

A treatise on digestion, and the disorders incident to it : which are comprehended under the term dyspepsia : adapted for general readers / by William Sweetser.

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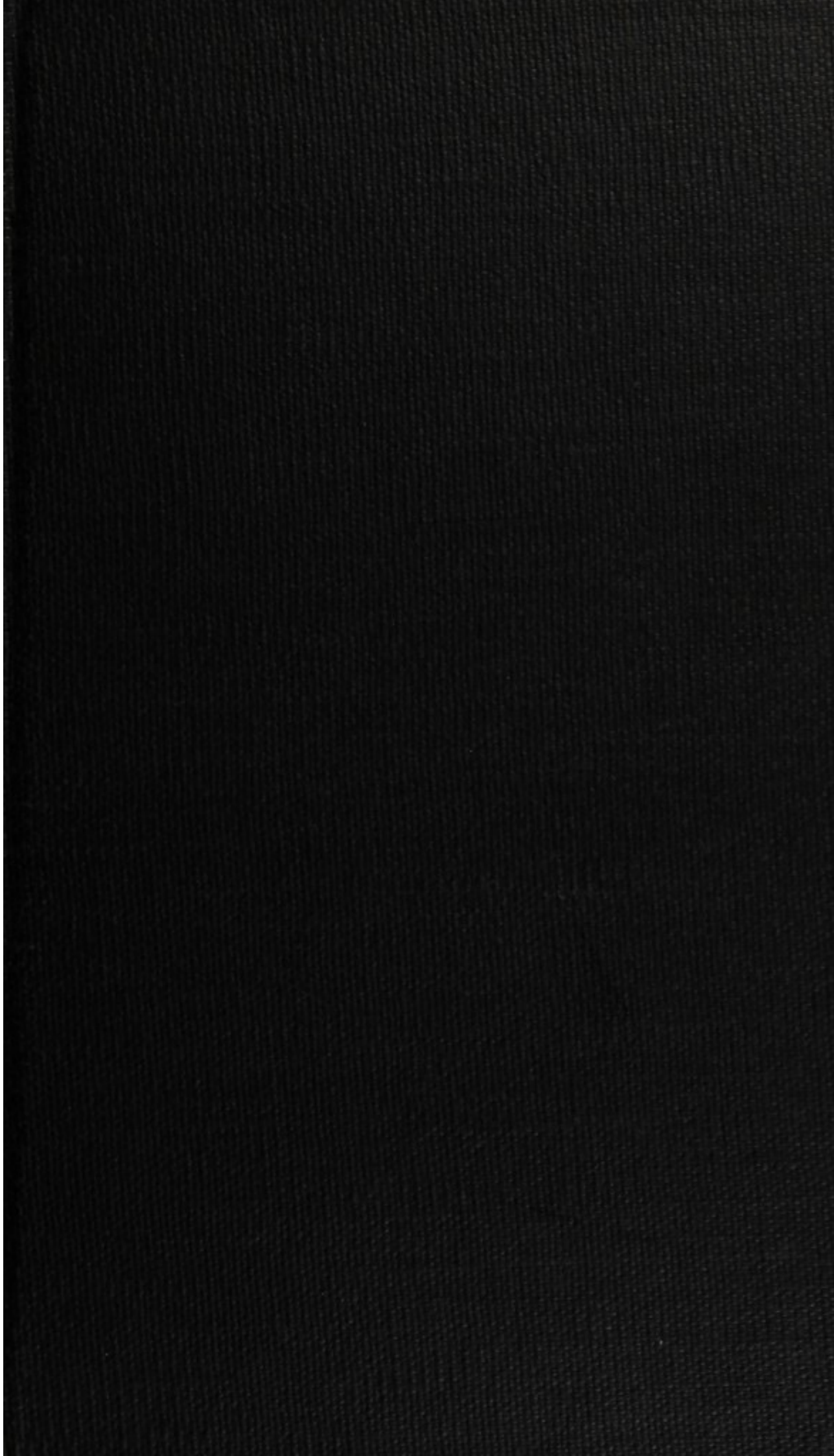
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A

TREATISE ON DIGESTION,

AND THE

DISORDERS INCIDENT TO IT

WHICH ARE COMPREHENDED UNDER THE TERM

DYSPEPSIA.

ADAPTED FOR GENERAL READERS.

BY WILLIAM SWEETSER, M. D.

AUTHOR OF A TREATISE ON CONSUMPTION, &C.

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INTRODUCTION.

THE purpose of the following treatise is to present,—in a form so far divested of the technical language of medicine as to come within the comprehension of all classes of the reading community,—a history of the phenomena, causes and treatment of dyspepsia, founded upon a general acquaintance with the physiology or healthy function of the organs which it implicates.

There are few disorders which occasion a larger sum of moral and physical suffering among us than those of digestion, and probably none whose prevention and cure are so directly dependent upon a prudent adjustment of our habits in relation to diet, and the general regimen of life, the principles of which, all may, and ought to understand.

So intimately is the health of the digestive organs associated with that of the general system, that a treatise on their derangements must necessarily comprehend a pretty full consideration of the

different principles which relate to the preservation of health; thus air, exercise, diet, the moral affections &c., will all be brought under notice.

Active medicinal agents being seldom called for in ordinary instances of dyspepsia, and never being admissible save under the immediate direction of a medical adviser, will only be noticed in the present volume with the view to discountenance their employment, and thus save from the hurtful consequences which I am convinced too frequently result from an unadvised resort to them.

Waiving all apologies, usual on such occasions, for the publication of the present treatise, well knowing that if worthy, it will require none, and if unworthy, none will be received, I will now, without further preface, leave it to tell its own story.

PHYSIOLOGICAL HISTORY

OF

DIGESTION.

CHAPTER I.

GENERAL REMARKS ON NUTRITION AND DIGESTION.

Nutrition.—Destruction and renovation are necessary conditions of vital action. A continued interchange of substance is going on in living beings from the beginning of their existence to its close in death. Nature but loans us her materials for a little term, when she resumes them for some new appropriation in her vast storehouse.

Mutation, though most remarkably characteristic of life, yet belongs to every department of nature. A constant transmigration of matter is essential to the present order of our globe. Thus common or mineral matter receives life in the vegetable—and through it, as a connecting link, in the animal—and

then may undergo a round of circulation in different animal bodies, and sooner or later resume its pristine state.

Nutrition is steadily furnishing our bodies with fresh materials, while those which have already answered their destination in the economy, are removed by absorption, thence conveyed into the circulation, and finally, separated from it and discharged by the different drains or emunctories of the system, as the skin, kidneys, lungs, and bowels. To these phenomena of composition and decomposition, or of building up and tearing down, all the organic vital actions are directly or indirectly contributing.

During the whole period of existence then, though without our consciousness, a ceaseless order of expenditure and supply is proceeding in our bodies under the directing influence of that mysterious principle, that Promethean fire, termed life. Many of the ancients—influenced probably of the Pythagorean doctrine of numbers, seven being a favorable one in this system—asserted that the human fabric experienced an entire renewal every seven years. Others again, have allowed only three years for such a metamorphosis. But we have no fixed data for calculations of this sort. Every physiologist well knows that the rapidity with which this permutation of particles is accomplished, is determined by the activity of the circulation, and consequent energy of life, which vary materially in different parts and structures of the body, and

even in the same, under different circumstances. Thus while some organs may undergo a complete renovation in a few months, many years may be required to effect it in others; and some structures, as the enamel of the teeth, perhaps continue permanently unchanged. Furthermore, waste and repair must, under ordinary circumstances, progress more speedily in the strong and active, than in the feeble and indolent. This indeed is sufficiently shown by the greater amount of supplies demanded by the former.

Nutrition varies in its force at different periods of life, and in different constitutions; and at the same period, and in the same constitution under different influences, as of sleep and watching, the moral affections, exercise and rest, the activity of the excretions, &c. It is influenced, too, in a striking manner, by external temperature. In high northern latitudes it becomes remarkably energetic, and there being less waste of the materials of the body than in warmer climates, an abundance of fat—indicating an excess of nutrition—is commonly deposited. We note this especially in northern animals, and fat, being a bad conductor of heat, serves them as a defence against the rigor of their weather.

In our own climate also, during winter, the appetite is usually more keen, and our bodies when in good health, become more full than in the warm months of summer. We may hence infer the importance of much physical exertion in cold

climates and seasons to insure a due relation between composition and decomposition; as likewise to augment the supply of animal heat, and to determine the blood, which the cold tends to concentrate internally, to the surface of the body. Thus when the inhabitants of high latitudes, are active and temperate, they arrive at the greatest degree of physical vigor of which the human frame is susceptible—and hence the general course of conquests has been from north to south.

Digestion.—We may define digestion to be that process, or rather series of processes, by which the individuality of the food is destroyed, and its nutritious principle separated, and rendered fit to be transmitted to, and identified with the blood, for the purpose of supplying the needful expenditure of this fluid in nutrition, and its associate functions. Or, if I may so speak, it accomplishes the first changes on the raw material, which is ultimately to be wrought into the fabric of our bodies.

Every living body, to maintain its active existence, must transform foreign matter into its own substance, but the manner in which this is effected varies materially in its complexity in the different gradations of life. Plants have no distinct digestive organs; they are generally fixed to the soil, and when in an active state, are, by means of their roots and the pores on their surface, constantly absorbing nutrimental materials, which are elaborated in their vessels. But all animals, however humble their position in the scale of life, exhibit some form

of an alimentary cavity, into which the food is first received, and where certain changes are to be wrought upon it. Cuvier asserts that he is acquainted with no animal unfurnished with such a cavity, and many naturalists regard it as the best means of distinguishing the animal from the vegetable, where the two kingdoms run close upon the confines of each other. Indeed the animal, different from the vegetable, generally having the power of locomotion, and receiving nourishment at intervals only, requires some distinct receptacle for his food.

By the plant then the aliment is absorbed directly from the soil into its circulation. By the animal it must first be received into a cavity, and from thence, after having experienced certain necessary changes, be absorbed into the blood-vessels. Hence the alimentary canal bears to the animal a relation somewhat analogous to what the soil, from whence it imbibes its nourishment, does to the vegetable.

The humblest animal existence yet known, and which the microscope only can discover to us, is found among the infusoria, or infusory animals, so called because they appear to be produced by the infusion in water, of animal or vegetable substances. The simplest animal of this class is merely a minute vesicle or bladder, inclosing a transparent fluid, without any opening to receive its food, and is hence supposed, like the plant, to be supported by simple imbibition. Yet it exhibits a distinct

cavity, and probably,—for all here is uncertainty,—nourishment may be absorbed through the delicate walls into its interior, and there undergoing some digestive change, be again absorbed and converted into the substance of this animated vesicle. As observed in regard to the vegetable, it is uniformly in contact with, and may be constantly imbibing its aliment.

The most simple form, however, of a digestive organ with which we can consider ourselves acquainted, is witnessed in the lowest order of polypes, denominated, from their resemblance to a purse, *bursariæ*. These animals represent a mere sac or pouch, with a single opening answering both for the reception of food, and for the discharge of its excrementitious portion. If turned inside out, their two surfaces exchange functions. We see then animal life beginning as a simple alimentary cavity—proving how essential it is—and rising by the superaddition of other organs.

Ascending in the scale of life, we observe the machinery of digestion growing more and more complex, advancing step by step to perfection—part after part being added, till at last may be enumerated organs for seizing and breaking down or masticating the food—for swallowing it—for transforming it into chyme, and next into chyle,—for the absorption of this chyle into the blood, and lastly for the evacuation of its refuse or excremental parts.

Man is rightly placed at the head of the animal creation, since viewing him as a whole, his structure and functions, are superior to those displayed by any other class of beings. But this is not equally true when considered in reference to his individual parts. Though life rises by gradations to its most perfect state, yet the advance is not necessarily uniform in each of its particular organs. Thus, anatomically viewed, man, in respect to his digestive organs, has no pre-eminence over many other animals of his order. In some, even, as among the ruminants, or those which chew the cud, they are far more extensive and complicated than in him. Many physiologists, however, imagine that in man they have a superior development of nervous force.

General view of the alimentary canal as it exists in the higher order of animals.—This continuous canal, which affords passage to our aliments, and prepares them to nourish the body, is commonly described as beginning at the superior orifice of the stomach; but since in man, at least, some change appears to be wrought in the food by its commixture with the fluids of the mouth,—not, to be sure, absolutely essential to digestion, yet probably facilitating it—I shall consider it as commencing at this orifice. It will comprehend then, the mouth, including the passage immediately behind the tongue, usually denominated the fauces—the œsophagus or gullet, the stomach, and the small and large intestines.

The intestinal division is variously convoluted on itself, and economically packed up in the cavity below the chest, named the abdomen. In the human animal, the intestines may be stated generally to be from five to six times the length of the individual. Meckel, from numerous admeasurements, found them very irregular in their length, varying in different persons from thirteen to twenty-seven feet, without any proportional difference in the stature of the body. In childhood they are often ten or even twelve times longer than the body, a great amount of nourishment being needed at this period to support the growth of the system.

The alimentary canal is of various dimensions in different parts. Sometimes representing a narrow tube, then swelling into the form of a pouch or sac.

I may remark that each division of this canal is capacious at its commencement, where the most important operations of digestion are performed, but soon contracts into a continuous tube. Thus the mouth, fauces, and pharynx, or upper portion of the œsophagus, form one large cavity representing the commencement of the first division of the alimentary canal, and here copious secretions are furnished, and in the mouth the important operations of mastication and insalivation are effected. This cavity in its descent narrows into the œsophagus. The œsophagus having proceeded for a certain distance, seems suddenly to expand to form the stomach, which may be viewed as the com-

mencement of the second division of the canal, or of the small intestine. How important are the actions which here take place on the food will be seen in the sequel. The small intestine, which is the narrow tube extending from the stomach, terminates its course in another enlargement, called the cæcum, and which is the beginning of the last division of the canal, or great intestine. In the cæcum, important influences are exerted on the residue of the food chiefly preparatory to its dismissal from the body in the character of feces.

With these general views I will now proceed to a somewhat more particular description of the different parts, with their offices, associated in the process of digestion.

CHAPTER II.

MASTICATION AND INSALIVATION.—TASTE.

MASTICATION and insalivation consist in the tearing, bruising and triturating of the food in the mouth, and the mingling of it with the fluids there secreted, preparatory to its reception into the stomach.

Mastication in the inferior animals.—Organs of mastication are by no means universal in the inferior departments of animate beings. Some insects, moluscous animals, vermes, &c., take their food by suction; and again, in other animals, organs of suction and mastication both exist. Those even of the highest class, at the first period of their existence, receive their nutriment by suction alone, hence their name—mammalia.* And indeed their organs of ingestion ever after remain capable of acting as organs of suction, and are frequently thus employed. Drinking, in many of the mammalia,

* This class of animals are brought forth alive, and all of them during infancy, obtain their support by means of suction, from the mammæ, or paps of their mother.

is uniformly accomplished by suction, and oftentimes in our own species, as in sipping. In this class, however, more numerous organs are concerned in its performance, as the lips, cheeks, tongue, in union with the instruments of respiration, and it therefore becomes a more complicated operation than in the aforementioned less elevated animals. We here witness an interesting repetition in the superior, of the earlier and inferior animal formations. "We find," says, Dr. Carus, "a remarkable proof of the accuracy of the principle of a gradually progressive developement of organization, in the fact, that the new-born Child, as regards the mode of ingestion of nutritive matter, re-approximates to the inferior Classes of Animals, and wanting teeth receives its nutriment by Suction, like a Polype or a Worm."* It might be added, too, that at the other extreme of life, the jaws becoming toothless like those of the infant, and the diet being necessarily of a more fluid character, suction is in part again resorted to. But this is not the only example of an approximation to inferior animal existences noticed in the two extremes of our being. In infancy our mode of progression is like that of the quadruped, on our four extremities. The energies of the human frame require a certain measure of developement before we can walk erect in the full dignity of our nature. And as we near

* Comparative Anatomy of Animals. Translated from the German, by R. T. Gore, vol. 2, p. 170.

the last boundary of life, and the animal powers, preparatory to their final extinction, decline, the body bends forward, the centre of gravity is changed, and a staff is needed for support, and thus again we incline to the position of the quadruped. Referring to the mode of progression, it has been not unaptly said—I believe by some French physiologist—that the transient state of man, is the permanent state of the inferior animal.

The organs of mastication vary much in their character and arrangement, and occupy different situations in the different tribes of animals. In fishes the teeth are diversely arranged in the mouth, pharynx, œsophagus and stomach. In the carp, for example, they are in the pharynx, in the sucker, lobster, crab and others, in the stomach; and some fishes, as the sturgeon, are utterly destitute of them. Certain insects have, also, their teeth in the stomach.

Birds have no teeth, their crops and gizzards producing effects on the food analogous to those of mastication. The crop more particularly belongs to birds which feed on grains, but likewise exists in many which are strictly flesh eaters. It is a large membranous cavity or pouch, susceptible of great distension, situated at the lower part of the gullet, into which the aliment is received when swallowed, and where, being exposed to a high temperature, and the dissolving influence of the secreted fluids, it undergoes a maceration, and its texture becomes softened.

The gizzard, in birds which feed on grains, or hard food, is a small cavity, with thick and powerful muscular walls, lined with a compact and callous membrane. It possesses great mechanical power, and like the strong molar teeth of many of the mammalia, crushes the most dense substances. In birds of prey, or such as feed on flesh, it is thinner and weaker, more resembling a membranous stomach.

Many birds, for the purpose, as is thought, of contributing to the mechanical effect of the gizzard, or to serve as temporary teeth, are in the practice of swallowing coarse sand and gravel stones, and some will not thrive when excluded from such substances. The ostrich swallows glass, nails, or indeed almost any bodies, however hard and rough, which are presented to him, and probably not from mere stupidity, as many suppose, but the force of a natural instinct.

Spallanzani introduced artificially into the gizzards, or muscular stomachs of birds, sharp needles and lancets, and without injury, they being quickly blunted and crushed by the mechanical power of the organs.

In the mammalia, owing to difference in the character and arrangement of their teeth, mastication exhibits remarkable modifications. It is generally accomplished in the mouth, yet there are exceptions. Thus the ant-eaters have no teeth, but like granivorous birds are furnished with a powerful muscular stomach, and are said also to

swallow stones to assist in breaking down their food.

Some of the mammalia have teeth for gnawing and cutting, others for seizing, holding and lacerating, and others again for crushing and grinding, and in different orders of this class, these varieties will be found more or less combined, in correspondence with their peculiar dietetic habits.

Teeth of man.—Three descriptions of teeth belong to the human species. First, the incisors or cutting teeth,—the four front ones in each jaw. They are broad, and flat, with a sharp, cutting edge, and shut over each other like the blades of a pair of scissors. Second, the cuspidati, or spear-shaped teeth, called also, canine or dog-teeth, and eye-teeth. Of these there are two in each jaw, placed next in order to the incisors. They have been thought to resemble the tusks of the flesh-eating animals, as of the dog for example, and from hence have derived one of their names. Third, the molar or grinding teeth, under which general name all the remainder may be comprehended. With the mode of action and use of these last, every one must be familiar. Let it not be understood, however, that man is peculiar in possessing these three kinds of teeth; for they belong to very many other animals, and who differ greatly in their habits of diet.

The monkey family approximate more closely to man in the form and arrangement of their teeth than any other known animals. “It is only in Man, however,” says Mr. Gore, “that the three

kinds of teeth are arranged in an uninterrupted series, so that those in one jaw every where touch the corresponding teeth in the other; a fossil Genus of Animals (*Anoplotherium*) alone resembling him in this respect. In Apes and Carnivora, and in all species where the Canine are longer than the other teeth, there is at least a vacancy in each jaw for the canine tooth of the other."* Dr. Carus also speaks of this same arrangement as being proper to man.

Mastication and insalivation in man.—During the mechanical action of mastication, particularly when the food is dry, the secretions of the mouth are greatly augmented, and blending with the morsel effect what is termed insalivation. The fluids subservient to mastication are mucus, and saliva. The former is supplied by the membrane lining the mouth, called, from its secretion, mucous membrane. This same membrane, modified in its character in different parts, forms a continuous lining for the whole alimentary canal, and every where secretes the like mucous fluid, sheathing its own delicate texture, allowing foreign substances to glide easily over it, and subserving also, other important ends in the different processes of digestion. The membrane is remarkably smooth and soft, and in many situations has a velvet-like appearance, or displays a delicate pile, from which latter character it has received the additional name

* Carus' Comparative Anatomy—Note to p. 77th, of volume 2d.

of villous coat. It appears to be but a continuation of the external skin, which may be seen gradually assuming its characters when turning into the internal cavities, as in the lips for example; hence it has been sometimes called the internal skin, and when, as under certain circumstances, it is long exposed to the atmosphere, a cuticle forms upon it, and it approaches in its aspect and functions to the true covering of the body. Could the mucous membrane and skin then exchange situations, it is not impossible that they might, in a measure at least, exchange characters.

The other secretion, or saliva, is far more copious, and, as usually considered, more important than the mucus. This is supplied by distinct glands, named salivary, from the fluid they prepare. The perfect glands, to which class these belong, are organs varying in their size and appearance, but generally affecting a somewhat spherical shape, which form out of the blood, fluids resembling it perhaps in none of their sensible qualities, and which, with the exception of the secretion of the kidneys, are destined to some useful purpose in the economy. They are furnished with a duct, called excretory, which receives their peculiar fluids when prepared, and conveys them to the situations where their agency is needed. Some have connected with them a bag or reservoir, into which their secretions are partly or wholly conducted, thus the gall bladder is

attached to the liver, and the urinary bladder to the kidneys.

Excited by their specific stimuli, or by common mechanical irritation, or under the influence of the imagination merely, the glands straightway emit their proper fluids. But how they accomplish their work—how they obtain from the blood substances so unlike it in character, as bile, tears, saliva, &c., physiology has yet failed to explain.

The salivary secretion is naturally called forth by the mechanical action of mastication, and the stimulus of food to the sense of taste. Yet the sight, smell, or even thoughts of savory food, when one is hungry, will literally cause the mouth to water. Thus let a piece of meat be held before a hungry dog and the saliva will often be seen streaming from each side of his mouth. Sometimes on the contact of sapid substances with the mouth, this fluid is emitted with a sudden jet, and to some distance, from the ducts of its glands. Acrimonious and disgusting articles taken into the mouth, greatly augment it—and the passions, as will hereafter be shown, exercise a marked influence both upon its quantity and qualities.

Saliva is a limpid, tasteless, inodorous and somewhat viscid fluid. Its constituents are water, which forms its chief proportion—a peculiar animal matter—mucus—a very little pure soda, and some alkaline muriates, especially the muriate of potash—and lactate of soda.

It has been estimated that upwards of eight ounces of saliva are secreted during an ordinary meal. Dr. Gairdner, speaking of the case of a man who had cut through the œsophagus, informs us that during a meal consisting of broth injected through the divided gullet into the stomach, from six to eight ounces of saliva were discharged. Here the secretion must have been excited by the stimulus of food to the stomach merely. The amount of saliva however, will of course vary according to the nature and quantity of the food, and the degree of mastication. It is comparatively greater in childhood than in adult life; and there are good reasons, too, for supposing that a vegetable, calls for a larger relative quantity of saliva than an animal diet. Thus comparative anatomy teaches that the salivary glands are most developed in the herbivorous species of the mammalia, as also in those birds which feed exclusively on vegetables.

In the mouth then the morsel being broken down and formed into a pulpy mass, and acquiring the temperature of the body, is prepared for deglutition. Some physiologists, as Haller for example, have thought that the more volatile particles of the nutriment are absorbed from the mouth during mastication, and contribute in some slight degree to nutrition.

The uses of the saliva have been differently stated. Some have regarded it merely serviceable, as any other bland fluid might be, to soften the

food, and lubricate its passages to favor deglutition; while others ascribe to it a more specific influence, believing that some vital change is wrought on the food in the mouth constituting the first step in the series of digestive phenomena. The inferences of Dr. Beaumont on this subject, drawn from his curious and interesting experiments on a young Canadian who had a fistulous opening into his stomach,* are—"That digestion is

* Dr. William Beaumont of the American army was called upon in 1822 to treat a young Canadian (Alexis St. Martin) eighteen years of age, for a severe and extensive wound of his left side—and which had completely penetrated into the stomach—from the accidental discharge of a musket. In about a year the wounded parts had become restored, only that the perforation into the stomach remained unclosed. Over this opening, which was about two inches and a half in circumference, the subject was at first compelled to wear a compress to prevent the escape of the food, but ere long a sort of valve formed out of the inner or mucous coat of the stomach, which opening inward only, securely retained the food during digestion. By pressing open this valve, and distending the orifice, the interior of the stomach could, to a certain extent, be actually inspected. Here then a most favorable opportunity presented for a series of experiments on the interesting subject of digestion, and one which it appears was not neglected. Dr. Beaumont having prosecuted his experiments for several years with a praiseworthy zeal and judgment, laid an account of them before the public in a distinct volume, entitled "Experiments and Observations on the Gastric Juice, and on the Physiology of Digestion." From Dr. Beaumont's inferences from his experiments, I shall often have occasion to quote in the course of the present volume.

Though we have on record other cases of fistulous openings into the stomach, yet this case was in a special manner favorable for physiological experiment, inasmuch as the subject enjoyed remarkably good health.

facilitated by minuteness of division and tenderness of fibre and retarded by opposite qualities."

"That the processes of mastication, insalivation and deglutition, in an abstract point of view, do not, in any way, affect the digestion of food; or in other words, when food is introduced directly into the stomach in a finely divided state, without these previous steps, it is as readily and as perfectly digested as when they have been taken.

"That saliva does not possess the properties of an alimentary solvent.

"That the first stage of digestion is effected in the stomach."

Still I am inclined to the belief that the saliva especially, is requisite to the function of digestion, and that its place could be adequately supplied by no other fluid. The care with which nature has provided for its preparation, and the copious secretion of it uniformly elicited even from the stimulus of food to the stomach, afford strong grounds for inferring that it is no unimportant agent in the function I am considering. Furthermore, in instances of wounds about the face and throat, so situated as to occasion an undue waste of saliva, loss of appetite, and indigestion uniformly ensue. "Ruysch knew a man who was wholly deprived of his appetite by a fistula in one of the salivary ducts; and it is well known to the physician who has attended maniacal patients, that the constant spitting in which such persons occasionally indulge, is invariably attended with loss of appetite,

dyspepsia, and emaciation.”* The habit then which many persons fall into, of throwing away the fluids of the mouth, in addition to its vulgarity, cannot but be prejudicial to health. Haller makes the remark, that by wellbred people the saliva is for the most part swallowed.

From the preceeding remarks the importance of slow and thorough mastication in lightening the task of the stomach may readily be deduced. The simple destruction of cohesion, and softening of the alimentary substances, must facilitate the union with them of the fluids of the stomach, just as the like processes favor purely chemical combinations. Spallanzani took two pieces of mutton, each weighing forty-five grains, and having chewed one as much as he was accustomed to chew his food, enclosed them both in separate hollow metallic spheres having perforations to admit the digestive fluids of the stomach. These were both voided at the same time, and of the masticated meat there remained only four grains, while of that which had not been masticated there were eighteen left.

Those articles whose cohesion cannot be easily overcome, and which, of course, but imperfectly mingle with the fluids of the mouth, as new, and doughy bread, or any tenacious and glutinous substances, are uniformly indigestible in delicate

* Paris on diet.

stomachs. The principal cause why stale, is more easy of digestion than fresh bread, is probably its greater friability, or more brittle texture, which is favorable to mastication, and the consequent action of the stomach. It will now, I trust, easily be conceived how digestion may become disordered from imperfect mastication, whether owing to rapid eating, defective teeth, or other causes.

Taste.—The sense of taste is perceived in the mucous membrane of the mouth and fauces, and fading insensibly, vanishes somewhere in the pharynx or upper portion of the œsophagus. In birds, who do not masticate, it probably extends further; and may not the greediness, and apparent pleasure with which many swallow hard and dry grains, be in anticipation of agreeable impressions to be experienced in their crops, or even gizzards? In those animals, too, which chew the cud, may not this sense be enjoyed in the first and second stomach? the latter, at least, is capable of voluntary action, the power of which in man is always combined with sensation.

An impression associated with taste, and which may be regarded but as a continuation of it, is perceived in the back part of the nostrils. Mr. Mayo speaks of this impression as being popularly referred to the palate, while in reality it is felt on the sentient membrane of the nostrils; thus the fume of certain kinds of food ascending into the cavities of the nose, occasions this distinct sensation: “in administering medicine to children,”—says this

physiologist—"it is well known that the greater part of what is disagreeable in its flavor may be avoided by closing the nostrils while the draught is swallowed: and by repeating this experiment upon various articles of food, it is easy to ascertain how much of their flavor depends upon one sense, and how much is appreciated by the other. Hence it is that the senses of taste and smell have been often compared as having a resemblance, the odor of many substances being supposed to resemble their flavor; while the fact is, that the flavor of such bodies consists in their scent, and that the two impressions, which are compared, are one and the same." *

It is through the intervention of taste, that the demands of hunger become the occasion of pleasure, and the needful supply of nutriment is thus more certainly secured.

This sense varies in its delicacy in different parts of the mouth. The lips have it only in a very slight degree, their province seeming more especially to judge of the temperature of the aliments. In the tongue, particularly at its tip or extremity, taste is remarkably vivid, and apparently even more so in some of the inferior animals than in man. Thus those which live on herbage are furnished with a long tongue, by means of which they very readily discriminate noxious or salutary

* Outlines of Physiology, p. 313.

qualities belonging to the different varieties among which they feed.

The taste, in union with the smell, which latter is in many very acute, direct the brute creation to their appropriate food, and probably in their native and unrestrained condition—their saving instincts uncorrupted by art—wholesome food alone would be agreeable to these senses, and thus would they be faithful sentinels to the stomach.

