, of greater or less degree have been treated by us. There has not been among them all, a single case in which there has not been an immediate and decided benefit produced by the treatment. And all cases in which our instructions were followed for a sufficient length of time have been restored to a condition of sexual health and power.

SEXUAL WEAKNESS.—This is a condition closely allied to the preceding ones, being, in fact, an earlier stage of sexual impotence. In this condition the sexual act may be performed, but in an imperfect and unsatisfactory manner. In some cases it can occur only at considerable intervals. In others it occurs more frequently, but the erections are feeble and imperfect, or the act is completed too soon, because the organs are in a weak, irritable condition.

Frequently, the victim of such a condition is tormented with sexual desires which he cannot satisfy owing to the weak and enfeebled condition of his sexual system. Desire has "outlived performance," and the imperfect sexual acts that do occur, serve only for an aggravation of the passions which they do not gratify.

NERVOUS DEBILITY.—This term, which has been much used by quacks who vend various medications recommended by them for the relief of sexual troubles, means, properly speaking, a general exhaustion of the nerve force of the body. It

may occur without any connection with the sexual system, but the most common cause of the condition is sexual exhaustion from excesses of some kind. It is characterized by a general loss of power of both mind and body. The individual cannot bring himself to engage in any prolonged effort, either mental or physical, and is unable to concentrate the mind on any object. Any treatment addressed to the system at large in these cases must be ineffective, so long as the sexual organs remain in a diseased condition. But when the sexual system is restored to a state of health and vigor, the general condition readily yields to treatment.

Our method of treatment in this class of cases is to make use of our vacuum appliance for the cure of all local troubles of the sexual organs combined with internal treatment addressed to the general nervous weakness and exhaustion. In this way we never fail to benefit every case, and can effect a cure in any case in which the patient will faithfully follow the instructions given by us.

UNDEVELOPED ORGANS OF GENERATION.

—Under this heading may be classed all the cases in which the male organ of generation or its appendages have never reached a proper size or form, or in which they have become wasted or shrunken from any cause. These cases are more numerous than might be supposed by any one who had not, like us, made a specialty of their treatment for a long time. The only possible way in which the organs can be restored to a normal size if wasted or atrophied; the only way developed, if dwarfed from birth, is by mechanical means. By increasing the blood supply of the organs, thus increasing their nutrition, they may be enlarged and developed to a proper size.

ONLY EFFECTIVE MEANS.—Our vacuum appliance furnishes the

only effective means for doing this, and therefore the only scientific, proper and successful treatment. None of the other various means which are advertised for this purpose can possibly accomplish any good.

We have treated a large number of these cases, with uniform success, as evidence in our possession will show, and we can say without fear of contradiction that our method of treatment is the only successful one. We send with the appliance, when sent for use in cases of undeveloped or wasted organs, all internal medicines and local applications that can be used as aids to the work of the appliance. But they must be considered only as adjuncts, and cannot in themselves secure the desired results. The vacuum appliance is the chief agent in effecting the work desired, all medical treatment that we send being merely to aid in strengthening the system and the parts.

VARICOCELE.—This is a condition in which the veins of the spermatic cord are enlarged and tortuous, having lost their tone, and becoming excessively dilated from the pressure of the column of blood. It is manifested by the scrotum, or bag containing the testicles being distended by a mass feeling "like a bunch of worms," which is the dilated, swollen and tender veins. It is a source of much annoyance to the patient, and in bad cases may prevent him from following any occupation. This condition cannot be treated with our vacuum appliance. The proper treatment is to press out the blood for a time, compressing the veins, until the stagnation is overcome and the veins regain their tone, a proper circulation being re-established. We have devised a combined supporter and compressor for these cases, by which the desired results may be accomplished. But in bad and neglected cases, where the scrotum has become so large and tender that it is a burden to the patient, a surgical operation offers the only relief. This operation, which is not dangerous when skill-

fully performed by a competent surgeon, will be done when needed by our surgical staff. The fee is from fifty to one hundred and fifty dollars, including board and nursing. Full details will be given in private correspondence.