In man, however, the taste is for the most part so perverted by luxury, and the numerous inventions of cookery necessarily associated with it, that it is far from being a safe guide in respect to diet; and it would probably be difficult to find two individuals in whom the standard of agreeable and disagreeable in relation to food would precisely correspond. In reality, our physical, vary nearly as much as our moral tastes. Other things being equal, too, this sense would appear to be less trusty in the human than in the brute animal; the former depending on the uncertain guidance of reason, while the latter is more obedient to his unerring instincts. Thus instances occur of young children eating cicuta, stramonium, and other poisonous herbs; and adults, too, not unfrequently mistake noxious for wholesome substances; but the inferior animal is by no means liable to such errors.

Individuals, as in regard to their other senses, differ naturally in the vividness of taste, and consequently in the enjoyment which it affords them. It is also susceptible of a high degree of cultiva-

tion, and thus the epicure gets to distinguish savors almost as accurately as the musician does sounds, or the painter, colors. Hence cooking is an art ever held in high estimation when society has advanced to a state of luxury and refinement ; it seems, I may almost say, to go hand in hand with the fine arts.

The habitual employment of acrid and stimulating food and drink blunts and corrupts the taste, so that simple and wholesome substances become insipid. The too uniform impressions from the same kind of food may also after a time weary the sense, and fail to impart pleasure. Healthful and agreeable excitement, in most of our organs, is to a certain extent dependent on variations in their stimuli. It is sameness that brings ennui, and the *tædium vitæ* so frequent among mankind.

It is essential to the perfection of taste, that its organs be moist, and the food softened, or partially dissolved, that it may come into extensive and close contact with the extremities of the nerves of this sense. These conditions are all insured by mastication. During this process, the food, beside being partly liquefied, is moved about the mouth, compressed between the tongue and palate, thus becoming generally and intimately applied to the different portions of the mucous membrane of the mouth, which is abundantly furnished with the nerves of taste. But it is in swallowing, when the different parts of the mouth and fauces are all contracting

themselves upon the morsel, that the pleasure of eating is at its acme.

The taste varies in its intenseness at different periods of life. In childhood, the system demanding frequent supplies of nourishment to contribute to its growth, this sense is particularly keen. In old age it diminishes in acuteness, and more sapid substances are commonly required to arouse it. Still its failure by no means corresponds with that in the other senses; but being necessary to existence, it continues to afford enjoyment even to its final term; seeming like the last solitary link which ties the old man to the pleasures of earth.

The taste is modified by climate and season, and by the different conditions, and often, wants of the system. It is affected in almost all diseases, but in a more especial manner by such as implicate the digestive function.

CHAPTER III.

DEGLUTITION.

THE food having undergone its needful alterations in the mouth, is next to be conveyed into the œsophagus, and through it to the stomach.

Description of the œsophagus.—The œsophagus, commonly called the gullet, is a straight, cylindrical, narrow and fleshy tube, forming a passage from the mouth to the stomach. It consists of three membraneous coats. The first or outer is composed chiefly of cellular texture, but having no immediate and obvious concern in the function of the organ, its description is not required. The second, middle, or muscular coat, comprises two distinct layers of muscular fibres—one, or the external, running lengthwise of the tube—the other, or internal, encircling it like rings; hence they are called the longitudinal and circular fibres of its middle coat. It is plain now that the contraction of the external layer of fibres must shorten the tube, while that of the internal or circular will contract it, both of which actions are necessary to the passage of the food.

The inner or mucous coat is a continuation of the lining of the mouth, and secretes a mucous or lubricating fluid, over which the aliments readily slide. This, compared with the other coats, having but little elasticity or power of distension, is necessarily more extensive, and hence displays a number of longitudinal folds, which become developed to correspond with the great dilatation to which the other more elastic coats are so frequently subjected, especially in those persons who eat in a hurry, and swallow huge mouthfuls.

At the superior part of the œsophagus is the pharynx, a broad funnel-shaped expansion of the

tube,—commonly described as a distinct division of it—continuous with the fauces, or straits of the mouth just behind the tongue. Into the pharynx, open the nasal passages, and the upper portion of the windpipe, named the larynx.

The œsophagus enters the stomach at its left or larger extremity, by what is called, from its vicinity to the heart, the cardiac orifice.

Physiology of deglutition.—When the food is to be swallowed, it is collected on the tongue, which is then raised,—brought into the condition of an inclined plane, and pressing itself continuously from its tip to its root against the roof of the mouth, and some other muscles at the same time aiding by their contractions, the morsel is necessarily forced back into the fauces. The pharynx next rises upward and forward to receive it, and the openings into the nostrils and air-tube are shut. The nasal passages are closed by the soft palate, or that curtain of flesh continued posteriorly from the palate bones or roof of the mouth, and which may be easily seen by looking into this cavity; and when the food is passing these openings, this is elevated and applied to them like a valve. Whenever, either originally, or from disease, the soft palate is imperfect, swallowing must be performed slowly and with great care, otherwise the food will find its way into the nostrils; and furthermore, as under such circumstances, the passage of air through these cavities cannot be controlled,

articulation is imperfect, and the voice has a disagreeable nasal sound.

The windpipe is guarded by the contraction of its aperture, and also by the epiglottis. This latter is a thin elastic cartilage, shaped like a little tongue, extending over the top of the air-pipe, and which, pressed down by the food, shuts over its orifice like a valve.

The pharynx having received the morsel, pushes it onward to the narrow part of the gullet, or œsophagus proper, through which, by the agency of its circular and longitudinal muscular fibres,—the former contracting it from above downward, the latter shortening it, or, as it were, drawing it over the food—it is conveyed into the stomach. Substances then do not pass down the œsophagus simply by the force of their own gravity, but are urged along by a foreign impulse. Many animals habitually swallow with their head downwards, and man is capable of doing the same; indeed he has been known to swallow even liquids while standing on his head.

Deglutition has been divided into three stages.—The first comprehending the passage of the aliment from the mouth to the pharynx; the second, from the pharynx to the œsophagus, and the third, from the œsophagus to the stomach. The second stage must be rapid, since during it the respiration is wholly interrupted. Thus if at this period we attempt to speak or breathe, or laughter from any cause is excited, the aperture of the windpipe is

unclosed, and portions of the food or drink necessarily falling into it, a convulsive cough, accompanied with a sense of strangulation instantly supervene, and we say, what is literally true, that the food has gone down the wrong way. It is in this manner that foreign substances, as beans, &c., will sometimes, particularly in children, get into the air-tube, when it may become necessary to make an artificial opening into it for their removal. We may now readily understand how substances, too large for deglutition, becoming impeded in the pharynx, endanger speedy suffocation.

Arrived in the *œsophagus*, the progress of the food becomes much more tardy, and it is not unfrequently subjected to delays here which would be fatal in the previous stage of its passage.

In the first step of deglutition the various parts of the mouth and fauces where the sense of taste resides, are brought into intimate and forcible contact with the sapid body, and hence during it, the pleasure of eating is at its height, and it may thus be termed the orgasm of taste. When therefore the appetite is good and the food agreeable, we eat with avidity—and it is with difficulty even that the inclination to swallow luscious articles is resisted. But under the reverse circumstances, deglutition takes place much more slowly. Every one knows how painful it is to swallow nauseous drugs, and how long, children will often retain them in their mouth before they can be urged to do it—and oftentimes force alone will impel them. Sometimes

it is utterly impossible, the pharynx contracting spasmodically against their passage. Whenever too the stomach is afflicted with nausea, deglutition becomes unpleasant, and is often very difficult to be accomplished.

In swallowing we remark the gradual transition of the sensitive and voluntary functions into those which are insensible and involuntary. I may here briefly state for the information of such as are unacquainted with the principles of physiology, that all animals are constituted of two classes of functions. One they have in common with vegetables, the other is peculiar to themselves. The former are denominated the vegetable, nutritive, or organic functions, and comprehend digestion, circulation, absorption, nutrition, secretion, &c., and being immediately essential to life, are withdrawn from the direct domain of the will,—a power too uncertain and capricious for their superintendence. Imagine the circulation and respiration to be wholly subject to volition, and how quickly must life cease!

These functions, too, when in health, go on independent of our consciousness—sensation indeed is unnecessary to them, it being an associate of, and a motive to volition.

The latter class, are both voluntary and sensitive, and comprise the mental feelings and operations, spontaneous muscular motions, and the functions of the different senses.

These two sets of functions however, are not always separated by very distinct boundaries, so that the exact point where they may be said to begin or terminate cannot in every instance be confidently decided upon. Some of our functions, too, partake of the character of both classes. Respiration, for example, being immediately necessary to life, continues without volition or consciousness; yet under the influence of the will, it can be increased, diminished, interrupted, and modified in a variety of ways.

In the different processes of digestion, phenomena of both divisions of the functions are likewise displayed, and we may here observe their gradual transition. Thus mastication and the first stage of deglutition, or the transmission of the food from the mouth to the pharynx, are spontaneous, and associated with feeling, and the specific sensation of taste. The second stage, or the passage of the food through the pharynx, though less decidedly, still is in a certain measure voluntary, the aid of the will being wanted to hasten the morsel over the aperture of the air passage. We can sometimes, too, by a spontaneous effort, repel our aliments in this stage of their progress. In the pharynx, common sensation, and specific, or taste, are both very slight. When the food has arrived in the œsophagus, the voluntary, appear wholly to have yielded to the organic contractions, and unless the mass is relatively large, or hard and rough, or acrid, or of a temperature varying considerably

from that of the body, its progress continues without our recognition. But as the refuse of the nutriment comes near to the outlet of the system, sensation is again excited, and voluntary actions are called forth for its dismissal. The mucous membrane then of the alimentary canal, ever as it approaches the skin, acquires the power of distinct sensation, and its functions become associated with voluntary actions. Let it be borne in mind that I am now speaking of the digestive function when in health.

CHAPTER IV.

FUNCTION OF THE STOMACH.

It is the important province of the stomach to transform the alimential matters into a peculiar substance termed chyme.

Description of the stomach.—In the human body, as in all the higher animals, there are three great cavities, each containing organs, which, though differing remarkably in their structure and offices,

are absolutely essential to existence. The superior is that of the cranium and includes the brain, upon which we depend, not only for life, but for all the noble functions of our nature. The next in order is the cavity of the thorax, where are the heart and lungs, without whose offices existence must at once cease. The third, or inferior, is the abdominal cavity, and here we find the organs of digestion, with which we are especially concerned.

A thin, flat muscle, with a tendinous centre, called the diaphragm or midriff, divides the abdomen from the chest, forming as it were, the roof of the former, and the floor of the latter. Just under this partition, and in contact with it, is the stomach.

The œsophagus descending through the chest along the backbone, passes an opening in the diaphragm, and then appears suddenly to expand into a large bag, which is the stomach. Or to use the more common description, the gullet having perforated the diaphragm, enters the stomach by the cardiac orifice near its left or great extremity.

The stomach represents a conical sac curved upon itself, and is commonly likened to the pouch of a bagpipe—a very happy comparison for those who are familiar with this instrument. It is situated obliquely across the upper part of the abdomen, diminishing, and descending a little from left to right, and hence its right extremity is much smaller, and somewhat more dependent than its left. In the former situation, or, regarding its conical shape—at its apex, is the outlet into the

intestines, called the pyloric orifice, encircled by a ring of muscular fibres, and furnished with a sort of fold in the mucous membrane which has been compared to a valve,—a construction supposed to have reference to the retention of the food while it is undergoing its preparation for the intestines.

The stomach is constructed of three coats, or layers of membrane. The external is thin, shining, dense and transparent, and because it exhales a moist vapor which when condensed into fluid is called serum, it has received the general name of serous membrane. The same membrane exists in the other great cavities, and indeed in various parts of the body, though with some modifications of character, and under different names. Thus in the chest it is called pleura, and in the abdomen, peritoneum, from a Greek word meaning to extend round. In this latter situation then, where we are concerned with it, it is called indiscriminately serous or peritoneal coat, and it here both lines the walls of the cavity, and invests more or less perfectly all its viscera. The obvious use of this membrane is to keep the organs externally moist and pliable, to prevent their adhesion, and facilitate their movements upon each other. It likewise strengthens the substance of the stomach, and also of the other abdominal viscera, and assists in confining them to their respective situations.

The next, or middle, is a muscular coat, and upon it the necessary contractions of the organ depend. Like the corresponding coat of the œso-

phagus, it has a longitudinal and circular layer of fibres for shortening and narrowing the stomach. It is most powerful at the two orifices, probably to control the egress of the food.

The inner, is a mucous coat, continuous with that of the œsophagus, but more soft and velvet-like. As if it were too large for the organ, it displays frequent plaits or wrinkles, called rugæ, which are unfolded in proportion as the stomach is distended, thus supplying a want of elasticity, a property enjoyed in so high a degree by the two other coats. By such an arrangement also, a more extensive surface is afforded to furnish the important digestive secretions. This membrane, ever when in health, is sheathed and moistened by a mucous fluid, essential to the wellbeing of the stomach, and probably also an important agent in the conversion of the food into chyme.

The organ under consideration is largely supplied with nerves and blood-vessels, as is the case with all parts which have important functions to perform. Its capacity varies of course in different individuals; in an adult, in its natural state, it will generally hold from three to four pints, yet it may be so distended as to contain one or two gallons.

Conversion of the food into chyme.—The aliments having been submitted to the influence of the stomach for a period varying in duration according to circumstances, are transformed into chyme. This, though differing somewhat in its color and consistence, may be described generally as a greyish

white, pulpy or nearly fluid substance. It has a peculiar acid, combined with a slightly sweetish taste, and a sharp or pungent odor. Its sensible qualities however are liable to considerable modifications from the nature of the diet employed.

The time expended by the stomach in transforming an ordinary meal into chyme, is most commonly stated to be from four to five hours. Dr. Beaumont found the usual period required by the subject of his experiments for the disposal of a moderate meal of the fibrous parts of meat, with bread, &c., to be from three to three and a half hours. This subject, it should be remembered, was a very active and vigorous young man, and a native of a cold climate. It is plain however that the time thus occupied must be influenced by a variety of circumstances. Some persons have constitutionally a quick, while others have a slow digestion; hence, all other things being equal, the process may be completed in half the time in one individual that will be required for it in another.

Different kinds of food will of course experience this change with greater or less celerity. We find it very commonly asserted that flesh, having a nearer similitude to our own substance, calls for less alteration to be transformed into it, than vegetable matter, and consequently for a less complicated and protracted operation of the stomach. But were this explanation true, raw meat should be more digestible than cooked, and human flesh the most so of any substance. Broussais found

that milk and fecula were more speedily transformed into chyme than meat. Still the digestibility of different kinds of food must depend greatly on habit, and constitution, and also on their different modes of preparation.

A variety of incidental circumstances, moreover, influence the facility of the process under consideration. Thus it is hastened by a proper mastication of the food, a keen appetite, happy feelings, and moderate exercise in a pure and cool atmosphere.

Exercise taken immediately after eating is generally thought to impede chymification; in support of which opinion no experiment is more often cited than that of Professor Harwood of Cambridge, in England. This gentleman fed two dogs,—nearly alike in age, health and appetite—with equal quantities of meat; and while one was permitted to indulge in his propensity to quietness and sleep, the other was taken into the fields, and kept at the severe exercise of hunting game. At the expiration of some hours both were killed and their stomachs opened; when it appeared that the food in the dog which had remained at rest, was wholly converted into chyme, while in the other it had experienced but a trifling change. This experiment teaches, not that any exercise, but,—what we need not kill dogs to learn,—that severe and fatiguing exertion, by wasting the bodily vigor, necessarily impairs the power of digestion.

Still, gentle exercise in the fresh air, and more especially that to which we have become habitua-

ted, has appeared to me rather to favor chymification than otherwise; and such Dr. Beaumont found to be the case in his subject.

Let me here remark that the terms gentle and severe as applied to exercise, are to be understood in relation to the habits and strength of the individual, for an exertion which would occasion only healthful excitement in one instance, might in another, be productive of painful exhaustion. The vigorous laborer goes to hard work immediately after a hearty meal, and generally experiences no inconvenience in consequence; but should one whose habits are sedentary, or whose body is more feeble, do the same, he would probably have to endure all the sufferings of difficult and imperfect chymification.

Sleep and the horizontal posture generally retard the formation of chyme. Dr. Beaumont learnt from his experiments, that sleep or rest in a recumbent position, reduced the temperature of the stomach from its natural standard, which is most favorable to chymification. But I must leave the further consideration of the causes influencing the function of the stomach until I come to treat of the disorders of digestion.

CHAPTER V.

FUNCTION OF THE STOMACH CONCLUDED.

Former hypotheses of chymification, or the conversion of the food into chyme.—To account for the remarkable transformation of the aliment in the stomach, a variety of hypotheses have at different periods been promulgated, whose absurdity can only find an excuse in the obscureness of their subject. Thus at one time it was ascribed to a putrefaction or rotting of the food, under the favoring influence of air, moisture and the high temperature to which it is subjected in the stomach. But healthy chyme emits no putrid odor, and, as I shall presently show, aliments, instead of corrupting, are, even when in a putrid state, speedily restored to sweetness by the gastric fluids. Another hypothesis referred it to fermentation, to excite which a leaven or ferment was imagined constantly to exist. But there is no analogy between the products of digestion and fermentation, and it is now known that the healthful influence of the stomach is to prevent chemical fermentation, and that this process is always unnatural and indicative of imperfect digestion.

The sect of mechanical philosophers, who at one period were disposed to refer all the phenomena of life to the principles of their own sciences, fancied that the walls of the stomach, operating like millstones, ground down the food into the semifluid pulpy mass called chyme; and hence many of them assumed for this organ a most incredible muscular power. Pitcairn, for example, computed its contractible force to be equal to a hundred and seventeen thousand pounds, and which he supposed to be aided by an equally powerful pressure derived from the surrounding muscles. Such are the absurdities of philosophers who, blinded by prejudice, model their facts to correspond with their theories. As previously stated, the food is broken down and triturated, in the dense muscular stomachs of many birds, but the human stomach is of quite a different character, being soft and membranous, and wholly inadequate to any powerful mechanical action. The best modern physiologists estimate its force of contraction as equal only to a few ounces. Beside, the food undergoes a positive change of properties, which simple trituration with moisture could not produce.

The extremely ridiculous hypothesis has even been advanced, that chymification is brought about by the agency of living animals—that a host of small worms, created for this special purpose, immediately on the entrance of the aliment into

the stomach, seize upon it, and greedily tear it in pieces.

Modern theory of the function of the stomach.—The opinion now commonly admitted is, that the stomach, in addition to its mucous secretion, prepares a peculiar fluid, called the gastric juice, which being powerfully solvent, is mainly instrumental in the formation of chyme. Still, eminent physiologists are not wanting, and among them may be mentioned M. Chaussier and Montègre of France, who, on the strength of their experiments and observations, deny the existence of such a specific fluid, regarding that which is so considered, as merely a combination of the saliva with the ordinary mucus of the stomach, mouth and œsophagus. To be sure, in the human stomach, no separate glands have been discovered for furnishing such a secretion; nevertheless I think the evidence is almost conclusive that a distinct and actively solvent liquid does exude from the lining membrane of this organ, and to which chymification is principally referrible. That it is of itself,—I mean independently of any mechanical aid from the walls of the stomach,—equal to the solution of the food, has been sufficiently established by experiment.

Spallanzani enclosed various sorts of aliment in hollow, perforated metallic spheres, and forced them into the stomachs of different animals, and under such circumstances, exempt from any mechanical influence, they were after a time, varying

according to their nature, found to be dissolved. This experimentalist having himself swallowed a perforated tube containing beef, and ejected it in four hours after by vomiting, found the beef softened and partly wasted.

The same experiments were repeated by Dr. Stephens, upon a man who had been in the custom of swallowing stones, and with analagous results; the silver perforated balls employed, being passed in about forty hours, completely vacated of the substances which had been enclosed in them.

Dr. Beaumont, whose opportunities for judging on this subject, have at least never been surpassed, asserts that the fluid under consideration is poured out by vessels distinct from those which prepare the mucus;—that it is only discharged under the stimulus of food, or some other substance, to the gastric mucous membrane;—that it dissolves the aliment, changes its properties, and converts it into chyme; its action, however, being facilitated by the warmth and motions of the stomach.

Description of the gastric liquor.—As ordinarily procured by experimenters, this substance is necessarily mixed with mucus, and oftentimes with saliva. In the pure state in which Dr. Beaumont was enabled to obtain it, it was a clear and transparent fluid, without odor, slightly salt, and perceptibly acid to the taste, and was kept for months without manifesting any sensible change. On chemical examination, it was found to contain free muriatic and acetic acid, beside several neutral

salts and an animal matter. Dr. Prout affirms that it always contains muriatic acid. But, as is true of all the other animal fluids, the results of its analysis have varied in the hands of different chemists. Perhaps it undergoes modifications to suit the nature of the food on which it is to act;—thus it has been asserted to differ in the flesh, and vegetable eating animals. Different conditions of the stomach, or of the general system, may likewise influence its character.

The chemical constitution of this fluid, so far at least as we are yet acquainted with it, will by no means explain its powerful agency in digestion. Its free muriatic acid would appear to be its most active solvent ingredient, yet, being in but slight excess, we should conclude it quite inadequate to the effects accomplished.

Chemical properties of the gastric liquor.—The solvent power of this liquid, to which I have already alluded, is very energetic in man, but still more so in many of the inferior animals. It appears generally to hold an inverse ratio to the muscular strength of the stomach, being greatest in those animals who have thin membranous stomachs, in which its agency is of course most needed. Even the soft, semi-solid stomachs in many of the moluscous or gelatinous animals, known under the common name of sun-fish, are capable of digesting hard and rough substances, as for example, a small prickly fish, on which some species of them feed.

Some years since, an account was published of a seaman, who, during ten years, had been in the occasional practice of swallowing claspknives to amuse his companions. At first but trifling inconvenience ensued; but in the end, the stomach became so weakened as to be incapable of transmitting these bodies to the intestines. The man at length died in an English hospital, and on examination, there were found in his stomach between thirty and forty fragments or portions of blades, knife-springs, and handles, greatly corroded and much reduced in size by the solvent power of the gastric juice. The handles being, for the principal part, of horn, were almost wholly dissolved.* In the stomach of the dog, common bones, and even ivory undergo solution.

Gastric juice has the property of coagulating milk, and albuminous fluids generally. Milk, uniformly becomes solid in the stomach previous to its conversion into chyme, hence when infants vomit this fluid, it is always found to be curdled. The same property is in like manner possessed by the dead stomach; the substance termed rennet, employed to coagulate the milk for making cheese, is a simple infusion of the digestive stomach of the calf. In a trial made by Dr. Fordyce, six or seven grains of the inner coat of the stomach infused in water, afforded a liquor which coagulated more than a hundred ounces of milk. It is probable

* Medico-Chirurg. Trans. vol. 12th, part 1st.

that most, if not all albuminous substances, are coagulated before being digested.

This remarkable fluid, is, moreover, antiseptic, having the quality both of resisting and correcting putrefaction. The northern savage often eats his fish in a highly putrid state; and certain meats, as mutton and venison, are not unfrequently eaten even in civilized life, when the putrefactive process has commenced in them.

Many of the inferior animals, as the dog for example, are well known often to feed on flesh far advanced in decomposition. The raven and vulture, as also many other birds of prey, revel and fatten on the most putrid animal substances, being attracted often from great distances by their effluvia. Now it appears from experiment, that food in this condition is quickly restored to sweetness in the stomach. Dr. Fordyce proved that the gastric juice of a dog soon sweetened the most putrid meat that he could be made to swallow; and Spallanzani showed that the same fluid from the crow and dog, will preserve veal and mutton for thirty-seven days in winter, whereas immersed in water, they become fetid by the seventh day, and are perfectly putrid by the thirtieth.

Some articles which otherwise introduced into the system, are highly poisonous, when taken into the stomach are decomposed or resolved into their elementary principles by the agency, as is believed, of the gastric liquor, and their noxious properties

thus destroyed. Such is said to be the case in regard to the poison of the rattlesnake and viper.

Action of the gastric juice on alimentary substances out of the stomach.—Spallanzani found that masticated meat put in a vial with a certain proportion of the gastric liquor, maintained at the natural temperature of the body, and subjected to gentle agitation, in a few hours was dissolved and presented the appearance of chyme. Dr. Beaumont also made a number of experiments on this subject, and with results analogous to those of Spallanzani. He found it highly essential to the process, that the heat of the mass experimented upon, be kept at about 99° or 100° of Fahrenheit, ascertained to be the usual temperature of the stomach during digestion, and also that it was much facilitated by gentle agitation, which removed the external layer of chyme, thus affording the gastric juice more ready access to the undissolved parts beneath. The solution, however, goes on with greater rapidity, and probably, perfection, in the stomach; being favored by the regular motions of the organ, and the fresh supplies of its secretion which are brought to act on the undissolved aliment as that which has undergone its destined change is removed. It may be, too, as before suggested, that difference in the nature of the diet calls for some modification of character in the digestive fluid.

Though the solution of alimentary matters out of the body by the agency of the gastric juice cannot be questioned, yet many physiologists deny

it to be chymification, believing the peculiar vital action of the stomach essential to this process.

Haller, Richerand and others have thought that bile was requisite to the formation of chyme; and it is true that this fluid does sometimes enter the stomach, and particularly when fatty and oily food is taken, and probably assists its digestion. The duct, however, which conveys the bile from the liver, has been tied in animals, and still chymification has gone on, and with apparent perfection.

The gastric juice does not act on living matter.—Observation instructs us that living matter will withstand the influence of many agents which speedily corrode and destroy it after its vital principle has departed. It is well known that worms live in the stomach of man, and of numerous other animals; and that reptiles and insects inadvertently swallowed, have existed here for some days. Dr. Good cites an instance of a water lizard being found alive in the stomach, two days after it had been swallowed. “Frogs and serpents,” says he, “have for a longer period of time been equally able to resist the action of the stomach; leeches swallowed unintentionally, in a draught of muddy water, have thriven and grown to an enormous size; the eggs and larvæ of various insects, and especially of the *musca cibaria*, and even of the spider, have been hatched or perfected in the stomach or intestines, and the kernels of plum and cherry stones have germinated there.” *

* Study of Medicine.

It is the principle of life that preserves the stomach itself from destruction by its own secretion. Some physiologists assert that parts of this organ have actually been dissolved by the gastric juice when subjected to its action after death. Mr. John Hunter, I believe, first called attention to this subject; and conceived it necessary to such a result, that the individual should die suddenly in the midst of full health, and when the gastric liquor under the stimulus of food, had been recently poured out. Subjected to such conditions, he imagined that this secretion would act on the stomach as on any other dead animal matter. But it may at least admit of a question whether the perforations and partial solutions which have been occasionally witnessed in the stomachs of man and some of the inferior animals in cases of their sudden death, and referred to the corrosive action of the gastric fluid, might not in reality have originated prior to dissolution and from some other cause. The facts and observations in connexion with this subject are as yet too limited to warrant any confident conclusion in regard to it.

Solvent power of the gastric liquor on different substances.—Different alimentary substances are dissolved with greater or less facility under the influence of this agent, and which is far from being determined in every instance by their mechanical texture or particular physical properties. “While”—to use the language of another—“it acts upon the densest membrane; while it speedily dissolves

bone itself, it produces not the slightest effect upon many substances of the most delicate texture; the skins of fruit, for example, and even the finest fibres of flax and cotton are not in the smallest degree affected by it. This selection of substances exactly resembles the operation of chemical affinity, and is decidedly contrary to what would be the effect of mechanical agency."* It operates with difficulty on most crude vegetable matters, and in a more particular manner on their stalks and leaves. Farinaceous vegetable matter, and lean flesh, as a general rule, appear to be most readily soluble in it.

Influence of the muscular contractions of the stomach in forwarding chymification.—Under the influence of the longitudinal, and circular or transverse contractions of the stomach, assisted probably by the play of the diaphragm and abdominal muscles during respiration, the alimentary matters are subjected to an oscillatory motion,—are gently agitated and compressed, and their admixture with the gastric juice, and consequently their solution, thus facilitated. Such is in correspondence with what happens in all chemical solutions, they being uniformly expedited by agitation, through which the dissolvent is brought into more intimate and extensive contact with the soluble matter.

The muscular contractions of the stomach are evidently affected by the qualities of the food; thus

* Library of Useful Knowledge. Article,—Animal Physiology.

some sorts call forth rapid, and others more tardy motions; and sometimes the natural order of its action appears to become inverted, as in vomiting.

Manner in which the gastric fluid unites with the food.—Many physiologists teach that the action of the gastric liquor is confined to the superficies of the food, alternate layers of it, as they are dissolved, being separated or rolled off from the rest, and carried to the pylorus by the motions of the stomach, and consequently that digestion goes on only at or near its mucous surface. Dr. Beaumont, however, observed in St. Martin's stomach, that the secretion gradually insinuated itself into, and became commingled with the whole alimentary mass, and that solution was progressing simultaneously throughout it. He remarked, too, in opposition to the statement of several physiologists, that chymification begins immediately on the entrance of the food into the stomach.

Is chymification limited to any particular portion of the stomach?—Here, again, physiologists are at issue, some believing that it is accomplished especially in the left or cardiac extremity, others in the right or pyloric, and many that the alimental mass circulates promiscuously about the whole cavity. Sir Everard Home described a sort of hour-glass contraction of the circular fibres of the stomach, during digestion, separating the greater from the less extremity, the purpose of which, was thought to retain the food in the former situation until it should be transformed into chyme. Many

have been skeptical in regard to this appearance, but Mr. Mayo asserts that he has seen it on several occasions in instances where death has happened suddenly while digestion was going on, and it is his opinion that the food thus retained in the great end of the organ is slowly dissolved, the solution taking place upon the surface, "and in proportion as it proceeds, the dissolved part is rolled off the rest by the peristaltic action of the fibres of the stomach, and carried to the pyloric portion."* But have we a right to conclude that a mode of contraction occasionally witnessed in the organ after death, necessarily represents its natural and healthy action?