URINARY COMPLAINTS.—In diseases of the kidneys, bladder, Prostate gland, etc., such as Bright's disease or albuminuria, diabetes, gravel or stone in the bladder, cystitis, (inflammation of the bladder,) nephritis, (inflammation of the kidney,) and enlargement or inflammation of the prostate gland, the use of our vacuum is not necessary, but we have devised and perfected a method of treatment which very seldom fails, even in the worst and most obstinate cases. Our treatment varies in individual cases, and must be adapted to the actual condition present. The causes of these diseases are various, and the symptoms many. It is little use for the patient to attempt to form an opinion himself as to the nature of the trouble, but in any case in which some or all of these symptoms are present, he may consider that he has some urinary disease; dull, aching, dragging or throbbing pain between the legs or in the small of the back, made worse by standing, walking, jolting, etc., and sometimes relieved by pressure or lying down, with feet elevated; pain, burning, smarting, or "scalding," on passing urine; difficulty of urination, twisting of the stream, urine in some cases is high-colored and scanty, in other cases profuse and pale, or colored a milky shade with whitish mucus; oozing of a sticky fluid, which fastens together at times the lips of mouth of urinary canal, aching, soreness or tenderness of one or both testicles, dizziness and fits of exhaustion, convulsions, stupor, constant or vehement desire to urinate, and pain and heat in perineum. To make a correct diagnosis in these cases and lay out a proper and effective course of treatment for them, we require a description of the main symptoms of the case,

and a sample of the patient's urine, for chemical and microscopical analysis and examination. We can then ascertain exactly what is wrong and decide as to the treatment to be pursued.

ANTE-NUPTIAL PREPARATION.—Many men who are contemplating marriage have doubts as to whether their sexual condition is such as to justify them in taking this important step or not. These doubts are in many cases well-founded; there is a greater or less degree of weakness in many cases that would render the matrimonial relation improper, and a source of more annoyance than pleasure. For these cases we have prepared a special course of treatment, comprising the vacuum strengthening and developing appliance, with remedies for internal and external use, which if used according to directions, will restore the sexual organs to full tone and vigor, and remove any doubts from the patient's mind as to his fitness for the marriage state.

TERMS OF TREATMENT.—The following are the prices that we charge for furnishing appliances, medicines, etc., for the different conditions described :

COURSE A.—For nervous debility, spermatorrhœa, losses in urine or at night, general physical, nervous and sexual failing. Price, vacuum appliance and remedies for ordinary cases, \$12.00. For serious cases, \$24.

COURSE B.—For impotence, loss of power, total unfitness for marriage, sexual and nervous wreckage. Price, vacuum appliance and remedies for ordinary cases, \$15.00. For serious cases, \$30.

COURSE C.—For development of weak, wasted, shrunken or naturally small organs. Price, vacuum appliance and remedies for ordinary cases, \$15.00. For serious cases, \$30.00.

COURSE D.—For urinary complaints, diseases of the kidney, bladder and prostate gland. Price, in ordinary

cases, \$7.00. For severe and complicated cases, \$12.00.

COURSE E.—For Varicocele. Combined compressor and supporter, and lotions. Price, \$6.00.

COURSE F.—Ante-nuptial, or before marriage treatment. Price, appliance and remedies for ordinary cases, \$15.00. For severe or old cases, \$30.00.

The vacuum appliance can be carried in the coat pocket, and used without the aid or knowledge of any other person, and only needs to be used once or twice daily for ten to twenty minutes.

Address ERIE MEDICAL CO.,
BUFFALO, N. Y.

SOME REASONS

WHY THOSE SUFFERING FROM ANY OF THE CONDITIONS
DESCRIBED SHOULD AVAIL THEMSELVES OF OUR
TREATMENT.