Passage of the aliment into the intestines.—The food being converted into chyme, the pyloric orifice which was before shut, now relaxes under its impression, and allows it a ready passage into the intestines. It is from the circumstance of its guarding the entrance of the bowels that this outlet has received its name of pylorus, which corresponds with the Greek word meaning a guard or doorkeeper. Beside the pylorus, we remark many other instances in the animal body of organs endowed with a sort of selecting tact, or, if I may thus term it, organic instinct, under whose superintendence, when in health, they admit only such substances as are appropriate to their wants, rejecting, or attempting to reject all others. Thus

* Outlines of Physiology, p. 132.

atmospheric air readily passes into the windpipe, but when irritating and noxious effluvia are combined with it, the opening into this passage contracts against them, and if perchance they gain an entrance, a convulsive cough immediately ensues for their expulsion.

Though, however, the pylorus tends to close against other substances than chyme, insomuch that food which is not digested will oftentimes be returned by the œsophagus and mouth, rather than be permitted to enter the intestines, still it does in many instances give way to them.—Thus the stones and skins of fruit, seeds, greens, and various undigested substances, are frequently passed by the bowels;* the pylorus, yielding as it were to the urgency of their solicitations, and the necessity of the case—for they could not remain in the stomach without endangering its welfare—at length withdraws its resistance. Broussais suggests that these crude matters clear the pyloric strait by aid of others more advanced in digestion, or in other words by stealing along with the chyme.

In many morbid conditions of the stomach, undigested substances are constantly passing into the intestines, but here the natural relations are changed.

* This is of material importance in the extension of the vegetable kingdom, since it is thus that birds are enabled to transfer the seeds of plants to coral islands and various distant situations, their germination manytimes being even facilitated by the maceration to which they had been subjected in passing through the alimentary canal.

CHAPTER VI.

CHYLIFICATION, OR SECOND DIGESTION.

CHYLIFICATION consists in the transformation of the chyme into a peculiar milky substance denominated chyle; and is the next in the series of changes which the aliment undergoes preparatory to its conversion into blood, and assimilation with the living structures. Owing to the difficulty of observing it, this process has been less studied, and less, consequently, is known about it, than of stomachic digestion.

The chyme, on its entrance into the small intestine, under the influence of the secretions of the liver and pancreas, soon begins to manifest new characters.

Description of the small intestine.—This division of the alimentary canal is included between the stomach and large intestine. Its length is generally stated to be about four times that of the body, though this proportion is far from being constant. In its diameter, it insensibly diminishes from its commencement at the outlet of the stomach till it communicates with the great intestine. Its struc-

ture is essentially the same as that of the stomach, having like it, a serous, muscular and mucous coat. Its muscular coat has a longitudinal and transverse layer of fibres, and appears to differ from the corresponding one in the stomach only in being somewhat weaker. The mucous or inner membrane is more villous than in the stomach, and is furnished with large and numerous transverse folds or plaits, as they appear, called *valvulae conniventes*, or winking valves, which serve to retard the passage of the chyle, and to increase the surface from which, as I shall presently show, it is to be absorbed to get into the circulation. The mucous secretions are here very abundant.

Though the small intestine is one continuous tube, yet anatomists describe it under three divisions, called duodenum, jejunum and ileum. The duodenum is the superior, communicating directly with the stomach, receiving the chyme and contributing to its conversion into chyle. Its name is derived from the Latin word *duodeni*, meaning twelve, because it was considered to be about twelve finger-breadths in length. About twelve inches are now commonly allowed to it. The diameter is here greater, and the muscular coat thicker and stronger than in either of the other divisions. Different from them, too, it has but little freedom of motion, being closely secured to the back part of the abdomen by its peritoneal or outer coat, two portions of which, meeting behind, are extended from it for a short space in the form of a

double layer, and fastened to the spine.—In the direction from right to left it makes an obvious curvature, serving to delay the passage of the chyme until it has experienced the necessary influence here to be wrought upon it.—It is largely furnished with nerves and bloodvessels, marking the high importance of its function.

The duodenum is by many physiologists looked upon as a lesser or secondary stomach, and it has even been imagined, though without adequate evidence, that, like this latter organ, it secretes a peculiar fluid subservient to its office.

Into the posterior part of this division, a little above its middle, the ducts from the two large glands in the immediate vicinity, viz. the liver and pancreas, enter,—sometimes separately, sometimes in union—and discharge their secretions.

The next division, comprehending two fifths of the small intestine, is the jejunum, so called because it is commonly found empty, jejunus being the Latin word for fasting. All the remainder is called ileum or ileon, from a Greek word εἰλεω—eileo—meaning to turn about, and expressive of its numerous turnings, or convolutions. These two latter divisions are allowed a large extent of motion, and hence are called free or floating. They have a thinner muscular coat, a somewhat smaller diameter, and are generally stated to possess less irritability than the duodenum.

Structure of the liver.—This is the largest gland in the body. It is situated principally on the right

side, below the diaphragm,—to the inferior surface of which it is united, and thus in a measure sustained in its position—and above the stomach, with which it is also connected. Its right extremity is more thick and bulky than its left. Its superior and anterior surface is regularly smooth and convex; its posterior and inferior, irregularly concave. It has three lobes or divisions, formed by deep fissures in the organ—viz. the right or great lobe,—the left, considerably smaller and extending somewhat into the left side—and the little lobe, or lobe of Spigelius as it is called, situated posteriorly.

In the concave, or hinder surface of the great right division, is a slight excavation in which is lodged a small oblong membraneous bag, called the gall-bladder.

The liver varies considerably in regard to its size in different individuals; on a general average, however, its weight in the adult may be stated at about four pounds. In some diseased conditions, it becomes enormously enlarged. Its color is a dull red, its structure granulous, and its consistence moderately soft.

From each of the fleshy granules composing this organ, seem to proceed—though their beginnings are too minute to be sensible—little tubes, which uniting together with an apparent irregularity, finally all terminate in a single one, of a relatively large size, called the hepatic duct. This, issuing from the under surface of the liver, directs its course toward the duodenum, but before reach-

ing it, is met, at nearly a right angle, by still another from the gall-bladder, called the cystic duct,—from a Greek word, meaning a bladder,—which, uniting with it, they form a single pipe, called the common duct, or in technical language, ductus communis choledochus. This proceeds directly to the duodenum, and perforating its two outer coats, passes a little way, between the muscular and mucous, and then penetrating the latter, opens into the cavity of the intestine about two inches from the pylorus. Or perhaps I may render this arrangement more intelligible by saying that the hepatic duct in its course from the liver to the intestines, reflects from itself at nearly a right angle, another, or the cystic, which having proceeded a short distance, suddenly swells into the gall-bladder. It will be seen here that the bile, to arrive at the gall-bladder, must turn at almost a right angle, and ascend against its own gravity.

Function of the liver.—The liver prepares the peculiar fluid we term bile. This is a viscid, unctuous, slightly bitter liquid, varying in consistence, and exhibiting, sometimes a yellowish brown, at others a light yellow, and again a green color. In its chemical constitution it is the most complex of all the animal fluids.

A portion of the bile, as it passes from the liver, commonly takes its course to the gall-bladder, where it is retained as in a reservoir, and where it experiences new modifications in its properties, which are probably of importance in the economy

of digestion. Bile having remained a certain time in the gall-bladder, and its watery parts being diminished by absorption, becomes thicker, and more unctuous and bitter, than when first secreted, and assumes a decided green hue. It is here called gall, and owing to its greater concentration, is thought to be a more active stimulus to the intestines than bile direct from the liver.

During chylication,—and, it may be, through the whole process of digestion,—the secretion of bile is augmented, and a draft is also made on that reserved in the gall-bladder.

This fluid, beside its probable use in transforming chyme into chyle, has also an important one in reference to the feces; its combination with them, diminishing their cohesion, giving a smooth polish to their surface, and rendering them more stimulating to the large intestine, thus materially facilitating their discharge. If perchance this secretion is deficient, the feces usually become dry, rough, and hard to be evacuated; assume a light color, or that of dry clay, and the bowels suffer from constipation.

But other important uses, beside those in direct reference to digestion, have been ascribed to the liver. Some physiologists believe that like the lungs,—on the common theory of respiration,—it purifies the blood of its carbonaceous matter; the bile containing a large proportion of carbon in many of its principles, which are excreted with the feces, as the resinous, fatty matter, &c.: that it

is, therefore, a repetition of the breathing organs, or in other words, that its function is supplementary to theirs; serving to carry off, any excess of carbon which the lungs may have left in the blood;—by respiration, it being separated in an æriform, by the hepatic function in a more solid state.

There are several facts which, to say the least, give plausibility to such an opinion. Thus comparative anatomy teaches that the developement of the liver in different animals is ordinarily in an inverse ratio to that of the respiratory organs. Tiedemann found, too, in those warm blooded animals, who dive, or burrow,—as the otter, marmot and field-mouse,—and who are thus often deprived, either wholly or partially of air, that the liver was relatively much larger than in such as live more uniformly on the surface of the ground.

Before birth, and of course previously to respiration, the relative magnitude of the liver is very remarkable, and the secretion of bile considerable. But afterwards, the function of the lungs having become established, the proportional bulk of the liver gradually lessens, and at adult life, when the chest has acquired its greatest developement, this organ,—though to be sure still large—has its least relative size.

It may furthermore be suggested that warm climates—in which the hepatic function is in greatest activity, and bilious complaints most prevalent,—are most favorable to the health of the lungs. Now may it not be that this increased activity of the

liver, in union with that of the skin, serves in a measure to lighten the labor of the lungs? It has been remarked in diseases of the heart, which are known greatly to embarrass the breathing, that the liver becomes enlarged; and also in what are called *blue children*, who are born with some imperfection of the heart or its great vessels, that the liver continues to preserve its early state of disproportion. Be this theory, however, true or false, there are few reflecting physiologists who do not suspect that the liver has some other purpose in the economy, beside its subservience to digestion. The high importance of biliary organs is declared by the great constancy with which they are found in the different animal organizations.

Pancreas.—The pancreas, or sweetbread, as it is called in the calf, is an oblong gland, of a light, or yellowish white color, weighing in the adult from four to six ounces, situated behind the stomach, and transversely in relation to the spine. In color and structure it nearly resembles the salival glands. A duct issues from it and enters the duodenum in company with, or close to that which conveys the bile.

The chemical nature of the secretion of this gland,—owing to the difficulty of procuring it apart from the bile and fluids of the duodenum—has been but little studied. Collected, however, as it passes by drops into the intestine, its sensible properties are found closely to resemble those of the saliva.

The pancreatic fluid, called into the duodenum during digestion, unites with that of the liver, and concurs with it in its action on the chyme.

Spleen.—The spleen or milt, though we have no certain knowledge of its uses, by many physiologists has been associated with the digestive organs, and regarded as directly or indirectly contributory to their functions; and this opinion would seem to be favored by its situation and anatomical connexions.

It is an oblong, flattened, oval viscus, of a deep color—which it owes to the large amount of dark red blood it contains—of a very brittle texture, and principally composed of blood vessels. It is seated in the left side, behind and adhering to the great extremity of the stomach. Its average weight in an adult is from seven to nine ounces; but it varies considerably in size, and oftentimes even in shape and position, in different individuals.

Some eminent physiologists of the present day believe the spleen to be subservient to the function of the liver,—or that it accomplishes some change in the blood preparatory to the secretion of bile. It is well known, however, that bile can be formed when this organ is absent.

The spleen has for ages afforded a most fruitful theme of fanciful hypotheses. Thus melancholy or low spirits were once referred to it, and hence acquired, and still retain the name of spleen. The ancient Greek physicians fancied that the blood was formed in the liver by the four principal humours of the body, at their time believed to

exist. These were called yellow bile,—blood, or the portion imparting the red color,—phlegma, or pale watery humour, meaning probably the serum,—and melancholia, constructed from the Greek words μελας, melas, meaning black, and χολη, cholee, bile, this was a dark thick fluid. Here, by the by, we trace the origin, to a false medical theory, of the common term melancholy. Now these four essential humours were supposed to be conveyed to the liver, and there, as it were in a laboratory, united together to form blood. But since, as might be expected, they would not always be in the exact proportions necessary to form this fluid, any redundance of them must be carried away, subserving, according to its nature, some useful purpose, or exciting disturbance in the economy. Thus the secretion of the liver was viewed but as the excess of the simple humour called yellow bile, and for which the gall-bladder was the appropriate receptacle. When the melancholia or black bile was too abundant, its superfluity was carried to the spleen, which was thought to be its peculiar reservoir; probably from the large quantity of dark grumous blood which this viscus is always found to contain. Some, however, imagined that the spleen, instead of being a simple recipient, prepared or concocted the melancholia, but all agreed that here was its seat. Now this particular humour, perhaps owing to its dark and gloomy aspect, was by the ancient physicians, who were all *humouralists*—that is, held diseases to originate in the fluids, or humours

of the body—viewed as a grievous disturber both of our moral and physical tranquillity—and to its superabundance were referred irritability, low spirits, and even hypochondriacism, which affections were hence generally denominated spleen.

I may here remark that the ancient division of temperaments, and which is still retained, was based on these four humours, and from them derived their names. The sanguine temperament was attributed to the prevalence of the red humour, now called red globules of the blood;—the phlegmatic, to that of the phlegma, or pale watery humour,—the choleric, from the Greek word meaning bile, to that of the yellow bile, or proper secretion of the liver,—and the melancholic, to that of the melancholia or black bile.

The spleen, because it is seated in the side, and tickling the sides makes a man laugh, has even been regarded as the seat of laughter, and the great propensity to it manifested in some persons has been ascribed to an enlargement of this viscus. Sir Charles Bell facetiously remarks that, “we have authority for the excision of the spleen from those who are otherwise incurable in their propensity to laughter!” It has, however, been very gravely objected to this opinion, that laughing is produced by tickling the right as well as the left side. But, seriously, we know absolutely nothing about its function. Like some other parts in the animal system, it has the texture of glands,

and their great vascularity, but differs from them in possessing no excretory ducts.

The fact that this organ has often been extirpated in the inferior animals,—as in dogs for example—and occasionally even in man, and without subsequent injury to health, proves that whatever its function may be, it is not essentially necessary to existence.

Phenomena which take place in the duodenum.—

On the entrance of the chyme into the duodenum, it becomes mixed with the mucus formed there, and also with the bile, and secretion of the pancreas. The two latter fluids, invited by the stimulus of the chyme, immediately begin to pass, though slowly, from their ducts into the intestine, blending gradually with its contents. Experiments on living animals have shown that a drop of bile appears at the orifice of the common duct, and diffuses itself over the neighboring surface about twice in a minute, and that the passage of the pancreatic liquid is still slower. It is not long, however, before the chyme acquires the color and bitterness of the bile.

Soon after the union referred to, the mass separates into two distinct portions, viz. a milky, tenacious, and slightly coagulable fluid, called chyle, and which is to be absorbed into the system for its support, and a yellowish pulpy mass, or the excrementitious part, which, after experiencing some further changes, is to be dismissed from the system.

This decomposition or separation of the chyme, is, by the greater number of physiologists, attributed to the agency of the bile and pancreatic fluid, whose union with it is supposed to effect a sort of chemical precipitation of the impurities of the aliment. The subject however is still obscure, and some recent researches, especially those of Tiedemann and Gmelin, have tended to cast considerable doubt over the uses of these secretions in chyliification.

The function of the duodenum is performed in less time, and probably with less labor, or at any rate it makes a less draft on the powers of the system than that of the stomach. And like the function of this latter organ, it must also be influenced both in regard to its celerity and perfection, by a variety of incidental circumstances.

Chyliification has a very close dependence on chymification. Thus if the latter is not accomplished, the food generally passes with but little alteration through the whole alimentary canal. Nevertheless the fluids of the intestines do display some solvent properties in relation to the food, when sufficient time is allowed for their action. Hence articles which have escaped the influence of the stomach will sometimes undergo, in their passage through the intestines,—if it be slow,—a more or less obvious solution, and change of character. That solution continues to be effected in the intestines of animals which feed on herbage, is sufficiently evident.

CHAPTER VII.

PASSAGE OF THE CHYLE AND REFUSE PORTION OF THE FOOD THROUGH THE SMALL INTESTINE;—ABSORPTION OF THE FORMER, AND ITS TRANSMISSION INTO THE CIRCULATION;—COURSE OF THE LATTER THROUGH THE GREAT INTESTINE, AND ITS DISMISSAL FROM THE BODY.—INFLUENCE OF FOOD IN THE STOMACH UPON THE GENERAL SYSTEM.—PASSAGE OF FLUIDS FROM THE STOMACH.

THE nutritious and excrementitious elements of the food, being separated from each other in the duodenum, are impelled along the small intestine by its peristaltic or vermicular motion, resulting from the contraction of its circular and longitudinal muscular fibres, assisted probably by the agitation imparted to the bowels, by respiration, and the various kinds of exercise. The folds of the mucous membrane, and the frequent curvatures of the intestine, which oblige its contents often to pass counter to their own gravity, guard against the too rapid passage of the chyle, and thus sufficient time is allowed for its absorption. A certain amount of air is always found in the stomach and

bowels, and seems absolutely essential to their healthy action.

The chyle, keeping in contact with, or adhering to the mucous membrane, is absorbed from it by a system of vessels called lacteals, which will here demand a brief description.

Lacteal absorbents.—The lacteals, so named from the Latin word *lac*, meaning milk,—because they convey a whitish, or milky fluid,—arise, probably,—their origin not being obvious to the senses,—from numerous minute pores or capillary orifices in the villi of the mucous membrane, and absorbing the nutritious materials to convey them into the circulation, bear to the animal a relation somewhat analogous to that of roots to the vegetable. Thus in the plant, nourishment is absorbed from the soil by the fibrils of its root,—in the animal it is absorbed from the mucous membrane of the intestines by the fibrils, if they may be so termed, of the lacteal apparatus.

The lacteals originate especially in the small intestine, and pass in great numbers between the two layers of what is termed the mesentery; that is, a posterior extension of the outer or peritoneal coat, in the form of a double membrane, enclosing more or less fat, tying the bowels loosely to the spine. In their course these vessels frequently open into and intersect each other, though without changing their diameter, and at length enter and are lost in what are called the mesenteric, or lacteal ganglions, or glands. These are small

lenticular bodies,—their shape being generally compared to that of a flattened olive,—scattered about, numerous and irregularly, in the fat between the two layers of the mesentery. Some are half an inch or more in length, while others are too minute to be readily distinguished. Their developement is greater in early than in adult life, and in the former period they are often found morbidly enlarged. They exhibit a pale red, or rose color, which is rendered lighter when they are filled with chyle. Their color, however, is subject to variations, which may often be owing to diseased conditions of them. They are invested by a dense and externally shining membrane, and seem to possess a high degree of vitality.

The intimate construction of these bodies is not clearly comprehended. Some imagine that they are only the lacteals coiled up in this particular form, and that therefore the chyle winds through them without leaving its vessels, while others suppose that this fluid on entering them, becomes extravasated, and is then again taken up by absorption. Be this as it may, all the chyle is obliged to pass through them, and hence it is reasonable to infer that some additional vital change is here wrought upon it preparatory to its reception into the blood. The sponglets, as they are termed, that is, minute, oblong, oval spongy bodies situated on the fibrils of the roots of plants, may not unlikely subserve an analogous use in the economy of the vegetable, that the mesenteric gangli-

ons do in that of the animal, and which, if true, furnishes another circumstance in favor of the analogy between the lacteal absorbents and vegetable roots.

On the opposite side of these ganglions, issue little tubes, or lacteal vessels, corresponding with those which were seen to enter them, still carrying forward the chyle. These soon unite to form larger ones, all finally terminating in one still more capacious, being about the size of a goosequill, called the thoracic duct. This commences in the cavity of the abdomen, and passing through the diaphragm, ascends along the spine to the apex of the thorax, where it opens into one of the large veins, at a little distance from the heart. I have thus traced the chyle into the circulation, where it is no longer distinguishable from the blood.

In the thoracic duct, the chyle meets and becomes mixed with a transparent, watery fluid called lymph, brought to it by a set of vessels denominated, from the matter they convey, lymphatics. These being found in almost all parts of the body, and supposed, at least by the greater number of physiologists, to be subservient to the function of absorption, which must take place throughout the system, have been named general absorbents, in contradistinction to those described, which arise from the intestines only, and seem destined to the absorption of nutrimental matters.

These two classes of absorbents manifest in many respects a near resemblance to each other.

Thus, like the lacteals, the lymphatics previously to arriving at the thoracic duct, enter into, and emerge from little, roundish, fleshy bodies, much like those through which the chyle passes, called lymphatic, or absorbent glands or ganglions.

Chyle in the thoracic duct then necessarily differs from that in the duodenum. It is in the former situation only,—where being separated entirely from the matters in the intestines, and having experienced the influence of the lacteal glands, and become further modified by its union with the lymph,—that the chyle is perfected, and approximating most closely to the nature of blood, is ready to be converted into this fluid. It is this chyle which is most commonly subjected to examination, and whose properties therefore I will here briefly describe.

Description of chyle.—This fluid drawn from the thoracic duct of animals was observed by Magendie to vary in appearance according as they had, or had not fed on aliments containing oil or fat. In the former case, its color was milkwhite, and white opaque matter rose to its surface. In the latter, it was nearly transparent. That the chyle differs in some measure according to the nature of the food is doubtless true, yet colored substances mixed with the aliments seldom impart any tinge to it.

The chyle I am describing is a little heavier than distilled water, having a saltish taste, and slight alkaline properties, which latter not being

possessed by the chyme, have by some been referred to the bile, a highly alkaline fluid. Its analogy with the blood, into which it is soon to be transformed, is very close. Like this fluid, it coagulates soon after being drawn, separating spontaneously into a solid and liquid portion, the former resembling the clot of the blood, the latter its serum, or watery part. It has now, too, assumed a faint reddish tint. Like the blood, moreover, it contains minute globules varying in size, though smaller than the red globules of this fluid. Chemists have likewise detected different salts in the chyle, corresponding with such as are found in the blood.

Each successive change experienced by the aliment from its first reception into the body has obvious reference to its final destination, or advances it more nearly to the nature of the vital fluid with which it is ultimately to become identified. Thus the chyle in the duodenum has more of the properties of the blood than the chyme; and that in the thoracic duct still more than that in the duodenum. In short we may say that the food goes on acquiring vital properties until it makes part of the different animal structures.

Absorption of the chyle.—How the chyle is taken up from the mucous membrane, or how its absorption commences, whether by a physical or vital power, is not decided. Some refer it to capillary attraction, which opinion gains some support from the fact that it has been seen passing a short distance into the lacteals, when life, both animal and

organic, had entirely ceased. Yet that vitality is concerned in it appears to be evinced by the circumstance that chyle is selected for absorption in preference to other matters not adapted to nutrition. Though, however, the lacteal vessels display a special affinity for chyle, still they do also admit other substances, and such even as are deleterious, or perhaps poisonous to the system. In disease, their discriminating property is often much impaired, and imperfect chyle, and other unsuitable matters may be absorbed to the detriment of the system.

The lacteal absorbents being furnished with numerous pairs of valves, all opening forward, or toward the point where their contents pass into the circulation, it is plain that the contraction of these vessels necessarily press onward the chyle, when it is once beyond the first pair of valves. The thoracic duct at its termination in the venous system, is supplied with a valve to guard against the return of its contents, and the intromission of the blood.

Having entered the blood, the chyle must be subjected to another important influence before its sanguification is completed. Entering the venous system near the heart, it is soon carried to the right side of this organ, from whence—having been agitated and more perfectly mingled with the blood—it is transmitted to the lungs, and there acted upon by the vital air, it receives its last finish, and is now fitted to convey life and health to every

part of the system. How important therefore is pure air to the perfection of nutrition may now be readily inferred.

Passage of the residual matter, and its dismissal from the body.—That portion of the food which is not absorbed into the circulation is slowly transmitted through a sort of valve, called the cœcal valve, separating the large from the small intestine, into the cœcum, or first portion of the former. This is a swell or enlargement in the alimentary canal marking a new division and a new function. On entering here, the contents of the bowels quickly assume the peculiar characters of feces.

The remaining divisions of the great intestine are the colon and rectum. The diameter of the large, is much greater than that of the small intestine, while its length is considerably less. The colon is by far the most extensive portion. The rectum constitutes the inferior division and terminates in the outlet of the alimentary canal.

The general structure of the large intestine corresponds with that of the small. Its muscular coat, however, is more powerful, surpassing in strength even that of the stomach, and its internal or mucous membrane is destitute of transverse folds, or *valvulæ conniventes*.

The colon exhibits circular contractions at regular intervals, as though bands were tied round it, and is thus divided into a number of cells. These are susceptible of great distension, and seem designed as places of deposit. Indeed the whole

colon must be regarded in the light of a reservoir for the fœcal matters.

Few, if any, lacteal absorbents arise from this division of the alimentary canal, and in healthy digestion no chyle is found beyond the cœcal valve. General absorbents however exist here, taking up the more fluid parts of the feces, and probably extracting from them any remaining nutritious particles. That some nutriment may be absorbed from the large intestine is evident from the fact that persons have been sustained for a time by clysters alone. Sir Astley Cooper, knew a lady, having a stricture of the œsophagus, to be supported forty-five days by clysters of broth and wine, when she could not swallow even a drop of water. It would appear then that undigested liquid aliment absorbed into the bloodvessels can contribute in a degree to nutrition; and it may be that some of the more subtile parts of the food are imbibed from the stomach by general absorbents, to be applied to the purposes of nutrition.

The secretions of the large intestines are less abundant than in the small, and hence their contents, becoming more consistent, and their passage being delayed by the cellular structure of the colon, are evacuated only periodically, an arrangement highly conducive to comfort.

When a certain amount of excrementitious matter has descended to the inferior portion of the large intestine, the brain becomes apprized of it, and consentaneous or cooperating muscular contrac-

tions and relaxations, partly voluntary, and partly involuntary, are excited for its expulsion.

The frequency of the dejections will depend on the character and quantity of the food, and on the constitution and habits of the individual. Vegetable, on a general principle, affords a larger proportion of refuse matter than animal food. Thus the fœcal discharges of animals which feed on vegetable substances, especially on grass and herbage, are more frequent and abundant than in such as live on flesh. In health, the evacuation ordinarily takes place about once, though sometimes twice, in the twenty-four hours. In some individuals, however, it happens only every other day, and in occasional instances but once in several days. Magendie states that in certain persons, and who enjoy good health, it does not occur oftener than once in ten or twelve days. "A very great difference"—says Dr. Heberden—"is observable in different constitutions in regard to the evacuation by stool. One man never went but once in a month: another had twelve stools every day for thirty years, and afterwards seven in a day, for seven years, and in the mean time did not fall away, but rather grew fat." * Such cases, however, are but exceptions to the general rule, and in almost all constitutions, it is essential to health that a dejection take place daily, or at furthest every other day.

* Commentaries.

Custom exercises a very marked influence in respect to the regularity of the excretion under notice, and thus the inclination to it may be caused to return with considerable periodical exactness. When the disposition, however, is neglected, it will commonly after a time cease, and the feces getting indurated from the absorption of their fluid portions, costiveness is liable to ensue, and when such neglect is frequent, a costive habit very often becomes established.

It was remarked by Hippocrates, Celsus, Boerhaave, and by other of the older physicians, that vigorous constitutions are apt to be disposed to constipation, which they regarded as indicating a more perfect digestion, and absorption of the nutritious portion of the aliments, and a more active perspiration. Sanctorius said, that the active and robust, discharge the remains of their nutriment chiefly by perspiration; the indolent and weak, principally by the kidneys and bowels. It is evident that in relaxed bowels, owing to the rapid passage of the alimential substances, their nutritious parts can be but partially absorbed, and hence will follow defective nutrition and debility. "People"—says Mr. Locke—"who have relaxed bowels, have seldom strong thoughts or strong bodies." *

Influence of flood in the stomach upon the general system.—When food is taken judiciously, and under the incitement of natural appetite,—the digestive

* On Education.

organs being in health,—the stomach is agreeably impressed, and a pleasing influence is diffused throughout the system. The mere healthful action of the stomach seems competent to excite and invigorate the body, refreshment being felt almost immediately on swallowing the food.

Fasting tends to irritate, while eating, if the organs are sound, soothes and quiets. Hence the reason why we feel so much disposed to discuss a man's faults while waiting dinner for him.

“ He was not taken well ; he had not din'd ;
The veins unfill'd, our blood is cold, and then
We pout upon the morning, are unapt
To give or to forgive.”—

We are doubtless so constituted that the natural play of the organs of life, that is their healthy response to their appropriate stimuli, must agreeably impress the brain ; and though we cannot appreciate the influence of each separate function, yet the general effect is to render mere existence pleasurable. Thus, in what is termed a physiological or healthy state, refreshment follows food and drink sleep is tranquil, imparting alacrity and vigor both to the mind and body, and in the young especially, there is a propensity to action, and a keen relish for the various pleasures of creation. Man, to be sure, from his higher nature, has many additional sources of happiness, as those of a moral and intellectual character, but it is probable that the enjoyment of most of the inferior animals is

especially dependent on the pleasurable impressions experienced in their nervous system from the healthful performance of the different functions contributory to life ; under which the gratification of their appetites will of course be comprehended. The gambols of the young animal plainly indicate to us the pleasure he derives from the simple feeling of existence.

Unfortunately, however, a perfect physiological state is of rare occurrence in our own species, and it is to deviations from it, that we owe a large share of our unhappiness. When from any cause, whether owing to some change in the condition of our organs, or to excessive, deficient, or improper stimuli applied to them, there is a departure from the necessary mode of action established in the living constitution, the brain is quickly apprized of it, and a state of things very different from that described soon ensues. Our moral and physical tranquillity are disturbed ; we become irritable, discontented, and perhaps despondent, and even our natural affections may be destroyed. Various physical sufferings too afflict the different organs. Such aberration of the actions of life constitutes what we call a pathological state, and the amount of pain and disturbance from it, will depend on the character of the organ or organs affected, on the nature and degree of the affection, and on the peculiar constitution of the individual. Thus a little physical uneasiness, and mental irritability, may alone be experienced, or there may be most

agonizing bodily suffering, and complete mental alienation.