OUR TREATMENT DOES CURE.—We have demonstrated in the preceding pages the scientific principles involved and the method by which the work is done. This, we think, should convince any one of the fact that our treatment is the very best that can be devised, and for some of the cases named the only treatment. We have almost countless testimonials as to the good results to be obtained, and that have been effected by our treatment. We have published two interesting pamphlets containing a large number of testimonials, photographed and engraved in the original hand writing of the patients themselves, coming from forty-seven States and Territories and the Dominion of Canada. We shall be glad to mail them to any one interested who will remit six cents for postage. The mass of testimony presented should be conclusive—men are hanged on less evidence. If you have any friend, acquaintance or correspondent in Buffalo who will call at our office in your behalf, we will take pleasure in showing him a thousand testimonials in original envelopes, just as received by us from patients, and which we have never published.

SEXUAL AND URINARY TROUBLES NEVER CURE
THEMSELVES.

Unlike many other diseased conditions, which, if let alone will be eradicated by the forces of nature, these cases are never restored to health without skillful treatment. True, it is nature's forces that finally accomplish the work, but they must be scientifically directed and applied,

In some cases a temporary improvement may seem to occur without treatment, especially if the patient's general health is improved by better hygienic surroundings. But such improvement is usually followed by a relapse to a worse condition than before. The tendency of all cases of sexual and urinary diseases, is to grow worse and worse, more and more confirmed, and the difficulties in the way of successful treatment increase in direct ratio with the length of time treatment is delayed, *or improper treatment pursued*. For in all matters of this kind, wrong treatment is worse than none, and tends to confirm and fix the disease. Some of the worst cases that come to us for treatment are those which have been long treated by some of the numerous quacks who infest our country at the present time.

OUR GREATEST DIFFICULTY in convincing afflicted persons of the merits of our treatment proceeds from the nefarious methods which have been pursued by these unprincipled charlatans. He who has been promised relief and received no benefit, is naturally skeptical regarding the claims of any other plan of treatment, and apt to class all alike as fraudulent, because that which he has been investing in has proved so. It is only by presenting a mass of evidence that cannot be gainsaid, that we can hope to convince such individuals. Our treatment is prepared under the direction of regularly educated medical men. Our operations are performed by surgeons of skill and experience.

THE CONSEQUENCES of neglecting diseased conditions of the sexual system are too serious to be lightly considered. Our insane asylums contain a surprising number of men who have been deprived of their normal reasoning powers by the results of neglected diseases or conditions of the sexual organs. There are thousands of others scattered through the country who are not violent enough to need the restraints of an asylum, who have been reduced to a condition approaching insanity or imbecility from like causes. Not, alas! those only whose mental powers were never very strong, but many who in earlier life gave promise of brilliant achievements.

Many of the suicides with which our daily papers teem, must be charged more or less directly to the same account. For the man whose sexual system is deranged is very prone to fall into a despondent condition in which life seems a burden and death a relief.

Of course these are the extreme cases, and we would not for a moment hold out the impression that all or most cases would terminate in any of these ways.

But the great majority of patients will, and do suffer from other consequences, scarcely less terrible, although not quite so pronounced in their manifestations. We refer to the general physical, mental and moral degradation that is sure to follow a neglect of the conditions referred to.

In every living thing, be it plant or animal, those parts which are devoted to the reproduction or propagation of the life of a species, are the most important. All else is to a greater or less extent subservient to this. In the lower forms of life there seems to be little else provided for, except that the individual should exist and transmit its life to other species, to follow its existence.

And in man, though endowed with a greater range of powers than any other specimen of animal life, the sex-

ual system is the center of all, and nothing else can reach its full fruition if it do not.

In every case in which the man is sexually weak and incompetent, there is a corresponding weakness in every other way. He is morally weak, and his ideas of right and wrong can seldom be relied upon. He is physically weak, and cannot perform any strong muscular exertion without great fatigue and prostration; and though in some cases there seems to be retained a certain degree of physical strength, it is only comparative, and far inferior to what he would possess were he in perfect sexual condition.

For all sexual troubles re-act upon the nervous system, and the most powerfully developed muscle would be helpless, were not the nervous stimulus supplied, to cause it to contract. Upon this nervous stimulus depends, as much as on the muscle itself, the ability to perform muscular effort.