After eating, more blood probably being sent to the lungs, respiration is accelerated, and more full. When the stomach is much distended, by pressing against the diaphragm, and thus impeding the freedom of its motions, it necessarily renders the breathing more difficult; and hence it is that those who habitually suffer from embarrassment of respiration, always find it aggravated by full eating.

Sometimes whilst chymification is going on, there is a paleness of the surface of the body, as though the blood was concentrated internally to contribute to this function. Some persons, too, even in apparent health, after a large repast, experience chills and flushes, or a sort of febrile action. If, subsequent to a full meal, especially of animal food, we are withdrawn from sensual stimuli, a disposition to sleep is apt to supervene.

The chyme having passed into the duodenum, respiration becomes more free, the skin more active and warm, and it is now, when the task of the stomach is finished, and the chyle is replenishing and refreshing the blood, that our systems feel the greatest vigor, and are capable of the most energetic efforts.

Passage of fluids from the stomach.—Those drinks which contain no nutriment, usually remain a much shorter period in the stomach than the food, yet of the manner in which they pass from it we have no positive knowledge. A common opinion

is that they are transmitted by the pylorus, and like the chyle, absorbed into the circulation by the lacteals. But Magendie found that a ligature passed round the pylorus did not essentially retard their disappearance. There is certainly a good deal of evidence to show that the drinks may in part, at least, be imbibed immediately from the stomach. At any rate they find their way very speedily into the circulation, as is proved by the suddenness with which they often increase the secretions after being swallowed.

Those fluids which contain nutritious matters, are either coagulated, as in the instance of milk, and their coagulum digested like any other solid matter, else their watery parts are absorbed, and the nutritious are left to be transformed into chyme.

CHAPTER VIII.

HUNGER AND THIRST.

Definition of appetites.—We may define appetites to be those instinctive propensities whose purpose is the preservation of the individual, and the continuance of the species. Physiologically considered, there are three, viz. hunger, thirst, and sensual love. The two former insure to the system its needful supplies of food and drink, and hence are indispensable to the life of the individual. The latter has reference to the permanence of the species.

The appetites probably originate in some peculiar condition of their appropriate organs, which, through the intervention of nerves, affects the brain in such a way as to awaken the specific desire. It is only with the appetites which preserve the individual that we are here concerned.

Hunger.—All animals, or certainly all those of the higher orders, who procure their food by a voluntary effort, are imperatively warned by this appetite of the wants of the system for new mate-

rials to supply the wear and tear consequent to its functions; and are thus impelled, and after a time by the most urgent sensations, to those mental and physical acts which are needed to answer such requisitions.

The importance of the appetite under consideration to the intellectual advancement and happiness of man in his social condition can hardly be estimated. To provide for it, both the bodily and mental energies are elicited, and thus secured against the degeneracy consequent to inaction. In those southern and fertile countries, whose soil teeming with a luxuriant vegetation, precludes the necessity for exertion, man is sure to become effeminate, and to offer an easy conquest to the active and hardy inhabitants of the more sterile and less inviting climes of the north.

Though there is ever a proneness to undervalue the pleasures of everyday occurrence, still every one must acknowledge that the temperate and judicious gratification of the appetite of hunger contributes in no small measure to human happiness. "Had there been no *pleasure*," says Dr. Brown, "attached to a repast, independent of the mere relief from the pain of hunger, the coarse and equal food would probably have been taken by each individual *apart*, and might even, like our other animal necessities, have been associated with feelings which would have rendered solitude a duty of external decorum. It would not be easy, even for those who have been accustomed to trace a

simple cause through all its remotest operations, to say, how much of happiness, and how much even of the warm tenderness of virtue, would be destroyed, by the change of manners, which should simply put an end to the *social meal*." * And true indeed, a change which would break in upon so many of the happy associations of domestic life, would be one of no trifling import.

All our appetites contribute both directly and indirectly to our enjoyment; it is their abuse alone that is reprehensible. The low estimate in which some persons pretend to hold the pleasures of sense appears to me to savor much of affectation. We have sensual, intellectual, and moral wants, directly or indirectly connected with, and often conducive to each other; and it is to their gratification that we owe the pleasure of existence.

Causes of hunger.—Numerous hypotheses have at various periods been advanced to explain the sensation of hunger. Thus it has been ascribed to the friction of the walls of the stomach upon each other when the organ is empty; and likewise to the irritating impression of the gastric juice on its coats, when this fluid is in excess, or when no food is present for it to act upon. Dr. Beaumont remarking that the gastric liquor did not flow spontaneously, but only under the stimulus of food, or the irritation of some foreign substance, concluded

* Philosophy of the Human Mind.

to refer hunger to the distension of the vessels which are supposed to form this secretion. But the truth is we have little else than conjecture on the subject. That the sensation emanates from some peculiar condition induced in the stomach, or its nerves, by the want of food, which transmitted to the brain causes the perception of hunger,—in like manner as a specific affection of the eye occasions vision, and of the ear hearing,—is, to say the least, not improbable. At any rate mankind generally agree in referring this appetite to the stomach, and independent of any physiological research.

Mr. Mayo thinks it not impossible that a person might be hungry without a stomach. Could life be continued after a removal of this organ, hunger might be experienced from an association like that which causes feeling to be referred to a limb after it has been separated from the body. But independent of such association, though uneasy sensations might be felt indicating the wants of the system, I question much whether that specific affection we denominate hunger could exist. We know that the stomach being diseased, the natural appetite for food is commonly absent. Let it be inflamed for example, and though the system be wasting for lack of nourishment, yet even a loathing of food will exist. Here there is a new condition of the organ incompatible with that exciting the sensation of hunger, but affecting the brain in

other ways, as to cause thirst, and perhaps stupor, sadness, anger, delirium.

The stomach oftentimes appears to act as a telegraph, informing the brain of the wants of the system, hunger being urgent in proportion to its need of nourishment.

There subsists among all the functions of assimilation a striking and nicely adjusted consecutive relation.

Thus if nutrition and its associate functions are energetic, demanding rapid supplies, the stomach will exert a corresponding force to furnish them, and will also call loudly on the brain in the language of hunger, that it may excite those voluntary acts necessary to the introduction of nutriment into the system.

During childhood and youth, active nutrition being called for to maintain the growth of the body, digestion is rapid, and hunger frequent and imperious. Thus we are often amazed at the excessive quantities of food which boys will devour and digest when growing rapidly in height. Many, at this period, seem to live almost completely under the dominion of their stomachs.

After profuse discharges, and during quick convalescence from diseases under which the body has become much emaciated, as fevers for example, hunger is apt to be very urgent, and to recur at short intervals. But protracted abstinences during health, from accidental causes, as in cases of shipwreck, are followed by a hunger far more difficult

to appease, and which may for a time subdue all the delicate feelings of man's higher nature. In illustration of this, the following account from Admiral Byron's narrative, relating to the effect upon his appetite, of the privations to which he was subjected when shipwrecked on the coast of South America, has often been cited. "The governor," says he, "ordered a table to be spread for us with cold ham and fowls, which only we three sat down to, and in a short time despatched more than ten men with common appetites would have done. It is amazing that our eating to that excess we had done from the time we first came among these kind Indians, had not killed us, as we were never satisfied, and used to take all opportunities, for some months after, of filling our pockets when we were not seen, that we might get up two or three times in the night to cram ourselves."

A case is on record of a rupture of the thoracic duct, and the chyle not being received into the blood, the child, who was the subject, was, while it lived, continually taking enormous quantities of food to satisfy the ardent cravings of hunger.

This appetite is subject to the influence of a variety of incidental circumstances. Thus, if the mind is under strong excitement, or engaged in some interesting pursuit, the desire for food is less frequent and urgent than when it is more free. It is a matter of common observation that the idle eat oftener than the busy. Habit, moreover, obviously affects it; hence we are apt to be most anxious for

our meals at the particular hour we have been accustomed to take them. Under its influence, too, a greater or less amount of food may be craved. Still, independent of all such influences, the appetite of hunger differs remarkably in different constitutions, some persons caring apparently but little for their meals, while others ever enjoy them with the keenest relish.

Phenomena of hunger when extreme.—Hunger in a slight degree is not painful, but if not allayed, it grows more and more imperious; a distressing sense of emptiness, or a sort of dragging, and gnawing, as commonly expressed, are referred to the stomach, and a languor and feebleness in all the important functions are experienced. If its demands still remain unanswered, phenomena of the most afflicting character are soon manifested. The peculiar distress in the stomach becomes extreme, and all the powers of the mind as it were absorbed by it, reason may partially or entirely yield, and languor, gloom and despondence alternate with the feverish ravings of madness, oftentimes associated with acts of the most brutal ferocity. Thus in accounts of shipwrecks, scenes are often described most shocking and humiliating to our nature; where the starving wretches have not hesitated to murder and feast upon their companions, or even to gnaw the flesh from their own bones. So imperious is the instinct of self-preservation! All know how daring and ferocious the inferior animals become under the excitement of hunger!

Voracity.—Habit induces many persons to take much more food than is required for the purposes of nutrition. When the stomach has been accustomed to frequent distension, it gets at length into such a state that it is uneasy without it; and thus food is demanded not merely to supply the natural wants of the system, but also to administer to the factitious cravings of the stomach. The idle are particularly in danger of falling into gluttonous habits,—“let a man,” says Dr. Good, “have nothing to do, and he will be almost sure, whenever he has an opportunity, to fill up his time by filling up his stomach.”

Cases, however, occur of what are termed bulimia or canine hunger, where the appetite from early infancy, or from some after period of life, craves incredible quantities of food, and unless abundantly supplied, the faintness and uneasiness at the stomach become very distressing. It is somewhat remarkable, too, that its subjects are often slender, or perhaps even unnaturally emaciated. Its causes doubtless vary in different instances. It may sometimes, as has been suggested, be dependent upon an error of structure or position of the stomach, causing the food to be too quickly discharged from it. It not unfrequently, however, is the result of some morbid state of this organ, or of the system. It is well known that the irritation of worms in the stomach, or upper portion of the small intestine, will manytimes keep up a most importunate hunger. There are, too, certain

capricious longings, happening under peculiar circumstances of the constitution, where astonishing quantities of the article desired are eaten and digested. Thus we are told of a lady who, longing for herrings, devoured four hundred at a meal. Still, voracity does occur in seemingly good health, at least in all other respects, and the food is rapidly digested.

As a matter of curiosity I will cite from Dr. Good's Study of Medicine, the two following remarkable cases of this canine appetite. The former has been often quoted, and seems to be pretty well authenticated. It occurred in a French soldier named Tarare, and was communicated by M. Percy to the National Institute of France. "Before his enlistment, he was in the habit of devouring enormous quantities of the coarsest flesh, fruits, and roots: and, subsequently, he was found, after swallowing his own rations, to feed on the refuse of his comrades' messes, or offensive meat thrown on the dunghills; and to devour cats, dogs, and serpents. M. Fournier tells us, that at seventeen years of age, when he weighed only one hundred pounds, he could devour, in the space of twenty-four hours, a quarter of beef as heavy as his body; and that, on one occasion, when in the army, he devoured in a few minutes a dinner prepared for fifteen German laborers, and composed of various substantial dishes. He was strongly suspected of cannibalism; and was often repulsed with difficulty from the ward appropriated to the dead.

He at length fled from the army in consequence of a rumor that he had devoured a child sixteen months old, which had suddenly disappeared." The alvine evacuations of this individual were not very great, but he sweated very profusely.

The next is a case related by Dr. Mortimer, and happened in a boy only twelve years old, "who from a feeling of inanition, had so strong a craving that he would gnaw his own flesh when not supplied with food; when awake, he was constantly eating: the food given him consisted of bread, meat, beer, milk, water, butter, cheese, sugar, treacle, puddings, pies, fruits, broths, potatoes; and of these he swallowed, in six successive days, three hundred and eighty-four pounds avoirdupois; being sixty-four pounds a day on the average." This was connected with disease, and lasted for a year; and the food was usually rejected a short time after it was swallowed.

Fasting.—We have on record many curious examples of persons subsisting on very small quantities of food, and cases also where perfect abstinence has been protracted during long periods. Haller, and others have given instances of fasting continued for years. Such stories however are too improbable to be admitted on the imperfect evidence which exists in regard to them. There are, however, numerous well authenticated examples of fasting, for ten or twelve days; and where water was to be had, for twenty, thirty, or even longer. Dr. James M' Naughton, professor of anatomy in the

university of the State of New York, published, some years ago, an account of a medical student who lived on water alone for fifty-three days.

The case of Ann Moore, which called forth so much interest in England, was certainly a very remarkable instance of fasting. Though this female did not, as was pretended, live wholly without food and drink, yet the committee appointed to watch her, reported it as their opinion that she could endure the privation of solid food longer than any other person. Her principal support was derived from tea and water. Her circulation, and indeed all her vital actions were remarkably feeble, and she was altogether confined to her bed.

Persons, from habit, and under the influence of certain incidental circumstances, will often be enabled to subsist on a comparatively very small amount of food. Every thing tending to reduce the vital movements, and of consequence, the waste of the living fabric, as a spare and dilute diet, quietude, and the avoidance of stimuli, both external and internal, will of course lessen the demand for nutritional supplies. Thus in some reduced states of the system, associated with chronic disease, and likewise in fevers, where the secretions and excretions are greatly diminished, and the body is also kept at rest, long periods are often passed either without any nutriment, or with but very little; whereas the active and healthy can generally subsist but a few days if debarred entirely of nourishment. Hence persons who are deprived of food,

or on short allowance, will endure their abstinence better by remaining inactive. The vital actions being more sluggish in the cold than in the warm blooded animals, the former are generally capable of living longer without food than the latter.

Animals who pass into a dormant or torpid state, that they may survive the cold of our northern winters, continue many months without any nourishment, other than what they derive from the absorption of their fat, which is usually abundant when they retire for the winter. The degree of torpidity varies in different animals, and under different circumstances of the same animal; but in its most perfect state, the actions of life are hardly perceptible, and hence the waste of the body, which bears a correspondent relation to the activeness of the functions, is very trifling, or no more than what can be repaired by the gradual absorption of the fat. In this dormant condition, frogs and toads have been found in the depths of the earth—enclosed in the trunks of trees, and even in solid rocks, where they must have been imprisoned for years, and in some instances, probably for ages, entirely deprived of food, and on being restored to warmth and liberty, quickly resumed their active life. Here was a most complete state of torpidity, life approaching its condition in the seeds of plants, which can retain their germinating power, or vital principle, for indefinite periods, but which, were it quickened into action by warmth and moisture, might not exist beyond a single season.

Instances are even recorded of human beings falling into a sort of apoplectic sleep, called a trance, and continuing in it, without food, even for months. Van Swieten, in his commentaries, tells of a nobleman of Lausanne, who fell into a deep sleep, which lasted for six months; at the end of which time arousing, his first question to his servant was whether he had fulfilled some directions which he had given him at the moment of his attack.

Thirst.—This appetite urges to the swallowing of liquids to soften and dilute the food, and to supply the expenditure of the fluid materials of the body.

There are a number of animals, however, and even of the higher order, that do not drink, as, according to Blumenbach, mice, quails, parrots, and others. Even in our own species, instances now and then occur where drink is never craved. Sauvages, and other medical writers have related cases of persons, who from some peculiarity of constitution never thirsted. Dr. Good cites an instance told by Fournier of one of his most intimate friends, who reached the age of forty-eight without ever having drunk any fluid, or been thirsty; but he was in the habit of eating voraciously, and what is curious, he died of dropsy of the chest. "I have," says Dr. Paris, "a lady of fifty years of age at this time under my care, who has declared that she is perfectly unacquainted with the nature

of thirst.”* In such examples there must be but small expense of the fluids of the body by the excretions. It ought to be borne in mind, however, that much liquid matter is both naturally and artificially united with our aliments. In fruits and fresh vegetables, it is particularly abundant, and hence the character of the diet must greatly influence the demand for drink. Still, different individuals, all other things being equal, crave different quantities of fluids, and I have known many persons, who, though yielding to the habit of taking liquids periodically, yet very seldom experience any sensation of thirst.

This appetite is promoted by various circumstances, as dry food, salt, and rapid waste of the fluids of the body, as in profuse perspirations. Violent passions of the mind, diminishing the secretions of the mouth and fauces, and creating a feverish condition of the system, at the same time that they destroy the appetite for food, often greatly excite the thirst. Severe bodily suffering also produces the same effect. We are told that under the cruel torture formerly inflicted to extort confessions, the most distressing thirst was commonly experienced. A close and vitiated atmosphere produces also the most urgent craving for liquids. In Mr. Holwell's narrative of the sufferings endured by himself and companions in the Black

* On Diet.

Hole in Calcutta, he says that the atmosphere becoming gradually more and more vitiated, "before 9 o'clock every man's thirst grew intolerable, and respiration difficult. In this distressing situation, the prisoners cried loudly for water; and when water was at length brought by some of the guards, with such eagerness did they struggle to get it, that not only the greatest part of the water handed in hats through the bars of the prison was spilt before it reached any one's lips, but many were trampled down and suffocated, while others, particularly those who stood near the windows, were pressed to death."

Habit exercises a marked influence over this, as over our other appetites: Man, uninfluenced by the luxury of civilization, and partaking only of a wholesome diet, would probably crave drink in such quantity only as to moisten his food when dry, and to meet the necessary waste of the animal fluids, and that would be water, or the juice of fruits and vegetables. But the free employment of high-seasoned food, and exciting liquors, so common in a state of society, serves to create a factitious thirst, which is maintained and aggravated by the very means used to quench it. Hence it is that by many, the providing of choice liquors is made an important business of life, and the administering to such unnatural thirst is ranked among the highest of enjoyments. And too often it happens that this necessary appetite becomes an

occasion of the destruction of health, and of all the noble faculties which distinguish our nature.

As some persons from peculiarity of constitution demand very little drink, others on the contrary crave vast quantities. This excessive thirst, is technically called polydipsia, and has occasionally been hereditary. In some well authenticated instances, thirty or forty pints of fluid have been required in the twenty-four hours to satisfy the thirst, and even four hundred are said in certain cases to have been swallowed daily. Such unnatural desire for liquids is usually the consequence of some morbid condition of the system.

The sensation of thirst is ordinarily referred to the mouth, fauces and pharynx. The secretions of these parts being lessened, they get dry and parched, and hence arises an ardent desire for liquids, particularly such as are cold and acidulated, to moisten and cool them. If the want is not satisfied, it grows more and more painful, the heat and dryness in the mouth and throat are augmented, and appear to extend through the chest. The secretions become more and more thick, scanty and adhesive, swallowing consequently being effected with much difficulty, and the longing for cold water is most urgent and distressing. Various other phenomena, too, soon follow, all of which are well exemplified in the burning thirst attendant on violent fevers.

Dryness of the mouth and throat, though commonly, still is not necessarily associated with great

thirst, instances occurring where these parts are dry and parched but without accompanying thirst. In some instances, too, the secretions from the glands of the mouth are very copious, and still there exists an urgent craving for drink. And, moreover, the local application of liquids to the mouth and throat has but little effect in assuaging thirst. A case, by Dr. Gairdner, is published in the sixteenth volume of the Edinburgh Medical and Surgical Journal, of a man who had cut through his œsophagus, and who suffering from a most insatiable thirst, several buckets of water were swallowed daily, but, being discharged through the wound, without allaying it. On injecting, however, a fluid into the stomach, the thirst was soon quenched. It is said too, that the desire for drink may be abated by injecting liquids into the veins. This appetite then would seem to be excited by a necessity on the part of the system for fluids, the common effect of which is to occasion a dryness of the mucous membrane of the mouth and throat, and doubtless also to influence the secretions of the stomach, which induced circumstances aid in awakening the specific desire.

Thirst, though accompanied perhaps with less physical exhaustion, yet when protracted, the suffering from it is even more intense than from hunger, hence no punishment inflicted by the heathen divinities is more often adduced than that of Tantalus. Hunger and thirst are when slight,

incompatible sensations, but after long deprivations of food and drink, are both experienced, and the thirst is apt to be the predominant affliction.

CHAPTER IX.

GENERAL REMARKS ON THE FOOD OF ANIMALS.

THERE is a dependence upon each other, either direct or indirect, among all living beings for their nutrition. Plants to be sure derive their support immediately from inorganic substances, as water and air, but then matter which has been endowed with life, or some of its products, are generally required to enable the soil in which they grow to afford them nourishment.

Animals, or certainly all of the higher orders, though they make use of some mineral substances, as salt and water, yet are mainly indebted for their sustenance to living bodies.

Life in a particular manner contributes to the circulation of matter, or to those unceasing mutations which are so essential in the scheme of the

universe. Thus plants, interposed as it were between mineral matter and animals, prepare the former for the nourishment of the latter, vast tribes of whom live on vegetables alone, and which being wrought into their own bodies, serve as food for still other animals. A reciprocal system of destruction, and a continued transmigration of the materials of life, are the only conditions on which it can be maintained, and indeed were it otherwise, the necessary relation between organic and inorganic matter would soon be destroyed, or the earth would become overburdened with vital existences.

General divisions of animals, founded on the nature of their food.—We have three general divisions of animals established on the character of their diet. Phytivorous, or those which feed exclusively on vegetable substances; the term being formed from the Greek and Latin words, φυτον, *phuton*, a plant, and *voro*, I devour.—Carnivorous, from *caro*, the Latin word meaning flesh, and *voro*, or those which live exclusively on flesh; and omnivorous, from the Latin word *omnis*, all, and the same verb, or such as derive their support both from the animal and vegetable kingdoms. Subdivisions of these are sometimes made. Thus among the phytivorous animals, some feed on grass and herbage, and are hence called graminivorous, *gramen* being the Latin word for grass and herbs. Others live on grain, and are denominated granivorous; and again others, on what in common language are distinguished by the name of fruits, and

are therefore called frugivorous. Some animals, too, deriving their chief subsistence from fish, receive the name of piscivorous, *piscis* being the Latin word for fish; and others living especially on insects, have been denominated insectivorous. In the application, however, of these terms, strict philosophical accuracy is not always regarded.

In their native state, and when not under the influence of necessity, animals adhere with considerable uniformity to their individual diet, whether it be animal or vegetable, and however limited may be its range. Nevertheless there is a faculty of adaptation in animal bodies empowering them from habit, or under circumstances of necessity, to sustain life on a diet very different from what they would employ in an unrestrained state. The dog, a purely carnivorous animal, learns very readily to eat vegetable substances, though still retaining his natural preference for flesh. Humbolt informs us that in Greenland, the dog eats the refuse of the fisheries, and when fish are wanting, feeds on seaweed. Even the cat, though with less facility than the dog, may be taught to eat bread and other vegetable substances. Spallanzani educated an eagle to live on bread, and a pigeon on flesh. Horses, oxen, and cows have occasionally been fed on fish; as, for example, in the northern parts of Asia, where grain is scarce. Such unnatural habits, however, can for the most part be only gradually induced, since any sudden and great change

in the natural diet of an animal, is apt to be attended with injurious, and often fatal consequences.

It is a curious fact that the physical condition of the stomach may be modified by the nature of the diet. I have previously stated that birds who feed on grain have a dense muscular stomach, while in birds of prey, or those subsisting on animal substances, less physical power being required of it from the nature of their diet, it is thinner and softer, or more membraneous. Now this strong muscular structure has to a certain extent been developed in birds of prey, by feeding them for long periods on grain and other hard substances. It has been remarked too, that species which are externally alike, yet differ in the structure of their stomach, in a manner dependent on their food.* But this is by no means a singular example of modification in the structure of an organ, consequent to a modification of its action.

Does the nature of different animals require particular kinds of nourishment, or is their diet determined solely by their powers of procuring and digesting it?† I do not know. Carnivorous and phytivorous animals certainly display marked

* Carus' Comparative Anatomy, vol. 2d, p. 67-8.

† Dr. Carus conceives "that the selection of food must depend on the organization of the alimentary canal, and general structure of the animal, rather than that any peculiar mode of nutrition influences the organization. Thus, shortness of the alimentary canal appears to render rapid assimilation, and consequently highly nutritive, i. e. animal,

differences of physical constitution, and which are associated with corresponding differences in their general character and habits.

Cuvier imagines that there is a certain necessary adaptation of the various organs of an animal to each other,—that they must have a mutual correspondence, and therefore that the structure of any one organ, or set of organs, must modify all the rest. Thus the digestive apparatus of animals is not only suited to the food by which they are sustained, but the general structure of their bodies is adapted to the requisitions of a particular regimen. If the intestines are formed to act on flesh in its recent state, it necessarily follows that the jaws and teeth should be strong and powerful, or fitted for holding, lacerating and devouring prey; the claws for fastening upon it, and assisting to tear it in pieces. The organs of motion, as the muscles, bones, &c., for pursuing, and those of sense for discovering it at a distance. Nature, moreover, must endow such an animal with an instinct to employ stratagem, to conceal itself and watch for its prey. Such being the conditions necessary to the purely carnivorous animals.

food necessary: a necessity which is still farther augmented, if the animal should be at the same time distinguished by the energy of its muscular powers. On the other hand, length and a more complicated structure of the alimentary canal, in other words, a decided development of the vegetative organs, appear to determine the subsistence of the animal on vegetable food."—vol. 2d, p. 100.

Comparative structure of the digestive organs in carnivorous and phytivorous animals.—Carnivorous animals have long, strong and pointed tusks, called cuspidati, or canine teeth, serving to seize, hold, and tear in pieces their prey. Their grinders are comparatively small, and like the rest of their teeth, much more pointed than in animals living on vegetable substances. Their jaws are short and strong, and being furnished with powerful muscles, can be closed with great force. The principal motions of the lower jaw are elevation and depression, the lateral or grinding, being, from the nature of their food, but little called for, are quite limited.

The graminivorous quadrupeds, or such as feed on grass and herbage, display the most marked contrast, in respect to their organs of digestion, with carnivorous animals. Their grinding teeth are broad and large, and their jaws consequently much more elongated than in the latter. Many of them have front incisors,—teeth with cutting edges for cropping the herbage, and much larger than those corresponding in situation in carnivorous animals. Some have the canine teeth, though their development is comparatively inconsiderable. It is a curious fact that the male of the horse has small tusks, while in the female they are seldom if ever seen. Why they are required in the former and not in the latter is no easy question to decide.

In phytivorous animals, too,—contrary to what is seen in the carnivorous—the lower jaw is so

fitted to the upper as to allow much freedom of lateral motion. This is especially remarkable in the grazing quadrupeds, being necessary to grind down the crude vegetable matters on which they feed.

The whole alimentary canal also differs in these two divisions of animals. In proper carnivorous animals it is comparatively short and narrow, with but few transverse folds of the mucous membrane in the small intestine for delaying the contents. The small and large intestine are both, more uniform in their structure, and the cœcum, for the most part, very small. The whole construction, indeed, of the canal, appears fitted to allow a quick passage of the food.

In phytivorous animals, the alimentary canal is generally longer and more capacious; the cœcum large, the colon divided into sacs, and the whole arrangement seems designed to retard the passage of the aliment through it. It varies, however, considerably both in length and complexity among the different vegetable eaters. It is most extensive and complicated in the ruminating animals, or those which chew the cud. In these, according to Cuvier, the length of the intestines varies from eleven to twenty-eight times, while in the purely carnivorous it is only from three to five or six times that of the body. To this, however, the hyena forms an exception, its intestinal canal being a little more than eight times longer than its body.

Now the food of carnivorous animals being highly nutritious, and consequently protracted operations upon it not being demanded to extract its nutrimental principles, it is unnecessary that it be subjected to long delay in its passage. But in animals who are confined to a less concentrated nourishment, as grass and herbage for example, more food must be taken, and a longer time and more numerous operations will be required to separate the nutritious from the mass of refuse matter, and hence their alimentary canal must be more capacious, complex and extended, to insure such separation. The horse and ass having a shorter and more simple digestive canal, derive relatively less nourishment from their food than ruminating animals, and hence, unless supplied with grain, require to feed a large proportion of the time to keep in good condition. It is a familiar fact to our farmers, that grain is less necessary for cattle than for horses that are worked. Hence we may understand, too, why cows and oxen are so often seen feeding on the fresh manure thrown from the stable of the horse, and why also this latter animal furnishes a richer manure than cattle.

It is obviously then because carnivorous animals subsist on more concentrated aliment, and not, as is often stated, because it approximates more nearly to their own substance, that their digestive canal is generally less extensive and complicated than in the vegetable eaters. Thus in such of the latter as feed on grains, and fruits, this canal is less spa-

cious and extended, and also more simple than in those who live on herbage.

In reference to the length of the alimentary canal, comparative anatomy has discovered many exceptions to the rule commonly stated—viz: that it is longer in phytivorous than in carnivorous animals. Dr. Carus tells us that, “in the Sloths, which live wholly on vegetables, and in several Makis, Mice, Shrews, &c., which live chiefly on fruits, &c., the intestine is unusually short, i. e. 3 or 4 times the length of the body; whilst, on the contrary, it is found of extraordinary length, (from 11 to 28 times as long as the body,) in many species that live solely on animal food, e. g. Seals, Porpoises, &c.” *

But though this canal is not invariably longer, yet I believe it will in almost every instance be found more capacious, as well as more complex in the vegetable, than in the flesh-eating animals. Thus in the makis, mice, shrews, &c., just instanced as having a very short intestine, though feeding chiefly on fruits, there is a very large developement of the cœcum; and in the sloths there is a highly complicated structure of the stomach.

Rumination. — In the ruminating animals, or those which subject their food to a second mastication, the different conditions of the alimentary canal adapting it to a purely vegetable regimen are most fully displayed. Their food, which is herb-

* Comparative Anatomy, vol. 2d, p. 100.

age, containing but a small amount of nutriment in relation to its bulk, it is necessary that its passage be slow, and the operations upon it multiplied. Hence comparing their digestive apparatus with the relatively small and simple one in the strictly carnivorous animal, the difference is most striking.