Such a person is mentally weak, and the mind has not its natural strength and vigor. He is slow to arrive at correct conclusions; dull and heavy of speech and action; he is vacillating, swaying from one conclusion to another, unable to fix upon that which is best and abide by it. He engages in a business, and probably ere he has mastered it, he abandons it for some other, having not moral strength to be constant to anything. He fails in nearly all he undertakes, and this is not surprising; for we live in a wide-awake, progressive age, and one in which all occupations and professions are crowded, and a fierce competition exists. There is no place for the man whose every faculty is not keen and unimpaired.

Of the effects of urinary complaints we shall say but little. The thousands who are placed in untimely graves each year from such diseases, and the other thousands who drag out an existence which is hardly endurable, from the same causes, form an argument stronger than any other we could make, as to the serious results which

are caused by diseases of the urinary organs when neglected.

THE INFLUENCE ON OFFSPRING of neglected sexual weakness or disease, is very deleterious. This is one of the most important phases of the whole affair. For what man wishes to see his off-spring weak, puny, scrofulous or idiotic? That sexual weakness will produce this result in off-spring has been demonstrated in many cases. And society has a right to demand of every man that he shall *not* people the world with children who are but a mockery of what the human race should be. No man has a right to enter the marriage state with weakened, shattered sexual powers, who has an opportunity offered him to be restored to health.

ORDINARY PHYSICIANS do not treat these cases of sexual trouble with success. They have not the experience, nor the appliances or medicines. Some decline to do anything for such sufferers. Few doctors have made a proper study of such cases, such as would enable them to understand and treat them.

ALL LETTERS ARE HELD CONFIDENTIAL, and will be destroyed, or returned to writer when requested, and in no case will a letter be used as a testimonial without the express consent of the writer.

OUR FEES ARE REASONABLE, and we think will not prove burdensome to any one in need of treatment. It would be exceedingly foolish to allow the small amounts our appliances and treatment cost to weigh in the balance against restoration to health.

WE URGE THIS MATTER more in the interest of the reader than in our own. Our business is in a very flourishing condition, and the thousands of cases we have cured are constantly

bringing us many more. And while of course, we wish to extend our business as much as possible, we can much better do without the fee we would receive in any individual case than the reader can do without the treatment we offer him, if he is a sufferer from any of the conditions we have described.

THE ERIE MEDICAL CO.,

BUFFALO, N. Y.

A VOLUNTARY TRIBUTE FROM A HIGH SOURCE.

There is so much quackery at the present day, and nostrums, panaceas, and even institutions for the cure of all the diseases that afflict humanity are so widely advertised, that it is very difficult to ascertain what remedy is the most effective, and it does not pay to experiment. When, however, an institution for the treatment of disease has been long established, is conducted by a staff of experienced physicians, and can produce a multitude of proofs of its success, it is safe to consider that it is entitled to public confidence. The Erie Medical Co., 64 Niagara Street, Buffalo, N. Y., have been established for several years, and the efficacy of their method of treatment is testified to by thousands of sufferers who have been cured by it. This company does not endeavor to attract public attention by sensational advertising. It modestly asserts its claims and simply points to facts to verify its assertions. The Company's physicians are successful practitioners. * * * Lasting injury to the constitution is almost sure to arise from tampering with a disease in its initiative stages, and it is better to obtain reliable information at once than to risk life by delay.—*From Belford's Magazine, March, 1891, page 633.*

SENSATIONS THROUGH VISION

POWER OF CERTAIN NERVES.

EXPLANATION OF DIAGRAM OPPOSITE.

To illustrate the paths along which nerve impulses causing the Emotional Phenomena of (1) Blushing, (2) Dilation of the Pupil, (3) Quickening or Slowing (to Stopping) of the Heart's beat, and (4) Sensation at the pit of the Stomach (Epigastrium), when an individual's attention is visually attracted by an exciting cause.