Animals which chew the cud are bisulcous, or cloven-hoofed; and under their order are comprehended the ox, goat, sheep, deer, camel, lama, &c. They derive their name of *ruminants* from their habits of regurgitating their food and submitting it to a second mastication preparatory to its conversion into chyme. I will give a brief account of the process under consideration as it takes place in the ruminants with horns, it differing somewhat in those destitute of them, as the camel, dromedary and lama.

The ruminating animals have four stomachs,* and into either of the first three—the gullet terminating at a point of communication between them—it would seem that the aliment might be directed at pleasure. The animal having slightly chewed his herbage, swallows it into the first or great stomach, called also paunch, *magnus venter*, &c. Here a rotary motion would appear to be imparted to the contents, which we infer from the circumstance that balls of hair, or woody fibres, oftentimes encrusted with dense concentric layers, or concre-

* Dr. Carus thinks that the first three should be considered as merely separate portions of the left or cardiac extremity.

tions, are frequently found in this cavity. These substances have been by some called bezoar stones; they are very different however from the fancied medicinal stone of this name so highly prized in the East. From this stomach, the alimentary matters, having experienced but little alteration, are gradually transmitted into the second, which is much smaller and more globular, and is named *reticulum*, bonnet, or king's hood, and also honeycomb bag, from its internal membrane being folded into numerous irregular polygonal cells, resembling honeycomb. From this the food, in the form of little moistened balls or pellets, is by a voluntary action returned to the mouth, where having experienced a second and very thorough mastication, it is again swallowed, and directed into the third stomach, called many-plies—its internal surface exhibiting broad, thin, and somewhat coarse membranous folds, ranged lengthwise. It is also called tripe or feck, and *omasum*. Some further influence is here wrought upon the aliment, and then it is transferred into the fourth stomach, with which the third communicates by a very narrow orifice. This is called *abomasum*, and also red, and rennet bag, and is the proper digestive stomach, where the food is transformed into chyme. It has been supposed that in the infancy of the animal, the milk passes directly into this stomach, the laminæ of the third being thought still to adhere closely together.

The ruminants while chewing the cud continue in a state of repose, apparently drowsing, and seem to derive much enjoyment from the act.

These animals, as will be anticipated, more completely extracting the nutritious matters of their aliment, do not need to graze so constantly as the non-ruminating graminivorous quadrupeds.

In the camel and dromedary, the second stomach, or bonnet, would appear to answer the additional purpose of a reservoir for water, the drinks, which they take in very large quantities, being, with the exception of so much as is needed to moisten the food in the paunch, all directed into it. It is furnished with cells about an inch in diameter, and which being interwoven with numerous muscular fibres, have the power of contracting and closing their orifices, so that the water they contain shall not become contaminated by intermixture with the other contents of the stomach.* From these cells the fluid can be discharged and returned to the mouth whenever the thirst urges it. Such an arrangement is particularly advantageous in these animals, which, dwelling on vast sandy deserts, are frequently obliged to pass several days together without a supply of fresh water.

Many animals which do not ruminate have complex stomachs analogous to those of the ruminants. Such is the case in a number of the cetacea, as in the porpoise, whale, &c., who have also rela-

* Carus' Comparative Anatomy, vol. 2d, p. 98.

tively long intestinal tubes. It has been noted as affording a curious coincidence,—the cetacea being piscivorous,—that ruminating animals are capable of subsisting on fish ; as, for example, oxen in the North of Asia ; and I may add the cows, in occasional instances, on our sandy and barren sea-coasts.

In the porcupine, the stomach exhibits three separate cavities. In the great kangaroo, it has numerous pouch-like appendages, and it has been said by Sir Everard Home, that this animal, when fed on hard substances, becomes capable of ruminating. In hares, rabbits, the water rat, &c., there is an obvious division in the stomach between its cardiac and pyloric portion ; and as I have already stated, some physiologists believe that an analogous division exists during digestion in that of man.

Many instances are recorded of a power of rumination in our own species. Dr. Good cites one related by Dr. Slare, and which he regards as among the best examples on record. The subject was a healthy adult man, and the rumination happened regularly about a quarter of an hour after eating, when a sense of weight was experienced at the lower end of the œsophagus. If he neglected to ruminate at the proper time, he became languid and sick.

Omnivorous animals.—These feeding promiscuously on animal and vegetable diet, it would be natural to infer that they should possess teeth cor-

responding to such as are witnessed in both the other divisions, and that their alimentary canal ought to hold a rank, in regard to its extent and complexness, intermediate between that of the strictly carnivorous and phytivorous animals. Now to a certain extent this may be the case, still with our present knowledge only of comparative anatomy and physiology, any inference in relation to the omnivorous propensities of an animal from his structure merely, would be extremely problematical.

The hog, domestic rat, bear, &c., are omnivorous animals, subsisting, according to circumstances, either on animal or vegetable food. But I will leave this subject for more particular consideration in the next chapter, in which I shall treat of the diet of man, who is generally viewed to be an omnivorous animal.

CHAPTER X.

FOOD OF MAN.

BESIDE man's habits and inclinations, various circumstances in his physical organization are commonly adduced to prove him naturally omnivorous. Thus his cuspidati or eye teeth have been likened to the tusks of carnivorous, and his incisors and grinders, to the cropping and molar teeth of phytivorous animals. Still the resemblance is not sufficiently close to warrant any decided analogical deduction.

The articulation of the lower jaw in man, is such as to admit the lateral or grinding motion, as in the vegetable eaters, though, from the circumstance of the jaws being much less elongated, this motion is more limited in its extent.

The relative length of the alimentary canal in our own species is generally less than in animals living exclusively on vegetable substances, and greater than in such as are purely carnivorous. I say generally, there existing a number of exceptions to this rule. In the sloths, for example, and in some other animals subsisting entirely on fruits

and grains, as several makis, mice, shrews &c. the relative length of the intestines is really less than in man. And in the hyena, a truly carnivorous animal, the intestinal tube is, according to the admeasurement of Cuvier, comparatively quite as long as in ourselves.

Man has a single stomach, but from this no inference can be deduced in reference to his diet, because it belongs not only to carnivorous animals, but also to a large proportion of those which feed on vegetables alone.

In the human species, different from what is seen in animals living on flesh exclusively, we find a pretty large cœcum, and a cellular colon; and, indeed, in respect to his digestive canal generally, man would seem to approximate more nearly to the vegetable, than to the flesh eating quadrupeds. He also lacks the necessary conditions belonging to carnivorous habits in the inferior animals, as speed to overtake, and powerful natural weapons, as claws and long tusks, to seize, hold and lacerate animal prey. But then it may be said that his higher intellectual endowments, and consequent contrivances supersede the necessity of such physical conditions for procuring animal food. *

* L'homme paraît fait pour se nourrir principalement de fruits, de racines et d'autres parties succulentes des végétaux. Ses mains lui donnent la facilité de les cueillir; ses mâchoires courtes et de force médiocre d'un côté, ses canines égales aux autres dents, et ses molaires tuberculeuses de l'autre, ne lui permettraient guère ni de paître de l'herbe, ni de dévorer de la chair, s'il ne préparait ces

In respect to our teeth, jaws, and digestive canal, and, in truth, in our general structure, we more closely resemble the monkey tribe, than any other animals with whom we have been compared. The canine teeth, however, in monkeys, are longer and stronger, and the relative length of the intestinal tube something less than in our own species, approximating them in these particulars, more nearly to carnivorous animals. All who have examined the teeth of the orang-outang—[*simia satyrus*—] who is the most manlike monkey, must have remarked how much more closely than our own, his cuspidati resemble the tusks of animals of prey. Now all evidence goes to show that this tribe of animals in their native state subsist almost entirely on vegetable productions. Being quadrumanous, or four-handed, and thus particularly fitted for climbing, they pass much of their time on trees, from whose fruits they mainly derive their sustenance. Certain South American species do occasionally devour insects, and some may now and then eat small birds, nevertheless fruits and vegetables form their chief diet. As, however, their propensities to imitation are very strong, when forced from their natural condition and associated

aliments par la cuisson; mais une fois qu'il a possédé le feu, et que ses arts l'ont aidé à saisir ou à tuer de loin les animaux, tous les êtres vivants ont pu servir à sa nourriture, ce qui lui a donné les moyens de multiplier infiniment son espèce." Cuvier. Règne Animal. Tome 1^{er}, p. 73,

with man, they soon fall into his flesh-eating habits, though manifestly to the prejudice of their health. The orang-outang, under the influence of example, has been remarked very readily to acquire a taste for different sorts of meat, eating it even in its raw state. He also becomes very fond of sucking eggs; and even learns to drink wine. Still he retains a decided preference for fruits, and his health is best preserved by restricting him to a vegetable diet.

In the present state of the investigation, we are not at liberty, I conceive, to make any positive inference in respect to man's diet from his structure alone; and more especially, since both parties,—I mean those who hold that man is omnivorous, and those who, on the contrary, contend that he is phytivorous,—have appealed to his organization, in support of their opinions. Let us then look to experience; or in other words let us regard his habits of diet in the various circumstances under which we find him on the surface of the globe, and see to what inference we shall be thus led.

In various climates and stages of civilization, man is found subsisting upon almost all sorts of animal and vegetable food, and which are furthermore acted upon and modified in a multiplicity of ways by the arts of cookery. Thus he employs fruits, roots, herbs, &c., either in their crude condition, or artificially prepared to please the palate, and render them more easy of solution in the stomach. In regard to animals and their products, his range of diet is almost unlimited. Beside his

well known animal diet of domestic birds, and quadrupeds, and game, he eats flesh of the coarsest description, as of the horse, and also of the whale, and other of the large cetacea. He likewise devours cats, dogs, rats, mice, lizards, frogs, serpents, snails, and many varieties of insects. Dr. George Fordyce in his work on digestion, informs us that he knew a black servant in America who was fond of soup made of rattlesnakes, the head even being boiled with the rest of the animal, without any regard to the poison. Man in some states of society, and under certain circumstances, even feasts on the flesh of his own species.

Humbolt tells us that the Otomacs,—one of the rudest of the South American tribes,—when the waters are low live mostly on fish and turtle, but when the rivers are swollen so that it is difficult to procure them, they then swallow quantities of earth, or a fine unctuous clay to soothe the cravings of hunger. This, rolled into balls, he found piled up in the shape of pyramids, three or four feet high, in the huts of these savages. This substance, except from some slight vegetable matter which may belong to its constitution,—as that perhaps giving its unctuous character,—can afford no nourishment, allaying, probably, the sense of hunger, chiefly, if not wholly, by the distension which it affords to, and the action which it calls forth in the stomach.

Man, dwelling in a temperate climate, and with the power to choose, almost uniformly employs a

mixture of animal and vegetable food ; but how much early education may have to do in forming his taste for such a mixed diet, it is difficult to estimate. Habit has certainly great influence in attaching to particular kinds of aliment. One who has long been accustomed to animal food, cannot at once abstain from it without experiencing some feebleness for the want of its stimulation, and perhaps even temporary emaciation. And on the other hand, he who has been long confined to a vegetable diet, is apt to lose his relish for flesh, and on recurring suddenly to its use, finds it too exciting.

The circumstances under which man exists, have an important concern in determining his habits of diet. In his savage, or hunting state, he subsists on the food which he can most easily procure. Thus when his country abounds in game and fish, these furnish his chief sustenance. The importance which the American savage attaches to a plentiful supply of game is familiar to us all ; indeed his fancied heaven consists in delightful hunting grounds, abounding in the deer and bison, and all the most highly prized animals of the chase. Roots and fruits, and such other palatable vegetable substances as the earth spontaneously brings forth, are likewise eaten. But as the natural products of the soil afford but a scanty subsistence, a scarcity of game is always looked upon by our native tribes as a great calamity, and hence they are

continually receding from the advances of civilization.

The New Hollanders, and the inhabitants of Van Dieman's Land, who rank among the lowest specimens of humanity, being scattered along the seashore, derive their principal subsistence from fish, but also devour roots, and some other vegetable substances, and insects, particularly ants and their larvæ, which they sometimes form into a paste with roots.

When advanced to the agricultural state, and more amply supplied with fruits, grains, and other edible vegetable substances, these enter more liberally into our bill of fare. And in a still higher degree of civilization, when we dwell together in cities and cultivate the luxuries of life, the whole earth is traversed, and the kingdoms of nature nearly all invaded to supply us with food, and all our arts and sciences are called into requisition in its preparation.

Among the circumstances influencing man in regard to his dietetic habits, climate is of important consideration. It is a general truth, that in warm climates, and during the warm seasons, vegetable food, and especially cooling fruits, which serve to abate the thirst and excitement occasioned by the external temperature, are most palatable. In the hot days of summer, most persons experience a diminished desire for flesh, and unpleasant feverish symptoms not unusually arise from its free employment. Hence the inhabitants of warm latitudes

almost uniformly use a less proportion of flesh-meat than those of cold. Still, unless, like the Brachmans of India and their disciples, forbidden by their religious creed, all nations make use of some animal food, though varying greatly in its relative amount. Even in the burning climate of Africa, though vegetables and fruits are abundant and freely employed, many of the tribes regard their cattle and flocks as constituting their principal wealth. They also eat the flesh of the lion, and beside, a great variety of small animals, as rats, mice, lizards, and sometimes even serpents. The Landers saw in the market of Katunga, besides beef and mutton, "an immense quantity of rats, mice, and lizards, dressed and undressed." *

Sir Francis Head, in his tour among the Andes, speaks of the Indians of the Pampas, as having neither bread, fruit, nor vegetables, but subsisting entirely, even from infancy, on the flesh of their mares, never riding them; and the only luxury, he says, in which they indulge, is that of washing their hair in mare's blood. Of the Gaucho, he also tells us, that his constant food is beef and water, and that "his constitution is so strong that he is able to endure great fatigue; and the distances he will ride, and the number of hours that he will remain on horseback, would hardly be credited." He likewise remarks that the character of the

* Expedition to the Niger.

Gaucha is often very estimable, and always hospitable.

Following man to the bleak and inhospitable climes of the north, we find him subsisting almost exclusively on animal substances, oftentimes raw, and of the coarsest and most unsavory character, as, for example, the flesh and rancid blubber of the whale.

The Laplander feasts in a special manner, on the milk, blood, and flesh of the rein-deer. Fish and fowls are also eaten by him, and likewise the strong flesh of the bear, which he regards as a great luxury. His drink is water, and animal oils. His vegetable productions are very inconsiderable.

The Russians, we are told, who winter in huts on the Spitzbergen coast, to hunt the walrus, seal, deer, and Arctic fox, subsist as much as possible on the flesh and warm blood of the rein-deer; and by eating occasionally some plants, as the sorrel, cochlearia, &c., procured by digging under the snow, and which act as preventives of scurvy, generally preserve their health uninjured.

Cold always tends to sharpen the appetite, and when extreme, to elevate in an astonishing measure the powers of digestion, as proved by the voracity of the polar savages, and the coarse and oily animal food on which they chiefly subsist. The accounts given us by northern voyagers of the gluttony, and general dietetic habits of the Esquimaux, a race of Indians widely dispersed over the shores of the Arctic ocean, are almost incredible. These people

generally refuse with disgust, the luxuries of civilization, as puddings, sweatmeats, and even grog, giving preference to trainoil, coarse raw fish, and indeed any thing which is composed of pure fat or grease. Captain Lyon, wishing to ingratiate himself with a handsome young Esquimaux damsel, "presented her with a good moulded candle, six in the pound. She immediately began to eat off the tallow with every symptom of the greatest enjoyment, after which she thrust the wick into her mouth; but the Captain, concerned for the consequences to this delicate virgin, insisted on pulling it out. *

"The talk of our friends"—two Esquimaux guides, one a lad of but sixteen or seventeen—"did not, however, prevent them from using their jaws in a very different manner. During the whole day they were employed in removing the meat from the upper half of the [musk] ox; cutting it off in long narrow slips, which in the usual manner they crammed into their mouths as far as they could push it in; then cutting the morsel from the end of their noses by the means of their sharp knives, they bolted the mouthfuls as a hungry dog would have done. Thus passing the slice from one to the other, alternately, they contrived at length to swallow all the meat from the neck, backbone and ribs, of one side of the ox: suspend-

* Discovery and Adventure in the Polar Seas and Regions.

ing their motions, however, every now and then, to complain that they could eat no more, and lying back on their beds, but still retaining their knives in one hand, with the unfinished morsel in the other, and again beginning with as much energy as before, as soon as they felt it possible to get down another lump."*

In relation to a party of Esquimaux who dined with him, captain Ross remarks, "while we found that one salmon and a half of another, was more than enough for all of us English, these voracious animals had devoured two each. At this rate of feeding, it is not wonderful that their whole time is occupied in procuring food: each man had eaten fourteen pounds of this raw salmon, and it was probably but a luncheon after all, or a superfluous meal for the sake of our society."† All savage people are, to be sure, gluttonous in their habits, though not to the same degree as those inhabiting polar countries.

The liberal use of animal food has been generally thought requisite in Arctic climes to stimulate the functions, and thus furnish a more abundant supply of animal heat to preserve against the extremity of external temperature. Northern voyagers mostly believe that fat animal food, and oils, are essential to the maintenance of health and life in the inhab-

* Sir John Ross' Second Voyage of Discovery in the Arctic Regions, page 357.

† Ibid. page 446—7.

itants of these frozen regions. But to me it would seem that their habits in respect to diet prove the capabilities rather than the necessities of their systems. They learn to eat their coarse fare because they can get no other. Their food, moreover, as is generally the case in savage life, is precarious, and thus being at times exposed to extreme want, they are stimulated to greater excesses when their supplies are ample. That, however, they frequently suffer from excess of eating, there appears to be sufficient evidence.

The Esquimaux use no vinous or spirituous liquors, drinking in their stead large quantities of water. Northern voyagers inform us that brandy, and other spirits are almost uniformly refused by them with disgust. I mention this fact because it is not an uncommon supposition that stimulating drinks are particularly needed in cold countries. Now these savages dwell under the most extreme cold that human life can endure, and yet their only diluent is cold water. On this point I am happy to cite the authority of Sir John Ross, whose opportunity for practical observation in relation to it, no one can question. During the protracted residence of himself and crew in the Arctic regions, no spirit—except under occasional circumstances—was used. On examining his stores, he found only one year's allowance of spirits, "which," says he, "was a subject rather of congratulation than otherwise, since there can be no question of their pernicious effects in these frozen climates; one of those

being, I have no doubt, to increase the tendency to scurvy." As this therefore might be needed for other purposes, the allowance of grog was stopped.

In describing one of his journeys of discovery, made in company with several of his companions while his ship was imprisoned in the ice, he says.—“As I was the only one who drank no spirits, and was also the only person who had not inflamed eyes, I represented that the use of grog was the cause, and therefore proposed that they should abandon this indulgence: showing further, that although I was the oldest of the party, I bore fatigue better than any of them. There was no hesitation in acquiescing.” “He,” it is further remarked, “who will make the corresponding experiments on two equal boats’ crews, rowing in a heavy sea, will soon be convinced that the water drinkers will far outdo the others.” Captain Ross—though he does not declare himself in favor of temperance societies, nevertheless says, “were it in my power, as commanding a vessel, I would exclude the use of grog, on the mere grounds of its debilitating effects.”*

But to return from this digression; it has been supposed that, owing to a diminution of the biliary secretion, which is alkaline, there exists a stronger tendency to acidity in the human system in cold than in warm seasons and countries, rendering

* Second Voyage of Discovery, &c. p. 396—7.

animal food, which is more alkaline and consequently less conducive to acidity than vegetable, better suited to the inhabitants of the former. It may further be remarked that the transpiration by the skin, in which there is an excess of acid, is lessened in cold climates. I have often noticed that persons liable to acidity of the stomach, creating the affection called heart-burn, suffer less from it in hot than in cold weather, and more particularly when the skin is free. I think too, the affection is for the most part less apt to be experienced, in those prone to it, under the use of a flesh, than of a vegetable diet.

Some persons fancy that the delicious and abundant vegetable products of warm climates were created in special reference to man's necessities—to contribute to his health and wellbeing; and that their existence there, indicates them to be his proper diet. Others again, imagine that we adapt ourselves to the circumstances of our diet, and thus, that the luxuriance and inviting character of vegetation in equatorial countries, are mainly instrumental in favoring the phytivorous habits of those who dwell in them. That man does suit himself in a remarkable manner to the conditions under which he is placed, and that he commonly employs the food in which his country abounds, is certainly true; but I believe that the like causes—the most obvious of which is heat—that make the soil to teem with cooling fruits, and all the richness of vegetation, so influence our constitutions and appe-

tites that they need and crave them. I much query if an inhabitant of the tropics could, like the polar savage, glut himself on animal oils and coarse raw fish, and maintain his health and vigor.

It has commonly been observed that such sects as are restrained from animal food by their religious creed, as the Brachmans of India, were instituted in warm climates; and that whenever they remove north, they are disposed to relax in the rigor of their phytivorous habits.

Observation then certainly teaches that man is omnivorous in his habits. In temperate climates we almost always find him, when he has the liberty of choice, employing a combination,—varying in proportion according to circumstances,—of animal and vegetable aliment; and it is the prevailing belief that such a diet is most conducive to the developement of his physical and intellectual energies. To the active and laborious, it is commonly viewed as absolutely essential to the maintenance of bodily vigor. Haller conceived it necessary that human life should be sustained by animal and vegetable food so apportioned that neither should be in excess; and he asserts that abstinence from animal food causes great weakness in the body and usually a troublesome diarrhœa. But such opinion is certainly incorrect, since not only particular individuals, but even numerous people dwelling in temperate climates, from various causes, subsist almost wholly on vegetable substances, and yet preserve their health and vigor.

The great mass of the poorer class of Irish eat very little animal food, the potato forming a large proportion of their diet, still there is no evidence that they are less hardy and daring than the same class of English, who feast more freely on flesh. The Scotch, too, use less animal food than the English, but we note in them neither moral nor physical degeneration.

The term omnivorous, certainly when used in reference to the inferior animals, expresses their capabilities rather than necessities. The hog and rat, for example, are omnivorous, feeding, according to circumstances, on animal or vegetable aliment, yet allow them abundance of corn, or other nutritious vegetable matters, and I much question if we should find them degenerating in size and strength, though wholly deprived of animal food. Our common black bear is also omnivorous, but if he can find an ample supply of fruits, nuts, or other vegetables that he likes, he grows fat, and appears to care little for flesh; but when the former food gets scarce, he then takes advantage of his carnivorous faculty.

I am disposed to believe that the monkey has the same omnivorous power as man, whom, in his structure, he so nearly resembles, and could he be brought to inhabit as great a variety of climate, and be consequently subjected to like necessities, that he would become equally omnivorous in his habits. Indeed all observation of him, or at least of many of his species, when under human influ-

ence, tends to prove this. Still one would scarcely assert that even in temperate climates, his system requires animal food. I doubt whether any instance can be adduced—unless man be regarded as such,—of an omnivorous animal incapable of being adequately nourished by a sufficient and proper vegetable aliment.

But though satisfied that we can be duly nourished on a vegetable diet alone, yet I am disengaged to admit that the use of animal food is inconsistent with the healthful developement of our moral and physical nature. The ancient Britons were a hardy, healthful and vigorous race, and we are told by their early historians that they lived chiefly on milk and flesh. The modern English too, admit a large proportion of flesh into their bill of fare; and what people, whether we regard their thews and sinews, or their intellectual character, afford finer specimens of our race? And, allowing the authority of its bills of mortality, where are the chances of life greater than in England? Let me not be understood, however, as adducing arguments in favor of animal food, my purpose here being only to show that its employment is not incompatible with physical, or moral wellbeing.

That animal food, when used largely, may, especially in the sedentary and inactive, and in constitutions thus predisposed, tend to induce diseases of repletion, and indirectly to shorten life, will not be questioned. But then whatever diet is employed, must, in regard to its quantity, be adap-

ted to the individual constitution, and habits of life, as it is ever essential to health that an equilibrium be preserved between the expenditures and supplies of the system. Animal food being more stimulating, and comprising more nutriment in relation to its bulk, the danger of an unnatural plethora from its excessive use, must of course be much greater than from a superabundance of vegetable food. An exclusive animal diet, therefore, unless perhaps in Arctic regions, or combined with a very great amount of exercise, would afford a too highly concentrated and stimulating nourishment to be compatible with the permanent welfare of the system. The ruddy complexion and full health of butchers are, to be sure, commonly adduced in favor of the liberal use of a flesh diet; but Mr. Thackrah, alluding to the duration of life among this class of people, says, "I suspect it is even shorter than among most other men, who spend as much time in the open air. Butchers, in fact, live too highly; not too highly for temporary health, but too highly for long life."*

Many hold to the belief that man is a phytivorous animal. That vegetable substances were alone designed for his food, and water for his drink, and that, in violation of nature's purposes, having invaded the animal kingdom for his support, moral and physical infirmities have necessarily ensued.

* Effects of Trades on Health. By C. Turner Thackrah.

Such doctrine in regard to diet, was taught by Pythagoras, and probably grew out of his belief in the transmigration of souls. Plutarch, Rousseau, and other eminent names have been enrolled among the disciples of this Pythagorean regimen.

Many of the poets, and poetical philosophers have had much to say of the golden age of man's early creation ; when his beverage was water, and his food acorns, or fruits and roots unaltered by the art of cookery.—

“Pride then was not, nor arts that pride to aid :
Man walk'd with beast, joint tenant of the shade ;
The same his table, and the same his bed ;
No murder clothed him, and no murder fed :”

He was then pure and gentle as the dove, and exempt from all bodily disease, he glided on, unhurt by the hand of time, through a long lapse of years, or even centuries, and when death finally overtook him, it came as would a tranquil sleep. But so soon as he yielded up his state of nature, sacrificing his liberty to the restraints of society,—imbuing his hands in the blood of animals, and feasting on their flesh, then were awakened all his furious passions,—then were his days on the earth shortened, and all manner of evils let loose upon him. The fable of Prometheus has by some been interpreted as referring to the employment of animal food. Thus before his time, this, and the art of cooking, were both unknown. But he introduced flesh as a diet, and applied fire to it to screen the disgust of the

shambles, and the vulture gnawing at his liver, indicates the painful thirst, disease and moral wickedness that supervened.

This pure state of nature, however, this primeval age of health and innocence, is, after all, but a creation of fancy. The savages of the present day, and we should suppose they would approach most nearly to the natural condition of our species, exist under very different circumstances. But then it may be answered that their nature has become corrupt from the use of animal food.

It is not unlikely, at the early origin of the human species, when their numbers were few, that their food was fruits, roots, and other vegetable productions to which they were guided by their taste and smell. But as they multiplied, and extended themselves to different soils and climates, and the spontaneous vegetable products becoming inadequate to their wants, necessity would drive them to eat the flesh of the animals by whom they were surrounded, and whose numbers, from their rapid increase, would be likely to incommode them.

But supposing man to exist under those circumstances which some philosophers have been anxious to prove his natural condition—under his vine and figtree—in a climate so soft as to need no shelter, and where the prolific soil spontaneously supplied his wants; though to be sure he might be gentle, innocent, and passively happy, yet having no stimulus to exertion, his superior capabilities would never be elicited, and his condition might not be

raised greatly above that of the brutes around him. But man's tendency is plainly to civilization and progressive improvement. His curiosity or thirst for knowledge; his power of advancing his view into futurity; his aspiring mind, and lofty capacities, are evidence that his condition was not intended to be stationary, but that he was destined to the highest moral and intellectual advancement of which his nature is susceptible; and to such, the stimulus of necessity, and the incitement of ambition, can alone urge him.

We hear a great deal of unmeaning declamation about man's natural diet; and the simple and natural habits of the brutes in regard to food and drink, are constantly adduced as an example for him. But though our instincts doubtless directed us at first, yet as the higher faculties became developed, and as ever happens, at the expense of instinct, reason, guided by observation and experience, must ere long have lent its aid in multiplying and improving our diet, and in so modifying it as to suit the circumstances of our different stages of advancement in society. Crude roots and nuts, to which man's instincts in his primeval state probably led him, and which then might have been very suitable to his constitution, would, to civilized man, be a far less grateful and digestible aliment than good wheat bread. Man's reason and art have modified from its native state the larger proportion of his articles of food. The vegetables which he employs are mostly altered and improved

by cultivation. I need but instance the difference between the cultivated potato, and the bitter little vegetable, from which it originated, first discovered in South America. Man has no strictly natural diet then, but must trust to his reason, by which his instincts have been so long superseded, for guidance in its selection, preparation and improvement, under the modifying circumstances to which his nature is subjected in a state of society.

Whether a diet purely vegetable, or one comprehending both animal and vegetable food, would be most conducive to health, longevity, and intellectual, moral and physical developement, is a question only to be determined by a long course of experiment, made on various individuals in equal health, and placed, in all other respects, under as nearly similar circumstances as practicable. That certain individuals, owing to peculiar conditions of their health, are benefitted by abstaining from animal food, while in others it appears to be more readily digested than vegetables, most physicians, I think, will admit as a matter of experience. But it belongs to me here only to speak of diet in connexion with a natural state of the body. That we may be healthy, vigorous and intellectual, when sustained by a combination of both sorts of food, we have abundant evidence. And were we educated to its exclusive use, I am persuaded that a vegetable diet would afford us ample support: but whether, if restrained from animal food, we should as a consequence, in the course of time and under

equally favoring circumstances in other respects, rise still higher in our moral and physical nature, remains, as I conceive, yet to be proved.

That the nature and quantity of the food of a people may in a measure modify their mental and physical constitution, will hardly be disputed. The influence which diet produces on the size, and qualities of the flesh of our domestic animals, is familiar to most persons; and its effect on the character of many of them is quite obvious. Horses, fed freely on oats, are well known to become more strong and mettlesome than when confined to hay or grass. It is also a matter of common remark, that dogs are rendered more ferocious by supplying them bountifully with raw flesh.

Animal flesh, affording a concentrated and stimulating nourishment, and consequently increasing the force of the circulation, may, when liberally employed, tend to render our nature more fierce, restless, ambitious and passionate than it would be under a less exciting diet. Nevertheless I am disposed to think that too much has by many been ascribed to the influence of food. It should be viewed but as one among a thousand other circumstances, as climate, government, national prosperity or adversity, &c., operating in advanced society to stamp the character of a people. It should also be remembered that moral and physical characters are inherited, and continue to be transmitted even for ages, and under very diverse external conditions. The superior bodily size of the English, is often

attributed to their liberal employment of fleshmeat, while the sprightliness and volatility of the French are by many referred to the greater proportion of light soups, and vegetable substances which enter into their bill of fare. But those among the latter people who have the means to procure solid animal food, certainly eat it very freely. They may not, to be sure, consume quite so much beef and mutton as the English, still their dinners consist of a large variety of solid meats, and of which they are not backward in partaking. In Lower Canada, the English and French are subjected to the same government, to the influence of the same climate, and both eat freely of animal food; and yet I apprehend that all who have visited this colony must have observed how strongly each people retain their national peculiarities.

Man's higher organization, more flexible body, and his exalted reason, which seeks out numerous inventions for his support and preservation, render him capable of inhabiting a greater diversity of climate than any other animal. We find him dwelling in health under the scorching heat of the tropics, and may trace him through all latitudes up to those dreary polar climes where nature is imprisoned in perpetual ice. Now such accommodating power in his constitution in regard to climate, supposes a correspondent one in respect to diet, and herein no living being enjoys a wider range. Let me not, however, be understood as urging the specious argument that because man dwells in

those high latitudes where vegetable food cannot be procured, he was therefore intended as a flesh-eating animal. To render this argument tenable, it should first be proved that these inhospitable climes were designed for him to inhabit. The fact of his dwelling in them, and eating what he can get there, shows the pliancy or adjusting power of his constitution, but of itself no more proves him to be naturally a flesh-eating animal, than the circumstance of some cattle learning to eat fish when in situations where they can obtain no other food, shows them to be piscivorous. But after all, this talk, of which so much is heard, about the designs of nature, is too frequently loose and unprofitable. It behoves us first to study faithfully her manifestations, since it is from these alone that we have a right to infer her purposes. I have not unfrequently heard it asked, for what purpose were all the inferior animals created, if not for the use of man? and argued furthermore that carnivorous habits were necessary in him to prevent their numbers from overrunning the earth. But geology instructs us that inferior orders of living nature existed many ages prior to our own species:—what then was their final purpose? But man's pride disposes him to see every thing in the universe as having reference to himself.—

“ Ask for what end the heavenly bodies shine ?

Earth for whose use ? Pride answers, ‘ ’Tis for mine ;

* * * * *

Seas roll to waft me, suns to light me rise ;

My footstool earth, my canopy the skies.’ ”

Nutritive principles of vegetable food.—The chief of these are gluten, fecula or starch, oil, mucilage, and sugar. Gum is also a nutritive vegetable principle. The ultimate elements of vegetables are oxygen, hydrogen and carbon, and in some few, nitrogen is likewise present.

Gluten is ranked as the most nutritious of these constituents, containing a considerable proportion of nitrogen, which does not exist in the other principles mentioned, it thus, in respect to its ultimate elements, approximates nearly to animal matter. Gluten exists more largely in wheat than in any other grain, and this has ever been esteemed as a highly nutritious and digestible aliment.

The principle which is usually ranked next in its nutrimental quality, is fecula or starch. This also abounds most in wheat. It exists, too, in large proportion in the potato, and to it, many edible vegetables owe much of their nutritive property.

Sugar and oil are likewise very nutritious; and mucilage and gum considerably so. Sugar has by some been stated to afford the most concentrated nutriment of either of the vegetable principles. Thus the negroes commonly grow fat at the season of gathering the cane. It is from the mucilage, and also some saccharine matter in the herbage, that grazing animals especially derive their nourishment. In most of our summer fruits, likewise, mucilage and sugar more or less abound. Oil,

moreover, enters into their constitution, and to this they owe their peculiar taste and odor.

Nutritive principles of animal food.—The most important proximate principles of our animal food are fibrin, albumen, jelly, oil, caseous or cheesy matter, and osmazome.

Fibrin is the basis of muscular flesh, and enters largely into the composition of the blood, and is thus a predominant proximate principle of most of our animal aliments.

Albumen abounds both in the animal solids and fluids. The white of eggs are almost entirely composed of it. When liquid, it is coagulated by heat, strong acids and alcohol, and by the fluids of the stomach.

Jelly and oil are animal principles with which every one is familiar. Caseous or cheesy matter is the curd of skimmilk.

Osmazome is a peculiar extractive matter of flesh, thought to impart to its different varieties their specific flavor; and thus the characteristic odor and taste of soups are referred to it. Dr. Thompson supposes that it may consist of fibrin only, slightly changed by heat.

Vegetable substances, with the exception stated, consist of but three essential ultimate elements, viz: oxygen, hydrogen and carbon; whereas in most animal matter, there exists in addition to these, azote or nitrogen. Carbon abounds most in vegetable, and hydrogen, in animal substances.

Such are essential constituents, though phosphorus, sulphur, iron, and earthy and saline matters are contained in some of the animal compounds. It is to the nitrogen that the great tendency to putrefaction in dead animal matter is commonly ascribed.

Simple and highly nutritious alimental principles are, under ordinary circumstances, unsuitable for diet, but require to be combined with others to fit them for digestion, just as oxygen needs to be blended with nitrogen to prepare it for respiration. Thus it happens that articles in themselves but slightly, or even not at all nutritious, are advantageously united with those in which the nutritional principles are highly concentrated. The inhabitants of polar countries form a sort of bread by mixing their animal oils with sawdust.

It is particularly important to health that our food be compounded of several proximate principles. Thus oil, sugar, gluten, though each very nutritious, are separately indigestible and unfit for a permanent diet; but united, as in most of our edible vegetables, constitute a more wholesome food. And it is probable that any two of these principles in union, would sustain life longer than either one of them alone. Hence we never feed, at least for any considerable period, on sugar, starch, fibrin, &c., separately, but employ them as food in their natural combinations. Every body knows how soon we are surfeited by the free use of sugar, or sweetmeats. Were one restricted to bread alone for support, that

made of coarse wheat flour, for reasons which must now be obvious, would probably best maintain health.

The fact, moreover, that the appetite readily becomes cloyed by confinement to any single article of food, evinces the necessity of combinations, to a certain extent, of different alimentary substances. It is to this indeed that all our culinary arts have reference, though it must be acknowledged that they too frequently produce mixtures of the most indigestible character. It is certainly an unfortunate circumstance that the art of cooking should be cultivated more to pander to our factitious tastes, than in reference to the ease and health of digestion.

Dr. Stark, of Vienna, showed by numerous experiments, that the body is uniformly weakened, and the health injured, by a long and exclusive confinement to any single and simple alimentary article. And furthermore, that even the most nutritious is of itself inadequate to sustain life for any considerable time. And by subjecting himself to such experiments, he is said to have ruined his health, and brought on premature death.

M. Magendie, of France, made numerous experiments on certain animals, which seem to prove the same thing in regard to them, though instituted for another purpose, and though a different inference was drawn from them. This distinguished physiologist believing the azote or nitrogen existing in the animal fabric to be derived from the food, conceived that to sustain life, the aliment must

necessarily contain this elementary principle. With the view of proving this, he performed a series of experiments on dogs ; making choice of this animal because he can subsist, at least for very long periods, on vegetable substances.

A healthy dog was permitted to feed at will on pure refined sugar, and allowed distilled water only for drink, neither of which substances contain nitrogen. The animal, though he ate sufficient for his support, yet on the second week showed evident emaciation, which was still further increased on the third, when his appetite also had obviously diminished. At this period, too, there appeared in the centre of the transparent cornea,—first of one, then of the other eye,—a small ulcer, which soon eating through it, the humours of the organ were discharged ; a profuse secretion occurring at the same time from its coats. Extreme debility and emaciation quickly ensued, and on the thirty-second day of the experiment death occurred.

In a second dog, a similar experiment resulted in like phenomena, only the ulcer in the eyes did not happen so early, and had not quite penetrated through their coats on the thirty-fourth day, or that on which the animal died.

This experimenter also fed two young dogs exclusively on olive oil, which is destitute of nitrogen, and gave them distilled water for drink. They both died on the thirty-sixth day of the experiment, having manifested symptoms corres-

ponding to those in the others, with the exception of the ulceration of the eyes.

He further fed several dogs on gum, and one on butter, and like the previous ones they soon died. In the right eye of the dog fed on butter an ulcer occurred.

That these substances, now, were inadequate to maintain life in dogs, appears evident; but it by no means necessarily follows that it was owing only to the absence of nitrogen. Would not other equally simple articles of food, even had they contained nitrogen, have been just as incompetent to continue life? Dr. Bostock has very truly remarked that—"In order to render M. Magendie's experiments unexceptionable, it would be necessary to employ a diet which should be composed of a mixture of substances, all of them without nitrogen, as farina, mucilage or gum, mixed with sugar or oil."* The ulcers which took place in the eyes of the animals, admit of no plausible explanation.

Other experiments of M. Magendie, more decidedly teach the inadequacy of such simple alimentary principles to sustain life in the inferior animals.

A dog, limited to a diet of bread made from pure wheat flour, died at the end of fifty days; while another confined to military biscuit, which are made of coarse flour, was not affected in his health.

* Physiology, vol. 2d, p. 369.

Rabbits and guinea pigs, when fed on a single substance, whether corn, hay, barley, carrots, cabbage, &c., were usually found to die within the first fortnight, with all the marks of inanition. The individual food remarked to support life the longest in these animals, was muscular flesh.

An ass, restricted to boiled rice, lived but fifteen days. Dogs fed exclusively on hard eggs or cheese, survived for a considerable time, but became feeble and lost their hair.

It was found when a certain degree of emaciation had been induced in an animal by confining him to one substance for a considerable period,—to wheat bread, for example, during forty days—that though retaining his appetite, and partaking of different kinds of food afterwards, he could not recover his strength, but continuing to waste, would die at about the same time he would have done had the exclusive diet been continued.

Whether human life could be supported on any one simple species of aliment, however nutritious, we have no means of ascertaining. It is related that in 1750, a caravan of more than a thousand Abyssinians, having consumed all their provisions, subsisted for two months entirely on gum arabic, which happened to be among their merchandise. If this be true, it certainly proves that man can live longer than dogs on a vegetable proximate principle.

In infancy, like all other animals of the same class, we subsist on a single article of diet, but this is quite complex in regard to its proximate

principles. It is not improbable, however, that at this period the system can be sustained on a more simple diet than afterwards.

Birds, reptiles, and the inferior departments of life, are probably capable of subsisting on a more simple diet than man, or other animals of the class mammalia.

In disease, the circumstances of the system being altered, a more simple diet is generally required than in health.

Condiments.—This class of substances are universally employed to add flavor to the diet. They also enter into the constitution of many of the vegetable aliments, the bitter and aromatic principles of which, being of this nature. Though derived from various sources, yet Dr. Bostock thinks they may all be brought under the general heads of salts and spices.

The use of many of the condiments depends in a great measure on habit and caprice; and hence those which are extremely nauseous and disgusting to some, are particularly grateful to others. "It may be laid down as a general principle"—says Dr. Bostock—"that such articles as are, in the first instance, disagreeable to the palate, are those for which we afterwards acquire the strongest partiality, and which even become necessary for our comfort; whereas the frequent repetition of flavors that are originally grateful, is very apt to produce a sense of satiety, or even of disgust. The examples of tobacco, garlic, and asafœtida,

on the one hand, and of such substances as possess simple sweetness on the other, may be adduced in proof of this position." *

Condiments differ from aliments inasmuch as their peculiar properties are retained in the stomach; or in other words, in not being decomposed, or digested in this organ. They afford consequently no nourishment, their uses being to gratify the palate, excite the stomach, and perhaps also to exert some influence upon the food favorable to its transformation into chyme, and to its healthful action on the bowels. And it may be that some, as salt, for example, enter in a measure into the constitution of the chyme and chyle, to subserve certain useful purposes in the economy.

Muriate of soda or common salt, is a natural and necessary stimulus to the digestive organs of man and most of the higher or warm blooded animals. Our domestic graminivorous quadrupeds, as horses, cattle, sheep, never thrive unless it be regularly furnished them. The prevalence of easterly winds is found to lessen the demand for salt on the part of our horses and cattle, even when a number of miles distant from the seacoast. Here the air doubtless retains a certain amount of this substance, which it had derived from the ocean, in solution, and which will consequently be absorbed into the system through the lungs;

* Physiology, vol. 2d, p. 374.

and deposited moreover on the herbage, will also be taken with this into the stomach.

It is familiarly known how the animals of the interior of Africa, and of our own western wilds, are in the habit of resorting to the salt springs, and what distances they often travel, and what difficulties they will overcome to reach them. Man is indeed generally directed to these springs by the regular paths traced to them by animals. Birds even are occasionally seen hovering over them in great numbers.

Salt is combined, in a greater or less extent, with nearly all our food, even our bread, I believe, uniformly receives an addition of it; and though the quantity consumed varies considerably in different individuals, yet a certain proportion seems absolutely essential to the health of all.

“I had some years ago,” says Dr. Paris, “a gentleman of rank and fortune under my care, for a deranged state of the digestive organs, accompanied with extreme emaciation. I found that, from some cause which he could not explain, he had never eaten any salt with his meals; I enforced the necessity of his taking it in moderate quantities, and the recovery of his digestive powers was soon evinced in the increase of his strength and condition. One of the ill effects,” he continues, “produced by an unsalted diet, is the generation of worms. Mr. Marshall has published the case of a lady who had a natural antipathy to salt, and was consequently most dreadfully infested with

worms during the whole of her life. In Ireland, where, from the bad quantity of the food, the lower classes are greatly infested with worms, a draught of salt and water is a popular and efficacious anthelmintic. Lord Somerville in his address to the Board of Agriculture, gave an interesting account of the effects of a punishment which formerly existed in Holland. 'The ancient laws of the country ordained men to be kept on bread alone, UNMIXED WITH SALT, as the severest punishment that could be inflicted upon them in their moist climate. The effect was horrible; the wretched criminals are said to have been devoured by worms engendered in their own stomachs.' " *

When, however, salted or corned meats are for long continued periods, used as the principal diet, the health is apt to suffer, and fresh vegetables, or vegetable acids are required as correctives. Corned meat, or such as has been exposed to the protracted action of salt, is certainly more indigestible than fresh, or that upon which salt has been but recently sprinkled. It has been thought that after a while a chemical union takes place between the salt and animal fibre, so altering the texture of the latter as to render it both less nutritious and less digestible.

The spicy or aromatic condiments are by no means so essential in our diet as salt, and in fact,

* Treatise on diet, p. 78.

like all stimulants, they are liable to serious abuse, oftentimes materially impairing the health of the digestive organs.

Vegetable acids have sometimes been classed with condiments, but being in a measure nutritious, they cannot strictly belong to them. These are very grateful, and abound in many of the different fruits employed in diet. In hot climates and seasons the appetite for the most part craves them, and they tend to favor digestion, abate thirst, and cool the system. They are particularly needful when animal food is liberally employed, and in a more especial manner, if it be salted.

DYSPEPSIA,

OR THE

DISORDERS OF DIGESTION.

CHAPTER XI.

DEFINITION OF DYSPEPSIA, AND GENERAL REMARKS UPON ITS NATURE.

DYSPEPSIA is compounded of two Greek words, viz. *δυσ*—*dus*—meaning bad or difficult, and *ωσπετο*—*pepto*—to concoct or digest. Its literal meaning then is bad digestion, to express which, the term indigestion is usually employed. The term dyspepsia, however, though such would be warranted by its literal meaning, is not ordinarily applied to those severe and temporary attacks of indigestion arising immediately from excesses in eating or drinking, undue exposure, or other transient causes, but only to such as are more obstinate and lasting in their character. If applied to the former cases,

the adjective acute is commonly affixed to it. From general custom then, rather than its legitimate signification, this term is used to indicate chronic indigestion, or rather a chronic weakness in the digestive function, and in such sense will it be generally employed in the ensuing pages.

In the physiological part of the present treatise, I have shown that several organs are cooperative in the function of digestion, or in the preparation of the aliment for its absorption into the circulation. Such being the case, it is plain that dyspepsia must comprehend something more than the disorders of the stomach. Nevertheless I am disposed to believe that it is most frequently owing to some imperfection in the function of chymification.

Dyspepsia, though oftener originating in the stomach, yet is doubtless manytimes dependent upon a failure in the second digestion, or chylickation, referrible to some fault in one or more of the organs subservient to this function, viz. the duodenum, liver, or pancreas.

The liver has to bear much, and often, as I think, undeserved blame in the disorders of digestion. That the bile may often be in fault will not of course be questioned, but at the same time, it must be allowed that the term bilious is by far too commonly and indefinitely employed. The secretion of the liver having a bright color, which distinguishes it from the other digestive fluids, attracts, in a more particular manner, the attention, and hence are commonly referred to it the various un-

natural complexions of the feces in dyspepsia, though oftentimes derived from quite other sources. The pancreas, on the other hand, secreting a colorless, and consequently undistinguishable fluid, is seldom if ever mentioned as having any concern in indigestion. The close relationship, however, subsisting among the different organs concerned in digestion, render it obvious that a derangement in the function of any one, cannot long exist without, in some measure at least, implicating those of the others. It is to this close and reciprocal connexion of the different agents in digestion that is referrible the difficulty, so frequently experienced, in determining the true seat of its disorders.

As the organs of digestion almost uniformly become affected in disorders of other parts of the system, and their affection being frequently one of the most prominent symptoms, secondary, symptomatic, or induced indigestion is unquestionably, oftentimes mistaken for an original affection. Unfortunately, however, such errors in regard to cause and effect are, owing to the obscureness of its nature, of daily occurrence in medical science, and the most patient investigation, and utmost freedom from prejudice are required to avoid them. I am apprehensive, indeed, that it has been the fashion of late years to attribute too much mischief to the digestive organs, and that they have often been viewed as principals in diseases in which they were playing but a secondary part.

Dyspepsia properly includes only such disorders of digestion as exist independent of, or are not maintained by, any other malady, being of themselves the occasion of all the morbid manifestations in the system. Indigestion, growing out of and kept up by some other disease, can be viewed but as a sign or phenomenon of such disease.

Dyspepsia is moreover ordinarily used to indicate a disturbance of the digestive function independent of any morbid change in the physical state of the organs subservient to it. But here we come upon debatable ground. Can the function of an organ ever be disordered without some modification of its material condition? Could we look into the stomach of an individual suffering from indigestion, would its inner or mucous coat present the same complexion as though its function was progressing healthfully? Dr. Beaumont observed that the mucous membrane of the stomach in the subject of his curious experiments, exhibited naturally a pale pink color, varying in its hues according to the full or empty state of the organ; whereas under indigestion, it became red, and sometimes displayed minute specks of ulceration, like those called canker in the mouths of children. Such physical change, however, must necessarily be slight, since whenever there exists inflammation, or any other morbid affection materially altering the physical circumstances of the digestive organs, more aggravated and alarming phenomena ensue. Diseases of structure, when obscure, may sometimes be

mistaken for common dyspepsia, yet this is not very liable to happen under careful investigation. They may occasionally, too, be the result of protracted dyspepsia, the slight affection causing simple indigestion, continuing to augment till it gets to be chronic inflammation, to which may ensue, ulceration, and other alterations of structure. Or perchance lasting disorder of function may superinduce physical injury, in like manner as frequent disturbance in the appropriate workings of ordinary machines impairs the integrity of their mechanism.

Dyspepsia, in its popular use, is allowed a far too comprehensive signification. Thus sedentary individuals, because they cannot eat and drink like the hardy daylaborer, are oftentimes heard complaining of dyspepsia. To take a common instance:—a person accustomed to occupations calling for a great deal of exercise in the open air, all at once yielding up his established habits, devotes himself to some less active occupation; but without any corresponding change in his diet. Now under his new circumstances, and the consequently diminished requisitions of his system, digesting with difficulty, as might be anticipated, his usual amount of food, he classes himself as a dyspeptic. Let him but adapt his diet to his altered habits, and the consequently lessened demands of nutrition, and he will digest well enough.

Those too who are habitually indulging in the free use of wine, spirits, and high-seasoned viands, are often heard lamenting over themselves as the

subjects of dyspepsia, and, perhaps, though still persisting in their mischievous habits, are resorting to physicians, and swallowing potions for relief. Now what would be thought of the man, who, while daily applying an irritating agent to his eyes, should be complaining that these organs were diseased and would not endure the light, and seeking advice of oculists, and submitting to their remedies. In the former, true dyspepsia, to be sure, would ere long be induced, or the stomach would get into such a condition that it could not bear even plain and wholesome food; just as in the latter, the eyes, from persistence in the unnatural application, would become so deeply affected, that, though relieved from their cause of irritation, still, disorder would remain in them, and the natural stimulus of light not be borne. But until such was the case, while the organs performed faithfully their functions when well treated, it could not be justly said, in either instance, that they were diseased.

Again, a mere relative weakness of the organs of digestion is not to be ranked under the name of dyspepsia. Because, for example, the stomach of A, cannot digest as much food as that of B, it does not necessarily follow that it is unhealthy, any more than it would that B's muscles were diseased if perchance they could not raise as heavy a weight as those of A. It is hardly necessary to say that different individuals, though in good health, vary materially in the relative force of their different

functions. Because therefore an individual is obliged to be prudent in respect to the quantity and quality of his diet, yet, at the same time, can readily digest enough plain wholesome food for the adequate nourishment of the system, he ought not to be regarded as dyspeptic. There are, however, a numerous class of persons, who, if they cannot bear all the heterogeneous articles with which luxury tempts their factitious appetites, complain of dyspepsia, and even fancy that some medicine may impart to the stomach the power of digesting whatever they please to put into it. Imagine an individual calling on his physician and saying, "doctor! I am quite weak, I am sure something must ail me." "Ah!"—answers the doctor,— "where do you feel unwell?" "I don't feel unwell sir." "Don't feel unwell!" "No sir, but on trial of strength with my neighbor he beat me in lifting by fifty pounds; now doctor! I want you to give me something that will make me stronger." This appears very absurd; but I appeal to medical men if requests nearly, or perhaps equally so in regard to the digestive organs, are not often made to them. Hence it is that wine, bark, cathartic pills, and all sorts of stuff, are constantly had recourse to, under the unreasonable expectation that they will enable the stomach to accomplish all the unnatural tasks which may be imposed upon it. Just as rationally might it be expected that the whip and the spur would empower an animal to execute labors beyond his muscular strength.

To whom then is the term dyspepsia applicable? I answer, to such as are unable to digest, or without inconvenience, plain food in sufficient quantity to meet the demands of nutrition.

CHAPTER XII.

HISTORY OF THE SYMPTOMS OF DYSPEPSIA.

I HAVE previously asserted that when digestion progresses healthfully, it transmits no distinct impression to the brain; but so soon as it becomes imperfect, and the natural relation between the food and its organs is disturbed, various phenomena supervene called symptoms of indigestion, and which occasion a greater or less amount of suffering, according to the nature and degree of the imperfection, and the sensibility of the nervous system.

An attempt to associate the symptoms in a philosophical manner, with the particular seat and nature of the affection, would not be in conformity with the plan of the present treatise. To do this,

indeed, is no easy task, since it requires a cautious analysis of all the symptoms; and mistakes here will sometimes happen even to the most experienced and scientific of the medical profession. Still certain symptoms indicate the difficulty to be especially in the stomach, others in the liver, &c., and some, also, mark an irritable, while others show a torpid condition of the organs.

I shall describe the symptoms of dyspepsia under two divisions. The first will comprehend such as are local, or associated more immediately with the organs of digestion; the second, all those which, manifested in other parts of the system, or such as are less directly concerned in digestion, are called secondary, induced, or sympathetic symptoms.

LOCAL PHENOMENA. *State of the tongue and mouth.*—The tongue becomes furred with different degrees of facility in different constitutions, and I have occasionally met with instances in which though there was considerable disorder of digestion, still the tongue remained natural; and with others again, where it was liable to be furred even in a seemingly good state of health. This organ, however, as likewise the whole mouth, being so closely associated in the digestive function,—the mucous membrane here being a continuous portion of that lining the whole alimentary canal,—their natural condition almost uniformly becomes changed under the influence of its disorders.

In slight, and recent indigestion, it is in the morning especially that the tongue is furred, and

the secretions of the mouth vitiated. Sometimes even in more confirmed cases, the natural secretions of the mouth being called forth under the stimulus of food, the tongue gets to look pretty natural in the course of the day. At first the fur is apt to be confined more particularly to the posterior part of the tongue, and indeed it seldom at any period extends to the tip, as happens in acute diseases. It is most commonly of a yellowish or creamy white appearance, though in occasional instances the shade of yellow is absent. Its thickness varies in different cases. The secretions of the whole mouth, too, more especially in the morning, are apt to be thick, clammy and disagreeable to the taste.

Instances now and then occur where the tongue is not coated, but is unusually dry and red. Such a state of it generally indicates an irritable condition of the stomach. The mouth may likewise be dry and parched, and its secretions adhesive, or its fluids may be too copious, and even morbidly thin, as in a salivation. "I have lately seen," observes Dr. Paris, "a dyspeptic patient who declares, that his pillow is thoroughly wet in the morning with the discharge which takes place during the night: and yet dryness of the mouth, and a parched tongue, are amongst the most disagreeable of the symptoms, as if the secretion had lost the power of lubricating the parts to which it is applied." *

* Treatise on Diet.

A viscid secretion not unusually takes place about the fauces, exciting a troublesome hawking. Soreness, with canker in the mouth, are oftentimes excited by indigestion in young children, but more seldom in adults.

Symptoms manifested in the throat.—Inflammation and ulceration, when a predisposition exists to such affections, are sometimes excited in this situation by indigestion. Dr. Philip remarks “that more or less habitual inflammation, and even ulceration of the throat, are by no means uncommon, and the voice and articulation are sometimes variously affected.” In occasional instances a difficulty is experienced in deglutition; thus the pharynx, apparently excited to spasmodic or unnatural contraction by the contact of the morsel, will reject it perhaps two or three times before it can be swallowed. Examples are not wanting even of spasmodic contractions of the œsophagus, materially impeding the progress of the food to the stomach, being produced by dyspepsia. In nervous females particularly, the sensation of a ball, or some substance, rising in the throat, will at times be associated with a difficulty in swallowing. These symptoms, however, though now and then occurring, can hardly be regarded as usual phenomena in disorders of digestion.

Symptoms disclosed in the stomach.—Some dyspeptic subjects are a good deal afflicted with nausea, and are in the habit of ejecting their food from the stomach, unless particularly prudent in their diet.

Bilious, mucous, gelatinous and watery fluids are occasionally vomited, either alone or in union with the food. In rare instances the tendency to vomiting is to such a degree, that alimentary substances, except in very small quantities, are retained with great difficulty. In some, again, vomiting seldom occurs, and it is very hard even to excite it.

I have already said that the function of the stomach, when properly performed, precludes chemical changes in our aliments, and transforms them into chyme; which having a healthy relation with the organ, occasions in it no appreciable sensation. Hence it has been justly said, we ought not to feel that we have a stomach. But if from any cause, chymification cannot be duly accomplished, the food left more or less to the influence of chemical laws, and at the same time placed under circumstances most conducive to their action,—exposure to warmth, air, and moisture,—chemical decomposition, to which all dead organic matter tends, must soon commence in it. This will be marked by fermentations, differing according to the nature of the food, and by a consequent extrication of acid, or fetid gases, and oftentimes by fetor of the breath. Sometimes portions of the unnatural contents are returned to the mouth, either from the impulse of the gases, or by an inverted action of the *œsophagus*, and from their acrimony cause an extremely unpleasant irritation in the throat. Animal fat and oils readily becoming rancid in weak stomachs, are very liable to be thus regurgitated. Under

such unnatural irritations, morbid secretions may be poured out in the stomach, and bile and pancreatic fluids perhaps drawn into it, adding, when in large quantity, to its disturbance.

Under such circumstances, various distressing sensations are commonly felt in the stomach; as of distension from the extricated gases; disagreeable burnings from the irritation of acid and acrid matters; and may-be pain and nausea from the unnatural contractions which are excited. Such symptoms will of course generally be aggravated in proportion as the chemical predominate over the vital influences.

The affection generally known by the name of heart-burn is so common in dyspepsia as to render a brief account of it necessary in this place. It has beside that mentioned, the name of pyrosis, from a Greek word meaning to burn. It consists in an uncomfortable, and often quite painful burning sensation referred to the stomach, occurring especially a little while after eating. It is apt to be excited, though not equally, by all indigestible substances; as warm bread, or such as is of bad quality, melted butter, gravies, crude vegetables, &c., &c. In some constitutions Indian meal will almost uniformly excite it, and hence it is that its subjects can seldom eat what is termed in New England *Rye and Indian bread*. It is accompanied by irritating acid or alkaline eructations, and a copious discharge of watery saliva, from which latter phenomenon it has in Scotland the name of

water-brash. Is this copious discharge of saliva suited to involve and dilute the acrid matters in the stomach, and ought it consequently to be swallowed? The irritation which the affection occasions in the throat, increasing the secretions there, excites a frequent hawking, with a discharge of adhesive mucus.

Some persons are liable to this complaint even from very early life, it being uniformly brought on by certain articles of diet. I have said that it is frequent in dyspepsia, but it is by no means necessary to it, since by some dyspeptic subjects it is seldom, or perhaps never experienced.