C = Surface of brain (cortex).	CP = Cardiac plexus of nerves.
ON = Optic nerve.	R = Recurrent laryngeal nerve.
P = Pupil (seen in profile).	V = Vagus nerve.
Cb = Small brain, or cerebellum.	G = Gullet.
B = Medulla oblongata.	W = Windpipe.
Sc = Spinal cord.	L = Larynx (vocal apparatus.)
Sy = Sympathetic nerve.	S = Stomach.
F = Facial nerve.	H = Heart.
8n = 8th cervical spinal nerve.	CA = Carotid artery.

FA = Facial artery.

With the aid of the diagram it is easy to understand how the stimulation of the optic nerve (ON) will cause active disturbance of the corpuscles forming the cortex of the brain, first, probably in the postero-lateral area (the sensory perceptive center for vision); and, secondly, the anterior and posterior regions. From each of these positions the nerve vibrations, having aroused intelligent reasoning and strong emotion, will stream down to the medulla oblongata (between Cb and B) where the centers of so-called organic life are all grouped together. These paths are represented yellow. Here the emotional impulses will, under certain circumstances of love, shame, etc., pass along (F) the facial nerve, and thus cause movements of the facial muscles, and so produce facial expression, and also will pass by the same means to the local vaso-motor apparatus, and cause dilation of the small arterioles, etc., producing the phenomenon of blushing. In addition, the emotional impulse will pass down the spinal cord (Sc) and out along the eighth spinal nerve (n), then running up the sympathetic nerve (Sy) will reach the pupil (P) and actively dilate it. All these channels are colored red. Under other circumstances, such as fear, rage, etc., the emotional impulse will pass at once from (B) into the sympathetic (Sy), and then to the facial bloodvessels (Fa), causing these to contract strongly, and also along the facial nerve (F), making the muscles act spasmodically, thus producing pallor and the expression of terror. Interference with the regular beating of the heart is brought about by the nerve force passing down either the vagus nerve (V) with the effect of slowing the heart or actually stopping it, or else along the spinal cord and out along the spinal nerves to the sympathetic and so to the cardiac plexus, these impulses quickening the heart's rate. But, in addition, the voice is materially altered, and this is produced by the emotional impulse traveling down the vagus nerve (V), then up along a branch of the same (R) to the voice apparatus or larynx, and by causing irregular or excessive contraction of the muscles therein produce abnormal tones. Lastly, the sensation at the pit of the stomach may be entirely subjective and produced in the bulbar centers (B) at least without actual disturbance of the vagus nerve endings, or it may be that the emotional nerve force travels down to the stomach (S) along the distribution of the nerve (V), and is again reflected thence to the cortex of the brain.

TREAT THE CONSUMPTIVE PATIENT.

One by one the "Royal Roads" to the cure of tuberculosis are found to lead the dispirited traveler astray, until finally, like others previously tried, they fade out into "blind paths" and have to be abandoned. The list of these supposed easy or "specific" methods of cure each physician can readily supply for himself; and there will also come to him a realization of the expensive apparatus and the revolting or painful methods of application required in most of them.

Now, not the least of the disadvantages connected with the popular run after these alluring delusions is that thus much valuable time is lost, and when the inevitable failure is finally realized, it is then too late to resort to the thoroughly proven and standard measures that might have been of real service. This field of practice affords a fine illustration of the wisdom of the injunction,

"Be not the first by whom the new is tried,
Nor yet the last to lay the old aside."

Follow the well-known lines along which careful, painstaking physicians, judging by the records of the past, may hope to achieve a reasonable degree of success.

It is an established fact that this disease can only attack persons who are in a condition of lowered vitality, either hereditary or acquired. It is also true, and has been proven time and again at *post mortems* and in the dissecting room, by the cicatrices of former pulmonary lesions in those who have died from other causes, that if the normal vitality be restored before the destructive process has gone too far, the disease may be entirely overcome.

Now, if many unrecognized cases are thus cured by nature, may we not follow similar lines and cure the most, if not all, of our cases early after the disease is detected? Undoubtedly, yes. The base line of this treatment is *restored vitality*. **TREAT THE PATIENT HIMSELF.** Furnish him with blood so rich in vigorous tissue-forming material that it will destroy the hosts of disease germs (there is no more successful germicide than pure, rich blood) and, pushing the line of healthy tissue out, gradually but surely reconquer lost territory, and heal the lesions already created.—*Medical World*.