The affection under notice may be induced by any acrimonious matters in the stomach, whether acid or alkaline, though I think it most usually results from an excess of acid, dependent on the acetous fermentation taking place in the food; and perhaps in some instances the secretions of the stomach may be too acid. Some constitutions certainly appear to be far more subject to acidity of the stomach than others. The acid extricated is at times very intense, so much so that when thrown up from the stomach, it causes even a soreness of the throat and fauces, and a roughness of the teeth, from a partial solution of their enamel. Though, however, acid or acrid matters in the stomach are the cause of heart-burn, still they will oftentimes exist there without producing it, their effect, doubtless, being in part determined by the degree of irritability of the organ.

Heart-burn, it has appeared to me, is more apt to be felt in the recumbent than in the erect position, and when lying on the right side than on the left, or the back. May not this be owing to the pyloric portion of the stomach, toward which the contents would be thrown by gravitation when resting on the right side, being more sensible than the rest of the organ, and thus receiving a more powerful impression from irritating matters?

Hippocrates asserts in one of his aphorisms that those who have acid eructations are never subject to pleuritic affections, by which is meant inflammations of the lungs generally.

Beside that described, there is another form of pyrosis, or water-brash, characterized by frequent, and often copious emissions, or a sort of vomiting without apparent effort, of a transparent, watery liquid. It is most apt to occur on rising from bed in the morning, and like the other form is also attended with a large discharge of saliva. Though it may be an indication of simple indigestion only, yet it is not unusually associated with more grave disease of the stomach.

Some subjects of indigestion are exceedingly annoyed by a peculiar, and often very distressing sensation in the stomach not easily represented by language. It is a sort of sinking faintness, or a sensation of dragging and gnawing, as often expressed, somewhat modified, however, in different cases. It commonly, too, being associated with a feeling of emptiness, eating is frequently resorted to as the

means of allaying it, and sometimes it does afford temporary relief; in which case it may probably arise from the morbid irritation of acrimonious secretions, or other matters, and which become involved and diluted by the more bland food. It is oftentimes felt at night on retiring to rest, with the addition perhaps of a fluttering sensation in the region of the stomach, which together are particularly distressing, and may entirely banish sleep.

These morbid phenomena manifested in the stomach vary much in degree and duration in different cases of dyspepsia. In some the stomach only suffers during chymification, and becomes tranquil so soon as its task is completed, while in others its afflictions are of a more enduring character.

There are a certain class of persons, who, though they cannot strictly be said to labor under dyspepsia, yet so frail, delicate and sympathetic are their constitutions, that some slight disturbance follows every meal, unless very plain and sparing; each digestion, indeed, resembling a temporary disease. In such, any imprudence in regard to diet will almost certainly call into existence the various uncomfortable symptoms of dyspepsia. Constitutions of this character are frequently inherited, but are likewise produced by mismanagement in early life.

Though in the majority of cases unpleasant sensations are experienced in the stomach, never-

theless instances, and even aggravated ones occur, in which it does not feel its own difficulties, but apprizes the mind of them through some intermediate and more sensible organ. Thus during indigestion the stomach will manytimes be free from all disagreeable sensations, but the head will ache, or the heart palpitate, and the nervous system be variously disturbed. Let it be kept in mind then that the circumstance of the stomach feeling at ease, does not necessarily prove that its function is healthy.

Occasionally an unnatural tenderness is felt from pressure over the situation of the stomach, still this is not very common in simple dyspepsia, rather indicating a graver difficulty in some one or more of the digestive organs.

Symptoms in the bowels.—The bowels almost always become affected at some period of dyspepsia. If the aliments are not duly prepared in the stomach, they will consequently be received into and pass through the intestines in a state unconformable with their healthy function, and may accordingly excite in them various morbid phenomena. I have already said, too, that dyspepsia may arise in the bowels, or from imperfection in the second digestion. When this is the case, no inconvenience is suffered until the food has passed out of the stomach, or till some hours after eating.

The circumstances of the biliary secretion very sensibly affect the condition of the bowels. If deficient, the large intestine, in a particular manner,

from the absence of its natural and requisite stimulus, becomes sluggish, and the evacuations from it are dry, rough, and light or ash-colored, approximating in their general appearance to dry clay. They are frequently also passed but in small portions at a time. When the bile is superabundant, diarrhœa is liable to supervene; and when morbid in its qualities, it may modify in diverse ways the action of the bowels, and impart various hues to their contents.

Sometimes derangements in the stomach will extend themselves immediately to the intestines, and again, though the former is suffering severely, the latter may continue quite tranquil.

The fecal evacuations exhibit a variety of character in different cases and under different circumstances of dyspepsia, and afford an important indication of the state of digestion. In the larger proportion of cases, particularly in their early stages, there is a tendency to costiveness, and a good deal of inconvenience is commonly experienced in consequence. Sometimes the bowels are very irregular, an unnatural laxness perhaps alternating with obstinate constipation. Or they may be uniformly irritable, and the passage of the aliments be consequently too rapid, which is worse than a costive habit. In almost all diseases in truth, it is preferable that the bowels be inclined to constipation rather than diarrhœa. Still, either extreme is an evil to be watchfully guarded against.

Pain, with a sense of bearing down, will sometimes accompany the dejections, and the bowels afterwards continue to feel unrelieved. Piles or hemorrhoids are not unusual, and are oftentimes very troublesome.

Though, as I have already said, the bowels almost always become disordered in dyspepsia, yet examples will now and then occur, and even of much severity, in which they are scarcely at all affected.

Influence of the disease on the urinary secretion.—Though the phenomena induced on the urine might with equal, or even more propriety, be brought under the head of secondary symptoms, nevertheless, so intimately is this secretion associated with digestion, that I prefer alluding to it in the present division.

The urinary secretion seldom, or probably never, escapes the influence of dyspepsia, and indeed even transient and slight indigestion can hardly occur without in some measure modifying its character. The most trifling alterations in regard to food will oftentimes immediately affect it; and hence if critically watched, it will in many instances afford an important indication of the changes happening in the disease, and of the benefit produced by diet or medicine. The sediments deposited by this fluid under different modifications of indigestion, are various in their proportions, and present diverse hues, as pink, lilac, red, whitish, &c., but their chemical nature and determining causes

are not well understood. Some of the changes witnessed in the urine may arise from imperfect chyle being taken up by the lacteals.

In respect to the quantity of this excretion, much will depend on the condition of the skin. Thus when the surface is pale and cold, and perspiration diminished, it will be much augmented, and at the same time unusually pale and watery. Hence in cold damp weather—the skin, for the most part, being highly sensitive in dyspepsia—the discharge under notice becomes profuse, and limpid, the reverse of which happens in warm and dry weather, when the function of the skin is more active. When this secretion is unnaturally copious and watery, nervous irritability is usually indicated, and on the other hand, if scanty and deep colored, it is a sign of febrile action.

It has been asserted by many medical writers that long continued indigestion tends to the production of urinary gravel, but in New England, certainly, observation does not show a common connexion between them.

State of the appetite for food. — This appetite varies materially in different cases, and at different periods and under different circumstances of the same case; and in some, even though quite severe, it is but slightly affected. It not unusually happens, even when digestion is very imperfect, that there is a frequent and unnatural craving for food, constantly tempting to excesses in eating. This may be occasioned in some instances by a want, on

the part of the system, of supplies which the digestive organs are incompetent to furnish; or, as I conceive, more commonly, by the irritation of morbid secretions, or other improper matters in the stomach. Again the appetite may be greatly impaired, and almost all food be taken with indifference, or perhaps with a positive disrelish. Such is not unfrequently the case in the advance of the malady.

On rising in the morning there is seldom any inclination, and manytimes there is even a loathing, for food. One of the surest signs of healthy digestion is to awake in the morning with a good appetite. Dyspeptic subjects are very apt to have the best appetite in the evening, often about bedtime, and indeed this,—different from what happens in more grave diseases—is frequently their most comfortable period.

Owing to different circumstances of the disease, and to previous habits, various sorts of food, as meats, vegetables, fruits, highly seasoned or otherwise, are desired by different subjects. In some, the appetite is exceedingly capricious, food being craved, but yet can seldom be prepared to suit the taste; thus it will almost always be overdone, or underdone, or too salt, or too fresh; at any rate something will be wrong about it. Or may-be a few mouthfuls only, or even the sight of it will pall the appetite. Or perhaps the most luscious and indigestible articles, as sweetmeats, pastry, rich sweet cake, &c., are alone relished. In many

complaints the appetite guides to the most suitable diet and drinks; in fevers, for example, there is an aversion to animal food and heating liquids, cold water and vegetable acids being coveted, and thin vegetable decoctions preferred to solid food. But in dyspepsia the appetite may urge to the most hurtful diet, and hence is seldom to be trusted.

In some forms of indigestion there is a longing for chalk, charcoal, clay, and other unnatural substances, and which are often better relished than even the most savory food. A desire for chalk, clay, and other absorbent earths, I have observed to be commonly associated with morbid acidity in the stomach. Such depraved appetite, however, mostly exists in union with the indigestion growing out of conditions peculiar to the female constitution. Sometimes there is a strong desire for acid substances, as vinegar, and what we denominate pickles.

Affection of the appetite for drink.—In dyspepsia not the result of too stimulating food and drink, this appetite is often but little affected. Still examples are met with where the mouth and fauces are unnaturally dry, and a troublesome thirst is experienced. When, however, the complaint has been produced by a too exciting diet, or the abuse of distilled or vinous liquors, thirst is apt to be a more prominent affection. The character of the drinks craved, whether mild or stimulating, is determined in a great measure by the previous habits of the individual.

CHAPTER XIII.

SYMPTOMS OF DYSPEPSIA CONTINUED.

SYMPATHETIC OR INDUCED SYMPTOMS.—So wide and important are the sympathetic relations of the stomach, that if failing in its office to any considerable extent, disturbance is liable to ensue throughout the whole animal economy. This division of symptoms then, as will readily be conceived, is exceeding numerous and important. But previous to delineating them, it will be proper to offer a concise explanation of the term sympathy as employed in medical language, in which its application is nearly as common as in that expressive of our social relations.

Sympathy.—This term is derived from a Greek word, meaning to suffer or feel together. The physical sympathy existing between man and man, as in the propagation of gaping, laughing, and in some instances even of convulsions, is familiar to all. That, however, with which we are here interested, operates among the different structures and organs of an individual body; and as moral sympathy associates man with his fellow man, or links together relatives and friends, causing

them to participate in the joys and griefs of each other, so this physiological sympathy, if I may thus term it, pervading the whole animal body, joins in mutual relationship all the organs and functions of life. Let me here remark that the term involves no theory, being simply used as an apt figurative expression under which to generalize certain phenomena witnessed in the economy of individual living bodies analogous to those indicated by the same term, displayed in the more extended economy of human society, or in the relations subsisting between man and man. To this analogy it owes its introduction into the science of life, and its application is sufficiently happy. Consent of parts is also employed in a synonymous sense with this term. Darwin, Hartley, and others use the word association as likewise expressive of sympathetic phenomena; but an obvious distinction may be here made. Thus associate actions, like associate thoughts, are referrible to habit, readily coexisting, or existing in consecution, because they have previously, and perhaps frequently been thus confederated, and must therefore be dependent upon education. We may cite as an example the combined and consecutive action of different muscles in walking, dancing, playing on many musical instruments, &c. But though sympathetic actions may be influenced, still they are not dependent on habit and education. The very first time a child's nose is tickled, his eyes will water, and certain muscular actions will straightway ensue, producing

a sneeze. So too if his stomach gets disordered, his nose may itch, his head may ache, his heart may beat quicker, or his muscles may become convulsed, though such affections had never before coexisted. It must nevertheless be admitted that those phenomena in the animal body which owe their existence to habit, and those necessarily resulting from physical connexion, or relationship of parts, are not always distinguishable, which, however, should be set down to the account of our limited capacities, and imperfect acquaintance with the science of life.

The principle I am considering is constantly operating in the animal economy, whether it be in health or disease. Thus the stomach, by its healthful action, will often diffuse a happy influence throughout the system, like that of a cheerful countenance upon a social circle. But the sympathies awakened in disease being painful, are most appreciable, and consequently leaving the strongest impression, are most commonly alluded to.

The term sympathy then may be understood in medical science to mean an influence exercised by one part of the living system upon some other part or parts, more or less remote, exciting either sensation or action, or a union of the two. It oftentimes happens that a particular nervous connexion may be discovered between organs which readily sympathize with each other; and it is probable indeed that sympathy is necessarily dependent upon nervous communication, either direct or indirect.

Numerous examples of sympathy, especially between mind and body, will readily offer themselves. Thus let a ludicrous idea be presented to the mind, and the countenance at once assumes a new expression; to this there immediately ensues a full inspiration, succeeded by a frequently interrupted and sonorous expiration, constituting laughter. Examples of the same principle acting between different parts of the body must likewise be sufficiently familiar. Tickle a person and he laughs, or may-be becomes convulsed. Irritate the throat, and suddenly the diaphragm and other muscles concerned in respiration are called into increased action, and coughing is the effect; or nausea and vomiting may result.

In disease, sympathetic phenomena are in a particular manner developed, and to them it is that many complaints owe their obscurity. Were symptoms declared only in parts actually diseased, the path of the physician would be comparatively plain; but now such a turmoil will often arise in the system, even too from slight local derangement, as to require the most careful scrutiny to ascertain with any degree of confidence whence the trouble originated. To the medical man, therefore, the study of the sympathetic relations are of incalculable importance. Disease is indeed oftentimes revealed, not by pain or any manifest disturbance in the organ primarily afflicted, which may be quite insensible, but by some more sensitive part acting as an intermediate agent to apprise us of a difficulty,

whose progress before detected, might otherwise be too great to be successfully combatted. It is in this way that dyspeptic subjects are manytimes deceived. They suffer, for example, from headach, or other uncomfortable sensations, yet if none are distinctly referrible to the organs of digestion, it is often hard to convince them that these can be in fault, and more especially as they have so powerful an advocate in the appetites. How common it is for the physician when urging caution in regard to diet, to be answered, "Why doctor! my stomach feels perfectly well, I am sure nothing can ail my stomach!"

As individuals differ in the relative activity of their moral, so also do they in that of their physical sympathy. In some, this principle is in such excess as to be the constant occasion of suffering. A morbid susceptibility in the different functions to sympathetic influences, constitutes what is called the nervous temperament. We naturally infer then that the amount of constitutional disturbance in indigestion—and the same may be said in respect to other diseases—is by no means a sure index of the degree of the affection.

As a general rule, the principle under consideration is more active in females than in males, and in children than in adults. In some female constitutions, violent disturbance will often arise from the most slight and transient causes. Thus trifling indigestion may even induce hysterics, and other convulsive actions, or such general disorder as in

more hardy and less sympathetic bodies would indicate a grave malady.

The greater facility with which convulsions and other sympathetic phenomena are excited in childhood than in later life, is a fact of common observation. Such sympathetic actions are usually called nervous, a term, however, exceedingly vague in its application. It may not be improper to remark here that in highly sympathetic constitutions, active medicines are ever to be used with great prudence, since their effects are often violent and uncertain, differing from what experience has taught them to be in ordinary cases.

There are various circumstances of the constitution which especially influence the activity of its sympathies. The disposition to morbid sympathetic actions generally bears an inverse proportion to the vigor of the body. Those organs which are feeble or predisposed to disease, become most readily affected by disorders in other parts. An individual, for example, having weak lungs, will be likely to suffer more embarrassment in respiration from indigestion, than one in whom these organs enjoy higher vigor. Whenever, too, a part performs its office with difficulty, whether it be from defect of power, or from the greatness of the task to be accomplished, the sympathies of the other organs are most forcibly awakened. I will now proceed to describe some of the secondary or sympathetic symptoms of dyspepsia.

Condition of the skin. — So intimate is the sympathetic relation between the cutaneous and digestive function, that the latter seldom if ever becomes disordered unless a morbid influence is imparted to the former. That portion of the skin, however, investing the face, being exposed to observation, largely furnished with bloodvessels, highly sensitive and sympathetic, and consequently endowed with a relatively great activity of function, manifests in a more particular manner the effects of indigestion. The clear, bright and blooming complexion of health is seldom witnessed in the countenance of one afflicted with this disorder; on the contrary, it is wan and contracted, and its natural freshness exchanged for a dull, and dingy hue. The face is also liable to sudden and transient flushings and burnings, especially after eating, or from any moral or physical excitement, alternating with paleness.

In many cases of dyspepsia eruptions are common, especially about the forehead, mouth and chin, and are oftentimes very obstinate and troublesome. They most frequently happen in youth, the skin at this period being more delicate and sensitive than in later life. At about the age of puberty, indeed, there seems to exist in the face a particular tendency to such eruptions, and hence they will frequently occur, and be very persisting at this time, even when the digestive organs are seemingly in good condition. In some individuals who have sensitive and delicate skins, the face

will uniformly become spotted with pimples subsequent to any excess either in eating or drinking, which subside as the digestive organs recover their tranquillity. Nothing in truth tends so certainly to purify the complexion as those means which impart health to the digestive function; as for example, temperance in eating and drinking, exercise in the open air, and a free state of the bowels. With the eruptions mentioned, itchings and burnings of the face are sometimes associated. Soreness and itching about the nose are in children commonly regarded as an indication of worms, which effects must be produced by the irritation and derangement which these animals occasion in the organs of digestion. Sometimes a troublesome itching is felt on different parts of the surface, quite annoying perhaps on retiring to rest at night. The skin too, under the influence even of temporary indigestion, is liable to be more tender and sensible than natural, as may be remarked in the operation of shaving.

In those seasons and states of the weather during which indigestion is most prevalent, the skin may often be remarked to lose its freshness, and to look rough, sallow, and contracted, and the eye also at the same time to become dull and dingy, or perhaps red. There are few persons but must have noted a sensible difference in their complexions at different periods and under different circumstances, and which is far more frequently dependent upon the state of the digestive function than is generally

suspected. Cleansing the stomach and bowels will often cleanse the face more effectually than the most assiduous use of soap and water; and no cosmetic can compete in its effects with a sound and quiet digestion.

“The influence,” observes Dr. Paris, “of a healthy condition of the digestive organs upon the skin, is so well understood by those that direct the art of training, that the clearness of the complexion is considered the best criterion of a man *being in good condition*, to which is added the appearance of the under lip, ‘which is plump and rosy in proportion to the health of the constitution.’ ” *

Persons who are predisposed to cutaneous affections, as erysipelas, nettle-rash, &c., are very apt to have them excited by indigestion. Sometimes they will almost immediately follow the use of indigestible food.

In dyspepsia, the skin is rather inclined to be dry, though sometimes sweating is very readily induced, as under the influence of warmth, or slight exertion. Unnatural dryness and moisture may likewise alternate with each other.

Influence of dyspepsia on the vital energies of the constitution. — That the general energies of life become depressed and disturbed by indigestion, is shown especially in its effect on the power of restoration from injuries, and of adjusting the

* Treatise on Diet.

animal temperature. Thus wounds are often slow to heal, and are apt to pass into unhealthy conditions. Every practical surgeon well knows the importance of a clean and quiet state of the digestive organs to the success of his art. Old ulcers which have been but recently healed, will not rarely break out afresh under the influence of morbid digestion. That a sore finger, or a sore toe, therefore, may sometimes be cured by an emetic or cathartic, is by no means so absurd an idea as might at first appear.

The ability to resist external temperature is almost uniformly lessened in the present complaint. Even during a transient fit of indigestion, the subject is liable to suffer unnaturally, more especially in his extremities, from any exposure to cold. Coldness of the hands and feet is hence more or less experienced in almost all cases of lasting indigestion. Sir John Ross remarks "that men of the largest appetites and most perfect digestion produce the most heat; feeble stomachs, whether dyspeptic, as it is termed, or merely unable to receive much food, are subject to suffer the most from cold." *

Under protracted indigestion, the constitution loses in a measure the power of adapting itself to sudden and great atmospherical vicissitudes. Cool and damp air, conducting the heat rapidly from the surface, and depressing the energy of its function,

* Second Voyage of Discovery to the Arctic Regions, p. 200.

is, for the most part, both unpleasant and prejudicial, and hence it is that the easterly winds of our seacoast are so much dreaded by dyspeptic valetudinarians. High and cool winds also speedily carrying off the animal temperature, are generally disagreeable in their effects. Nor is a high degree of heat ordinarily well supported, since the same defect of vital power that disqualifies the body to endure one extreme of temperature, unfits it also to bear the other,—the power of adaptation to circumstances bearing generally a direct proportion to the health and vigor of the system. It is to this diminution in the adjusting power of the constitution, added to the morbidly sensitive state of the surface to atmospherical impressions, that may be ascribed the habitual complainings of dyspeptic invalids about the weather,—seldom indeed is it in perfect harmony with their diseased sensibilities.

Symptoms manifested in the head.—The sympathetic relations between the head and digestive organs are close and mutual. The head, however, is differently affected by indigestion in different constitutions. In some, distress is excited here by the most trifling derangements in the stomach, while in others, it arises only when the disorder is very considerable; and in rare instances there is a complete exemption from it.

The affections of the head are various in their seat and character. A sense of vertigo or swimming is very common, and particularly apt to be felt on stooping, or on suddenly rising from this, or a

horizontal posture, and hence is often experienced on first getting up in the morning. It is frequently attended with a confusion or mistiness, and occasionally with an almost entire obscuration of vision. Probably many cases of optical illusion owe their origin to some derangement in the organs of digestion; at any rate they not uncommonly yield to such means as tend to cleanse and invigorate them.

Pain in the head is very common, differing in its degree and situation. It may be obtuse, or merely a sensation of fulness or distension, relieved in a measure by pressure, either of the hands or a tight bandage. Again, it may be acute with a sense of shooting. In respect to its situation, it is superficial or deep, general, or limited to some particular part, as the forehead, temples, or occiput. Sometimes the scalp is sore and tender; and again it is numb, as though its nerves were partially palsied. Such affections may be transient, and dependent on incidental causes aggravating the indigestion; or more persisting, and less owing to temporary influences. Sometimes there is an undue determination of blood to the head, causing an unnatural heat in it, and a flushing of the face, associated with, and perhaps often the cause of many of the affections enumerated. Severe indigestion may even excite apoplexy, and perhaps other affections of the brain to which there is a predisposition.

Effects of morbid digestion on the mental feelings and operations.—The mind, seldom, if ever wholly

escapes the prejudicial influence of indigestion, but the extent to which it becomes affected will be determined by the severity, pertinacity, particular character and seat of the complaint, and also on the temperament of its subject. The sanguine, for example, might bear up, and be even cheerful under a degree of dyspepsia which would depress the melancholic to the deepest despondence. The moral character, however, almost always exhibits striking changes under the long continued influence of the complaint.

Though I am not disposed with some physiologists to regard the organic viscera,—that is the stomach, liver, spleen, heart, &c.—as the seat of the passions, yet that their condition may so influence the brain that it will arouse them into action, is indisputable. Sound digestion is indeed almost indispensable to the harmony of our moral nature. It is a matter of familiar remark that a capricious and irritable temper is almost always associated with a spare body, sallow complexion, and infirm digestion. There are few but must have observed how quickly clouds will often be dispersed from the mind by dispelling morbid matters from the bowels.

Dyspepsia usually depresses the moral energy, or the power of the will, and hence the character becomes less enterprising, and is often marked by an unnatural timidity and irresolution, and thus even the ordinary duties of life are all magnified. In aggravated cases, the thoughts are liable to

become confused and wandering, and it being consequently difficult to confine the attention, all mental labor gets to be irksome. The memory, too, particularly for names, is oftentimes impaired. The feelings are frequently suspicious and gloomy; and liable to be disturbed and irritated by trivial causes. The mind's eye turning to the shadowy side of every thing, the little mischances of the present are often exaggerated into grave misfortunes, and the future is regarded with the darkest forebodings. Under such moral feelings, the countenance, as might be imagined, becomes gloomy, anxious and contracted. It demands an exaltation of will with which few are endowed, successfully to combat such unfortunate moral influences. "He," says Dr. Reid, "whose disposition to goodness can resist the influence of dyspepsia, and whose career of philanthropy is not liable to be checked by an obstruction in the hepatic organs, may boast of a much deeper and firmer virtue than falls to the ordinary lot of human nature." *

The feelings, influenced by the state of the weather, or other incidental causes, are exceedingly variable, and the judgment, swayed by their force, is correspondently uncertain. Transient disturbances of digestion even, not uncommonly produce analogous effects on the temper. Thus it is curious to remark, when thrown into close and frequent

* Essays on Hypochondriasis.

intercourse with particular individuals, how sensitive, irritable and disputatious they often become, and how quick they are to take offence, when bad weather has debarred them of their customary exercise, or when they have been feasted freely on pastry or other indigestible food. The skin at the same time looks more dingy, and the eye less clear and bright than natural; a further confirmation that bad digestion exists to cause such change of feelings. We all, to be sure, are disposed to lay our faults of temper wholly to moral vexations, but I apprehend we should find the effect of these vastly diminished, were they unaided by those of a physical character. Such facts should teach a lesson of charity for the moral infirmities of those with whom we may be associated; and should also instruct parents in the important truth that the ill temper of their children will often yield more certainly to a simple and spare diet, with fresh air and exercise, than to the most assiduous use of the rod. I would therefore suggest as a punishment for peevish and refractory children, that they be debarred of their cake, pies, and sweetmeats, and be put upon an exclusive diet of plain bread and milk, with the additional penalty of daily exercise in the open air.

As different individuals, from constitution, education and other causes, differ materially in the temper of their minds, the moral effects of dyspepsia must accordingly vary.

As it is the tendency of indigestion to throw gloom and apprehension over the mind, the subject is very prone to magnify his complaints, and to become alarmed for their consequences; and this is more particularly the case if his temperament is melancholic.

Manifestations of dyspepsia in the nervous system.

—In union with the condition of the mind just described, there is generally a morbid sensibility and irritability of the nervous system. Between the digestive apparatus and general nervous system, mutual sympathies are exercised, and neither one can be long disturbed without prejudice to the other. Hence it is that in dyspeptic subjects, tremors, and startings are induced by slight causes; and little noises often vex and disturb them, owing sometimes to an increased sensibility in the organ of hearing.

Indigestion happening in nervous and sympathetic constitutions, particularly in females, is oftentimes associated with a morbid irritability of the heart, its pulsations being quickened, or perhaps severe palpitations brought on, even by the most trivial causes when occurring unexpectedly; as the appearance of a stranger, the sight of an insect, a sudden noise, or indeed any thing exciting to the feelings. At such times the voice will often tremble, articulation become difficult, and the breathing be quick and embarrassed; and under strong and sudden excitement, even fainting is liable to happen. Boys and girls at about the age of puberty, if their

physical education has been neglected, and their digestive organs are feeble, often suffer much from palpitations of the heart, and which have generally an obvious connexion with the state of their digestion.

Palpitations growing out of indigestion are liable to be most distressing at night after having retired to rest, at which time they are in some instances so severe that they even jar the bed; and each beat is most painfully perceived, its sound, rushing as it were through the head. With this unnatural agitation of the heart, is associated oppression of the breathing, and very frequently pain in the shoulder, more particularly the left, extending perhaps to the elbow. If indigestible food is taken late in the evening, such sufferings are apt to be greatly aggravated.

In some cases, palpitations are in a measure periodical, while in others they are more immediately dependent on incidental causes, as errors of diet, &c. Occasionally the action of the heart becomes so disturbed as to awaken the suspicion of positive disease in the organ; and other signs which exist at the same time, as embarrassed respiration, and difficulty of speaking, from severe bodily exertion,—particularly that of ascending a hill, or going up stairs,—and from mental emotion, tend to strengthen such suspicion. And indeed it is not improbable that such disturbance of the heart's function if long continued, may terminate in

enlargement, or some other unnatural change of structure.

Intermissions sometimes occur in the pulse, having apparently an intimate connexion with the condition of digestion. These are mostly accompanied by a feeling in the heart as though its action was interrupted, and frequently also of a peculiar "rolling or tumbling motion." A sense of constriction, too, is at times felt at the heart, as though it were forcibly grasped. In some cases fits of fainting, complete or partial, and attended with pain in the chest and shoulders, are liable to happen, and to which the name of *angina pectoris* is often applied. Dr. Hope—alluding to *angina pectoris* in a moderate degree—observes; "I have frequently met with it in hysterical females subject to palpitation, and in cases of nervous dyspepsia and hypochondriasis, under the form of spasmodic, aching pains in the anterior part of the chest, extending sometimes to the neck and stomach, and either attended or not with pain and numbness in one or both arms. One of my medical friends always feels the affection of the arm when attacked with dyspeptic palpitation, to which he is subject." *

The symptoms most remarkable on an attack of the affection referred to, are a sense of pain and constriction at the heart; a feebleness, or irregularity, or both, in its contractions; and a painful

* On Diseases of the Heart and Great Vessels, p. 479.

numbness in one of the arms, most frequently in the left. The pain in the heart and arm is sometimes quite acute. The heart's action here may either partially and temporarily, or completely and permanently cease. In severe and fatal cases of this affection, other phenomena are manifested, but it is probable that these are generally dependent upon local disease, or a morbid disposition in the heart itself.

When a disease of structure, or a predisposition, from some other cause, to the affection under notice, exists in the heart, it may be excited by embarrassed digestion, or an undue distension of the stomach, as by any other causes tending to disturb, or interfere with the circulation. Hence it is that in persons afflicted with complaints of the heart, death will sometimes occur suddenly after eating imprudently, and more especially at night. The real origin, however, of these affections of the heart, is oftentimes exceedingly obscure; and when severe, the most cautious investigation is demanded to ascertain whether they are merely sympathetic, or dependent upon some morbid state of the organ itself. They may be excited by other causes beside indigestion, especially those of a moral nature; but be their origin what it may, they are uniformly aggravated by derangement of the digestive function, and which therefore should always be an object of primary regard in them. They are exceedingly prevalent, and are the occasion of no small amount of suffering in civilized life.