NEW SYSTEMS OF TRAINING THE BODY.

THREE METHODS OF PHYSICAL CULTURE FOR MAKING "PERFECT MEN" CONTRASTED.

The Checkley system is founded on this basic principle: Instead of drawing water, punching the bag, or pulling a rowing machine for the purpose of making your muscles grow and your lungs expand, by an effort of the will restrict the contraction of the muscles. If lifting a fifty-pound weight from the floor will cause a visible swelling of your biceps, and so exercise that muscle and produce what is conceded to be a desirable result, then by the Checkley system one may "go through the motions" of raising the weight without doing any work at all—for raising the weight would be "work"—and, by an act of volition swell and so exercise the same muscles and derive the same benefits from the exercise.

MULDOON WORKS HIS PUPILS.

Muldoon believes in work for his pupils. He made Sullivan do the hardest work of his life when in training for the fight with Kilrain. He had Police Superintendent Murray—Muldoon was on the New York police force himself, by the way, in the Church Street station—making hay and pounding a block of wood with a big hammer before he had been at the Belfast farm forty-eight hours.

Laffin prefers outdoor sports to outdoor work and rowing machines to most other apparatus for indoor exercise. Instead of setting a man to raking hay, he

accompanies him on long fishing, shooting, swimming or rowing excursions.

To the casual observer the Laflin system seems to appeal most strongly, as it produces a beneficial result by exercise not merely for the sake of exercise, but having a definite, sportsmanlike object of its own in view.

Checkley, however, not only thinks, but he sets others to thinking. He exercises the brain as well as the body, and develops both through the very superiority of mind over matter. If a man may stay at home and by will-power make himself as tired as he would be at the end of a day on the hay rake, it stands to reason that a good many men would prefer the Checkley system. It appeals to the curiosity above all others.

Mr. Murray was Muldoon's latest pupil, whose name most readers are familiar with. A day of Murray under the Muldoon *regime* was, in a few words, as follows: Exercise with light dumbbells; "firing" stuffed balls across a room and catching them when "fired" back; pounding a block of wood with two twelve-pound hammers, one in each hand; a long walk, the latter portion of it done on a run so as to heat the body up well; wrapping in blankets for a sweat and a rub down; a salt shower and another rub down; shoveling hay,—all this varied with horseback exercise and general gymnasium work.

A day of Sullivan under the Muldoon *regime* was much more laborious and included longer and more violent exercise in the way of running, wrestling, punching the bag and walking.

So the Muldoon system offers the seeker after physical culture plenty of work and but little fun; the exercise is not relieved of any of its irksomeness by the suggestion of sport. There are no birds to be shot or trout to be taken by way of amusing the mind as well as exercising the muscles.

MIND TRAINING MUSCLE.

Now that was not the way the ancient Greeks trained for the Olympic games, the victors in which were the favorite models for the world's greatest sculptors. Their's was an open air training, however, and running long distances, throwing weights, wrestling and the *cæstus* were their favorite exercises. The Greek training, by its all 'round development and its accompanying mental culture, produced ideals of male and female beauty.

Yet Mr. Edwin Checkley declares that given the same training our modern athletes would greatly surpass the Greek records. "Muscle-moulding schemes," says Checkley, "that make men die in middle life may be pictorially interesting and may sound heroic, but they are not for that wise average mortal who wishes simply to feel light and strong, and, if need be, to find himself ready to enter safely on any reasonable physical undertaking. There is more straining than training in a good many popular systems practiced in and out of the college gymnasium.

"The strength of a man so trained is only skin deep. It won't stick. We must breathe properly or forfeit all chance of ever becoming really strong; we must stand properly if we wish to give the body and its muscles a chance to do and be their best."

What do the adherents of other systems think of the following: "A man covered with hard muscles will often display great immediate power, but not endurance, and of after health he can have little chance. His muscles feed upon his vitality and threaten his general health. On the other hand, a man who keeps his muscular system in a state of comparative softness and high flexibility can not only summon great strength, but his powers of endurance are surprising. He is easily kept in training."

IMPORTANCE OF RIGHT BREATHING.

Checkley recommends that girls and boys should as soon as possible and first of all learn thoroughly how to breathe, stoop, stand, walk and sit properly; the proper uses of the joints, as the shoulder, hip, neck, &c. "Teach them tumbling, both girls as well as boys," says he. "There is nothing better. I advise generally a mixed diet. For my own part I eat and drink just what I like and what I feel I desire. The chemical changes that the food undergoes in the human stomach are so many and complicated, and in no two are they alike, so unless I could tell with certainty just how the food would change in each individual, I give the diet problem up. Young children should be trained the same as boys and girls as far as the first principles go. Their early years, I think, ought to be devoted to their physical nature, even their very games should be guided and directed, in fact playmasters should be the primary teachers. I firmly believe that if a child is taught physically properly first, the mental development will be greatly assisted. It certainly must be that the games which the child learns as a pleasure will, if taught properly, make it use its reasoning powers, fitting it better for the purely mental studies which it is necessary to acquire later on."

OPINIONS ABOUT EXERCISES.

Of the various athletic sports Mr. Checkley expresses this opinion: "I look upon tumbling as the acme of physical perfection, because the person so fortunate as to possess this ability you will notice is generally strong, agile and intelligent; the very nature of the movements must make them quick, self-reliant and to a certain extent courageous. As to bicycling I think that if people who are physically weak, be they male or female, wish to take up some form of muscular exercise that is mild, one in which the amount of muscular force expend-

ed compared to the work accomplished is very small, I do not know anything that can be used to better advantage than the bicycle. Tennis I have never tried; in fact I do not know what the game really is, so would not care to give an opinion. Boxing as an amusement or as a sport, for fun and pure enjoyment, where the parties are physically all right, I say is good; for my part I like it, and so with fencing, dancing, running, or, in fact, any of the things that ought only be indulged in by those who are in good physical condition as a means of enjoyment. They are all very good, but what I claim is that the power to enter any of these sports should be gained first. It is rather in the conservation of energy we gain strength and not in the expenditure of force. The power to do these things should be made the effect and not the cause."

Mr. Checkley, who can lift fifteen hundred pounds, two-thirds of the work in that feat being done, he says, by the will, prides himself specially on his cure for adiposity.

CURE FOR TOO MUCH FAT.

This is what he says of his cure: "I first teach the person, whether male or female, how to carry the body in a manner that I find most conducive to health, strength and longevity, then how to gain the control of the muscles of the abdomen mentally. A proper carriage of the body is a positive enemy to the secretion of fat. As for the wearing of a flannel bandage wrapped around the abdomen to keep down fat I think it useless and utterly unnecessary in cases of ordinary health. Of course if a man has typhoid fever he requires strong medicines. Many women and men have through physical ignorance become so weak in their abdominal muscles as to not only need a flannel bandage, but something more heroic, to keep themselves from apparently spilling out all their abdominal viscera. If a band is found necessary, flannel or silk elastic are the two best

that I know of. But the strengthening of the muscles is better than bandaging, and the afflicted one can acquire it easily and without trouble."

Checkley doesn't believe in dieting, but says obesity is a disease. "When the natural functions of the body proceed without interruption there can be no accumulation of fat. A man may box and fence and even walk without losing his terrible abdominal accumulation. But if he centres his efforts at muscular exertion on the abdomen itself, the fat cannot stand the attack and will gradually disappear."

CONTROL OF THE ABDOMEN.

"To get rid of it muscular control of the abdomen must be regained. When once it has been lost this is no easy matter." To attain this result Checkley prescribes twelve exercises, and adds, "persistently subdue the abdomen and give the prominence to the chest. Walk with the whole body, and do not move as if afraid of jarring some internal machinery. Give the hips free play, and in walking the more of this the better. Practice contraction of the waist muscles. In this way a continuous training, the only training that is effectual, is kept up, and the result will be immediate and lasting."

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