The signs commonly enumerated as distinguishing the nervous palpitation induced by dyspepsia from that dependent on disease of the heart, are, that in the former the pulse is regular and the heart's action natural during the interval of the occasional attacks of palpitation; and, moreover, that it is not excited, but on the contrary commonly relieved by such bodily exercise as would occasion severe disturbance in the heart were it actually diseased. That it is disposed to come on when the individual is at rest, especially at the beginning of the night, when he lies wakeful in bed. That a fluttering takes place in it over the situation of the stomach, and that it is accompanied by general nervous disturbances, whose aggravation increases the severity of the attack of palpitation. Sympathetic palpitations are furthermore remarked to manifest a more obvious connexion with disorders of the stomach, and to derive more perfect relief from remedies which relieve these. Still, however, actual diseases of the heart are aggravated after meals, and by indigestion.* Disturbances of the heart when severe and obstinate, are never to be regarded with indifference, but should be subjected to careful medical investigation.

Different nervous pains are often, though not necessarily experienced in dyspepsia. Sometimes there is pain in the side, probably dependent on

* See Hope on Diseases of the Heart, &c., p. 490.

the superficial nerves of the chest, and occasionally it is quite acute. In the early stage of the complaint, it is apt to be felt in the left side; and manytimes a slight pain, or an uncomfortable sensation not easily described, is experienced when lying on this side. Some dyspeptic invalids seldom sleep quietly in this position; but then again others are more uncomfortable on the right side, and many assume either posture indifferently. The back and limbs are in some instances affected with nervous pains. Those affecting the head have already been described.

Sometimes a numbness will be experienced in the extremities, and I have even witnessed an entire loss of the power of voluntary motion in the lower limb of a child, which could be ascribed to no other cause than a very disordered condition of the stomach, and the relief of which quickly restored to the part its natural powers. Convulsive actions may arise out of indigestion, and if there exists a predisposition to these, as to hysterics and epilepsy for example, it will frequently excite them into action. Such effects, however, most commonly follow acute attacks of indigestion.

The nerves of the senses do not escape the influence exercised on the general nervous system. Thus the sense of feeling may be more acute than natural, and in occasional instances it is blunted. Sometimes there takes place a partial deafness, and again, as before remarked, the sensibility to sounds becomes morbidly acute. Occasionally, too, ring-

ings and other disagreeable noises are perceived in the ears. In the vision, different effects are experienced. It is very liable to be weakened, and may even become much impaired under the long continued influence of bad digestion.

State of the pulse. — Except under incidental nervous excitement, or during sympathetic palpitation, the pulse is generally natural. Indeed the usual regularity of the pulse, and the freedom from febrile symptoms, are among the most important signs distinguishing dyspepsia from inflammatory and other grave diseases of the organs of digestion, which are almost uniformly marked, particularly toward evening, by acceleration of the circulation, and febrile exacerbations.

CHAPTER XIV.

SYMPTOMS OF DYSPEPSIA CONCLUDED.

Influence of indigestion upon the sleep. — Few circumstances are more favorable to sound, easy and refreshing sleep, than a natural and quiet state

of the digestive organs ; and few are more unpropitious to the slumbers than the opposite conditions.

Some subjects of indigestion are oppressed, perhaps even in the daytime, by an unnatural drowsiness ; and their sleep is more profound and lasting than usual, and they awake out of it in the morning stupid, heavy, unrefreshed, and oftentimes with headach and other uncomfortable sensations. This morbid drowsiness is commonly ascribed to a disordered state of the liver, or to what we vaguely denominate bilious complaints, and is most frequent in the spring season.

Dyspepsia however is more frequently attended with wakefulness or unquiet sleep. Thus on retiring to rest the individual is oftentimes afflicted with a general and undefinable uneasiness, united perhaps with a disagreeable sensation at the stomach, causing frequent turnings from side to side in search of a comfortable posture. But, as it has been justly said, if one cannot go to sleep by lying still, he will seldom accomplish it by tossing about ; and so in this unenviable condition, anxious and striving for sleep, and in consequence becoming more excited, — endeavoring to withdraw the thoughts from subjects of interest, but finding that they will ever and anon revert to them, the pitiable sufferer may pass hours, or most of the night, before experiencing the soothing influence of that

— “ balm of life, whose kindly warmth restores
Light to the eyes, and vigor to the heart.”

Such a state is especially liable to happen when the feelings have been excited, whether pleasantly or painfully, or when food has been taken, particularly of an indigestible character, shortly before bedtime. A similar restlessness may occur from a painful, and consequently exciting sensation in the animal muscles resulting from undue fatigue, or, in sensitive persons, from any cause tending to arouse or disturb the nervous system, independent of indigestion. There are also certain conditions of the atmosphere which have appeared to me to dispose to this state of sleeplessness, especially that characterized by warmth and moisture. Though, however, it occurs under other circumstances, yet I conceive it to be most common in dyspepsia, and arises from the nervous irritation which is so frequent in it.

With the state described, some other unpleasant affections are often associated. Thus the mouth and throat become dry, and their secretions tenacious, and frequent swallowing is the consequence. The skin may be too dry or too moist, or these conditions may quickly alternate with each other. The extremities are liable to be cold, though they will sometimes be uncomfortably hot. On falling asleep under such circumstances, sudden startings, and twitches of the limbs, or a numbness of them, especially when exposed to pressure, are not unusual. Flashes of light, too, will sometimes appear to dart across, or play about the eyes.

Some dyspeptic subjects on falling asleep, are subject to oppressions of the chest, accompanied with a feeling of suffocation, and not uncommonly exciting that peculiarly painful affection denominated nightmare, and of which, from its frequent association with indigestion, a concise account may not be irrelevant.

NIGHTMARE afflicts some persons who seem in all other respects to enjoy good health, at times occurring independent of any obvious exciting cause. It must generally, however, be regarded as an indication of a morbid state of some of the functions of the body. The following are its most remarkable phenomena. A distressing sense of weight, or oppression in the chest or region of the stomach, united with a numbness, or other uncomfortable feelings in different parts of the body. Sometimes there is sweating, though dryness of the skin is more common. Heat or coldness may be experienced according to incidental circumstances. The pulse are most frequently full and soft, without acceleration.

Such physical suffering, in conformity with the laws of association, calls up in the mind some dream of terror and distress. Thus the sufferer will fancy himself beset by murderers, thieves, or phantoms; or that he is smothering, or drowning, or about to fall from some lofty precipice; when, filled with alarm, he struggles to resist or escape. But the influence of the will being for the most part partially or completely suspended during sleep,

his efforts avail him nothing, and hence there follows a consciousness of this absence of voluntary power. Again and again perhaps he strives to exclaim for help, and after many painful efforts, resulting only in feeble moanings, he at length succeeds, and his cry is often loud, unnatural, and expressive of the most agonizing terror. Having cried out lustily, the nervous energy is aroused, the breathing becomes more frequent and full, and he awakes, and is relieved. Sometimes his fears and struggles awaken him without his making any noise, and again he vociferates repeatedly before being sensible of his real situation.

Persons usually awake out of the nightmare in great alarm, and are afraid to look from their beds, or even to open their eyes, lest they should still see the objects of their terrors, and some minutes even may elapse before they can fully realize that only phantoms of the night had affrighted their slumbers. It sometimes happens that under the influence of this affection, persons will spring out of their bed, run across the room, uttering several painful cries before getting relief. For the most part, however, so soon as the sufferer can bestir himself, and utter a full sound, or resume in a measure his voluntary power, he recovers from his situation. The cry, even of itself, calling for a fuller inspiration, tends to relieve the feeling of suffocation. Sometimes on awaking, a pricking sensation is felt in one or more of the limbs, as when they are coming out of that state in which they are said to be asleep,

seeming as though the nervous influence was diffusing itself rapidly through them, to restore their suspended powers.

As is always the case in dreaming, and also when under circumstances of pain, the period seems exceedingly protracted, even though the affection may last but a few minutes. It is a curious fact, too, that when laboring under nightmare, we are sometimes actually conscious of our situation, and though extremely terrified, are still aware that we are only under the influence of a dream, and, moreover, that could we but speak or move, relief would be procured.

Conformable with the laws of association, the distressing sense of suffocation commonly experienced, occasions the fancy that some heavy, or frightful object is seated upon the chest, oppressing the breath and impeding the voluntary movements, and it is to this circumstance that the affection owes its various appellations. Thus *ephaltes*, one of its names, comes from a Greek verb meaning to leap upon, and was given it from the belief that it was caused by a demon, who leaped upon our chests during sleep. *Incubus*, a common name of it, is derived from the Latin verb *incubo*, meaning to lie or sit upon. It has likewise been called hag-riding, under the idea that it was occasioned by hags or witches, who rode us when asleep. The term nightmare means a goblin,—a sort of squab, clumsy fiend, supposed also, to bestride the chest during our slumbers.

"Saint Withold footed thrice the wold ;
He met the nightmare, and her nine-fold ;"

This affection has indeed ever been personified by some disgusting superhuman shape, whose nightly employment was to oppress the breath of mortals when sunk in sleep.

The immediate cause of this distressing affection is not well ascertained. It may at times be dependent on some peculiar condition of the nervous system; yet I am inclined to believe that in most cases it is ascribable to embarrassment in the function of respiration, and occurs particularly during sleep, because the will being then suspended in its influence, cannot, as in the waking state, augment the breathing powers to correspond with the incidental demands for increased activity of respiration. For illustration, in many diseases of the chest, respiration is uniformly labored, voluntary efforts being required to furnish the lungs with an adequate supply of atmospherical air; but on falling asleep, these voluntary efforts being suspended, or reduced, the quantity inhaled is unequal to the requisitions, whence will ensue a sense of suffocation, which may originate all the distressing phenomena of the affection under consideration. Thus the subjects of diseases of the heart suffer great distress in their sleep, and are very liable to awake suddenly under a sense of alarm and suffocation, when the voluntary powers becoming restored, and respiration consequently augmented, a degree of relief is soon experienced.

Sleeping in small, confined, and warm rooms, is a frequent cause of nightmare, and its mode of action will now be easily comprehended. It is well known that in such situations, when awake, oppression is experienced in the chest, and which, for the reasons stated, will be aggravated on falling to sleep.

Indigestion may also act through the instrumentality of respiration in the production of the affection. Thus during the waking state, if digestion is much disordered, or the stomach unduly distended, the breathing ordinarily becomes labored, and more especially in the horizontal posture. In this position, the stomach, when full, must press against the diaphragm,—an important agent, as will be remembered, in the mechanism of breathing—and thus impeding its motions, constitutes a mechanical obstacle to the freedom of respiration. Nightmare is in truth exceedingly apt to occur in all diseases which are associated, either primarily or secondarily, with embarrassment of the breathing function; and hence I conclude that the imperfect renovation of the blood in the lungs is a common, though probably not the only cause of it.

In most persons, even in good health, respiration is more labored when sleeping on the back than on the side, it is therefore in this former position that nightmare is most prone to occur.

The dyspeptic invalid, at least when his complaint is of an aggravated character, seldom awakes in the morning cheerful and refreshed; his condi-

tion indeed at this time is any thing but enviable. His hopes clouded ; his thoughts dull and confused, his memory imperfect, and his bodily and mental energies all weighed down by painful languor, he has scarcely resolution to rise from his bed. His mouth, too, is now foul, causing a most nauseous taste, and a disrelish for food ; his breath fetid, and his head, not unlikely aching and oppressed. After taking a light breakfast, however, these disagreeable symptoms ordinarily begin to subside, and by evening he may get to feel comparatively well, with perhaps a much better appetite than at any other period of the day, and thus is he often tempted to take food at the most unfit time, enhancing the sufferings of the coming night and morning.

When the night has been passed in a state of nervous restlessness, a sinking faintness at the stomach, confusion of the head, weakness of the eyes, nervous irritability, with other phenomena indicative of the loss of sleep, are liable to be experienced through the day, and the nervous irritation may even continue into, and disturb the rest of the ensuing night.

Under protracted dyspepsia, owing to defective or imperfect nutrition, and the sympathetic disturbances of important functions of life, the body emaciates, and the muscular strength diminishes.

Peculiarities marking that form of dyspepsia resulting from the use of ardent spirits.—In the dyspepsia of the intemperate spirit drinker, the

weakness and irritability of the nervous system are very remarkable. The hands, and frequently the head, grow tremulous, and the step is unsteady. The temper too is apt to become irascible, the feelings depraved, and in truth the whole moral and intellectual nature degraded. The nervous system perhaps receives here some direct morbid influence from the spirit, in addition to that which is imparted sympathetically through the medium of the digestive function.

The skin, especially that of the face, is in a more particular manner affected in the dyspepsia of intemperance, which is in part, though probably not altogether referrible to its sympathy with the morbid state of digestion. "Are the monstrous noses," asks Mr. Abernethy, "caused by excessive drinking of vinous and spirituous liquors to be otherwise accounted for, than by irritation arising from the stomach?"* The eyes, also, become unnaturally red and watery. There is furthermore less energy of reaction, or less restorative power in the constitution, than in dyspepsia from most other causes; hence wounds and ulcers are liable to run into a bad condition, and to be very slow to heal. This is especially the case on the lower extremities, where even a slight abrasion of the skin will manytimes grow into an extensive morbid sore.

* On the Constitutional Origin and Treatment of Local Diseases.

The pain and oppression in the head are here disposed to be severe and frequent; and the sinking faintness, or gnawing at the stomach, and the depression of the mental feelings and muscular powers, are most extreme and distressing in the absence of the customary stimulus, and so intense are they in some instances as to drive the victim to self destruction.

The symptoms in this form of dyspepsia are uncommonly aggravated in the morning; and the miserable sufferer awakes indeed to a world of gloom and wretchedness. It is now especially that he experiences, in his dizzy and aching head, in his foul and parched mouth, in the nausea and sickly faintness at his stomach, and in the painful depression of all his physical and moral powers, the penalties affixed to his unnatural habits, and which are warnings not to be misunderstood, though too often disregarded, of their destructive consequences. So distressing are these sufferings in the morning, that the votary of intemperance is commonly urged early from his bed to obtain the transient relief of his accustomed dram.

In the dyspepsia of intemperance, the lining or mucous membrane of the air passages is liable, after a while, to participate in the irritation created in the digestive organs, and perhaps is at the same time affected by the spirit in other ways, as for example, from the frequent inhalation of its vapor; at any rate a cough, at times severe and suffocating, and ordinarily terminating in the vomiting of a

greenish bitter matter, or a glareous mucus, or the two united, often adds to the other sufferings of the morning. Vomitings of such fluids on first rising from bed, are quite usual, independent of any cough, though associated with a good deal of hawking, and commonly afford very sensible relief.

Dyspeptic symptoms arising out of intemperance appear often to be but little affected by such incidental circumstances as exercise a most marked influence upon them when dependent on other causes. Thus they will often continue obstinate in the most favorable weather, and under the most judicious course of diet and exercise. It often happens indeed that no obvious connexion can be traced between the food taken, and the disordered condition of the digestive function, the symptoms seeming to depend rather on some morbid state of the mucous membrane, and nerves of the stomach, and consequently the secretions, than upon chemical changes in the alimentary matters; nevertheless the digestion of the food must be in a measure imperfect, and any imprudence in diet will necessarily aggravate the symptoms. Excesses in eating however are not usual in the dyspepsia of intemperance, the parched mouth and throat, and unnatural thirst so common in it, being incompatible with the sensation of hunger. It is in fact almost proverbial that great rum drinkers are small eaters; and hence they are very apt to become neglectful of, and consequently irregular at, their periodical meals. Let a beggarly drunkard pass the whole

day with scarcely a mouthful of food, and give him a sixpence at night, and he will in all probability expend it for rum rather than bread.

The habitual application of the acrid liquor to the mouth and stomach having blunted their healthy sensibility, mild food, as well as drink, becomes insipid, and consequently the most savory and stimulating dishes are ordinarily craved. A desire for high seasoned, and exciting food, may, to be sure, exist in indigestion from other causes, yet I think it most frequent and remarkable in that from intemperance.

The dyspeptic symptoms in the intemperate are commonly designated by the indefinite term *bilious*, and the liver may doubtless often have a concern in them; still the primary effect of spirituous liquors is, as I conceive, most frequently to occasion some morbid state of the mucous membrane of the stomach. Dr. Beaumont found that the free indulgence in the use of ardent spirits, or any intoxicating liquor, even when continued but a few days, uniformly occasioned a diseased appearance of this membrane, and vitiated its secretions. Still, from their intimate relationship, all the digestive organs ere long become implicated, and the liver is not the least sufferer.

Duration and course of dyspepsia.—Dyspepsia, though rarely dangerous, is oftentimes very obstinate. Some persons suffer from it more or less constantly during a protracted existence. Dyspeptic valetudinarians, though to be sure very

prone to talk about dying, yet will often long outlive their most healthy coevals. It may be that the temperance and regularity which they are obliged to observe, tend to secure them against inflammatory and other diseases, often the result of repletion, of a more serious character than that with which they are afflicted.

Though indigestion is at times quite obstinate, yet it will for the most part yield to temperance in eating and drinking, and a judicious regulation of the various habits of life. In truth its obstinacy is in by far the larger proportion of cases, owing to the indiscretion of its subjects. It is most intractable when hereditary, that is when an unnatural delicacy, or some imperfection of the organs of digestion is derived from parents or ancestors.

It not unfrequently exhibits something of a periodical character, its symptoms becoming more remarkably developed at certain seasons, as with us, for example, more especially in the spring, in part perhaps from the prevalence of easterly winds at this time. Various causes, however, of whose nature we are ignorant, may lend their aid in exciting, or increasing it at particular periods.

Sometimes it will continue, varying in severity, and subject to intermissions, for several years, when the digestive organs, perhaps without any assignable cause, resume their healthful powers. As individuals advance in life, other things being equal, the organs of digestion—dependent, perhaps, on the general reduction of nervous sensibility—

become less susceptible to functional disorders. And it may be, too, that as we grow older, acquiring wisdom from experience, and being less subject to our instinctive appetites, we bring our habits into more perfect accord with the powers and circumstances of our constitutions. At any rate, dyspepsia, although no age is exempted from it, is more common in youth than in later life; and thus the digestive powers, if they had been previously delicate, are oftentimes found to improve after about the thirtieth year; I mean of course if the habits are good.

Dyspepsia,—with perhaps some rare exceptions,—can only prove fatal indirectly. Thus long continued disturbance of function, with the irritation of morbid secretions, and acrid matters resulting from imperfect digestion, may in the end create inflammation and ulceration, or other disease of structure in the stomach or bowels. The liver may also become seriously affected under protracted disorder of its function. Such effects are always hazarded by persisting in improper habits of diet; and the indigestion of the spirit or wine drinker, if long maintained by a perseverance in its cause, almost uniformly terminates in grave disease of some one or more of the organs of digestion.

Indigestion may moreover tend, in some instances, to call into existence diseases in other organs beside those immediately concerned in digestion, and more especially to excite those to which there already exists a predisposition. Still we are here

very liable to error, owing to the difficulty, to which I have before alluded, of accurately analyzing causes and effects in the science of disease; and I much question whether simple indigestion is so common an instigator of fatal maladies as many modern pathologists have been disposed to believe. That it is often regarded as a prime occasion of a disease when it is only a concomitant effect of some other cause, is hardly to be questioned. Thus for example, gout is oftentimes referred to dyspepsia, its subjects being liable to bad digestion, whereas both affections may in reality belong to the gouty predisposition, or the causes inducing it. Consumption too is frequently ascribed to the influence of dyspepsia. Now in scrofulous persons, who are the frequent subjects of this complaint, there is a general delicacy or feebleness of all the functions of the economy, in which that of digestion must of course participate, and hence both their indigestion and pulmonary disease may be but induced effects of the same constitutional imbecility. Still it must be admitted that if disorder of digestion is continued, and aggravated by improper diet, the developement of consumption, or any other malady to which the constitution has a particular tendency, may be hastened, as from any other cause deranging the general health, and thus reducing the power of the system to resist the establishment of disease.

Indigestion is doubtless manytimes mistaken for a cause of a disease when it is in reality but a

premonitory sign. Let us suppose disease to be establishing itself in the brain. The sympathy between this organ and those belonging to digestion being strong and mutual, disorder in the stomach and bowels, or liver, is not uncommonly among the first and most prominent symptoms, and alone attract the attention. When at length therefore the true malady reveals itself, it may be looked upon but as an effect of the apparently antecedent disorder in the digestive function. Hence the reason why we so frequently hear the hydrocephalus of young children ascribed to stomach and bowel complaints. To recur again to consumption as a further illustration of such inversion of cause and effect :—indigestion frequently happening as a symptom or induced phenomenon of its early and obscure beginning, is perhaps the only circumstance at first exciting regard, and the malady of the lungs which afterwards becomes disclosed, is hence oftentimes viewed but as its unhappy consequence.

CHAPTER XV.

CAUSES OF DYSPEPSIA.

CHRONIC indigestion, so far as our knowledge extends, seldom if ever exists in the early stages of society, but grows out of the effeminacy and morbid nervous susceptibility which are the accompaniments of luxury and mental cultivation. Some of the brute creation even, when associated with man, and exposed to the hurtful influences belonging to his civilized state, will not unfrequently become the subjects of indigestion. It is then among the various circumstances operating upon man in his advanced social condition, that we are to seek for the causes of dyspepsia.

Constitutional predisposition to indigestion. — There may exist an inherent delicacy, or some sort of imperfection in the instruments of digestion, rendering them unusually susceptible to disorder, even, perhaps, from early infancy. Such condition, like imbecilities or tendencies to disease in other organs, may be inherited, or connected with circumstances incidental to the early developement of the organization, of whose nature we can form no conjecture.

For the most part, vigorous circulation and respiration, muscular strength and capability of endurance, announce an energy of digestion; and a general delicacy of constitution, a corresponding infirmness in this function. Still there are occasional exceptions, in which the digestive function, either from innate or incidental causes, displays a weakness peculiar to itself.

So many causes, however, may be operative in early life, as even the nurse's milk, to hurt the powers of digestion, that it is no easy thing to decide when the disposition to dyspepsia is innate, or dependent on original physical organization, and when referrible to the agency of contingent causes acting after birth. There may, too, exist a native delicacy of digestion, and yet owing to prudence in diet, and a judicious physical education, dyspepsia will perhaps never become developed. Though, to be sure, some stomachs have far less original power than others, and consequently demand a more scrupulous care in respect to diet, yet I believe it is seldom the case that this organ when rightly treated is inadequate to supply the necessary demands of nutrition.

Early foundation of dyspepsia.—Though bodily infirmities may be derived from the authors of our days, causing disease and suffering, and rendering life an afflictive burden which would be laid down with gladness, yet more frequently do they originate in the mismanagement of parents. Thus the diet of infancy and childhood is not unfrequently of

the most unsuitable character. Even that which nature has provided for infancy, may be allowed in too great quantity, or may be even vitious in its qualities. Were young children left entirely to their own instinctive inclinations, in taking food, that is, were the breast only offered them when distinctly sought,—not every time they happen to cry, or open their mouths, or are fretful,—and were they removed from it on the first indication of satisfied appetite, and, moreover, were no unnatural stimulants urged upon them to create an artificial hunger, there would probably be little danger to digestion from excess in regard to quantity while nursing. But then the milk may sometimes be unsuitable in its qualities, and thus tend to prejudice the health of digestion.

That nature has imposed on the mother the obligation of suckling her own offspring is sufficiently manifested by the secretion of milk immediately following its birth, and by the want which, when this fluid is accumulated, is excited for its discharge; and also by the sensation of pleasure that its emission affords. That the mother's milk, supposing her in health, is, from the natural relationship between the two beings, better suited to her offspring than that of a stranger, is certainly a rational inference. Mothers, therefore, who are healthy, and not prevented by physical incapacity, by neglecting this duty, and submitting their offspring to the precarious care of mercenary nurses, perhaps immoral and diseased,—for the

contrary cannot always be known,—are guilty of a positive infraction of the ordinations of nature, and of injustice to the innocent being to whom they have given life. Furthermore, the mother not only owes her own milk to her infant, but it is also her duty to insure its good quality by living temperately and modestly, and attending scrupulously to the various circumstances of diet and regimen, which contribute to the calm, equable, and healthful play of the different functions of life. Whenever the health is disturbed, or the moral feelings unduly affected, the secretions, are all liable to become depraved.

When circumstances render it necessary that a nurse be employed, she should be healthy and moral, and as nearly as possible under like circumstances in respect to age and period of confinement, with the mother.

But the errors of parents in the nurture of their offspring, laying the foundation for indigestion, nervous irritability, and a host of afflictions in future life, are exceedingly numerous, and I shall have repeated occasions to allude to them.

Periods of life most favorable to dyspepsia.—Though no time of life is exempt from this complaint, yet the disposition to it varies remarkably at different ages. Young children, though quite subject to transient disorders of the stomach and bowels, yet are not commonly affected with lasting indigestion. Still it may in some instances happen even in infancy, and many of its physical and

mental sufferings be experienced before there is language to express them.

Dyspepsia will oftentimes, particularly in females, be first manifested at about the time of puberty, its symptoms continuing with greater or less severity, according as they are influenced by incidental circumstances, for several months, or perchance even years, when, some favorable change apparently happening in the constitution, the digestive organs gradually resume their healthy action.

I have already observed that as we advance in life, having passed the age of thirty, the susceptibility to the complaint under consideration seems to diminish. Still it should be taken into the account, that after the period of youth, the habits, for the most part, become more regular, the feelings less intense, and the will and judgment having acquired strength, are less liable to be swayed by the appetites; and experience moreover has taught her lessons of wisdom, at least to those who are competent to learn them. Still dyspepsia is by no means unusual even in advanced years.

Influence of the weather, and impure air in the production of indigestion. — Damp and variable weather, or such as characterizes the spring in many parts of Europe and the United States, seems particularly conducive to disorders of digestion, and is very sensibly felt by those disposed to them. The easterly winds on our northern seacoast, owing to their dampness, are exceedingly inimical to dyspeptic invalids, and they conse-

quently become very impatient of them. Most persons indeed experience a sharper appetite, more vigorous digestion, and a happier state of temper, when the air is clear, cool and dry, than when reeking with an oppressive moisture. Hence dwelling in low, marshy, and foggy situations; or in narrow lanes, or underground apartments in cities, deprived of the kindly influence of the sun's rays, is in a peculiar manner unfriendly to the health of digestion. In such situations there may sometimes exist impurities in the air, which will aid the influence of the dampness. Exposure to morning and evening fogs, is well known to be prejudicial to dyspeptic subjects.

“In reference”—says Mr. Thackrah—“to the agency of mere aqueous vapor,—of steam I mean—without frequent and considerable changes of temperature, our best subjects of observation are the men and boys employed in brushing cloth. That this vapor should affect principally the stomach and bowels, is a circumstance which we should not have expected.” *

The experiments of Dr. Beaumont on St. Martin proved the natural temperature of his stomach to be about 99° or 100° of Fahrenheit's scale, and also that this heat was most favorable to the solution of alimentary substances in the gastric juice out of the stomach, the process wholly ceasing under any

* Effects of Trades on Health.

considerable reduction of it. Now in damp and rainy weather this temperature was observed to be lowered several degrees.

Dampness, especially when aided by cold, may disturb digestion through the medium of the cutaneous function. Under such influence the surface is known to become pale, cold, and inactive, and so important are the sympathetic relations between the offices of the skin and stomach, that if either one is imperfect the other is almost sure to suffer.

It is, however, to the sudden and extreme vicissitudes of weather, so common in our own climate, that indigestion has been more particularly ascribed, and doubtless their influence may operate as an important adjuvant to other causes. Thus seasons marked by great atmospherical changes are always found unfriendly to the subjects of dyspepsia. Though the human constitution can readily conform itself to almost any weather if steady, yet much vital energy is needed to enable its powers of adjustment to keep pace with sudden extremes; and hence in climates exposed to such, delicate individuals are particularly liable to suffer in the health of their digestion, or indeed in that of any function which is prone to disease.

A confined and impure state of the air is always unfavorable to digestion; wholesome air in truth is quite as essential to health as wholesome food. Thus symptoms of indigestion are not unusually excited by remaining long in crowded assemblies. The superior digestive vigor enjoyed by the working

classes who pursue their occupations in the open air, over those employed within doors, and especially in close and crowded apartments, is a matter of familiar observation. The laboring classes in the country, too, have usually more strength of digestion than those in dense cities. Children especially, to grow up healthy, require a pure air, and hence crowding them together in ill-ventilated school rooms is highly prejudicial.

Deficient exercise.—Few causes are more influential in the production of dyspepsia than defective bodily exertion. Exercise seems absolutely essential to the health of all the higher orders of animals, and probably most of the lower departments may also require it. A large proportion even of the vegetable kingdom thrives better when agitated by the wind. Persons who exercise much in the open air, commonly acquire a vigor enabling them to maintain health under a freedom of living which would entail all the miseries of dyspepsia on those of more inactive habits. Individuals, therefore, whose employments are sedentary, as students, clerks, book-keepers; also those classes of artisans who are confined to one posture, and exercise only a particular set of muscles, as tailors, watchmakers, compositors, &c., are very subject to disorders of digestion.

Persons suddenly withdrawn from active pursuits, especially in youth, and confined to those of a sedentary character, are quite liable to experience the evils of indigestion. As, for example,

young men, who, as is not uncommon in the United States, leave agricultural labors for professional studies ; and females who give up active domestic occupations, to become milliners or dress-makers. Under such changes, the requisitions of nutrition, and consequently the powers of digestion, being lessened, and, for the most part, without a corresponding diminution of appetite and ingestion, disorders of the stomach, and its associate organs, will necessarily ensue.

Considerable difference, however, is manifested by different constitutions as it regards the necessity for exercise, some withstanding the influence of sedentary habits far better than others. With this difference the native vigor of digestion will of course have much concern.

Women, though they often suffer much from neglect of exercise, especially in early life when they are acquiring accomplishments, nevertheless I am disposed to think that they bear up under sedentary occupations better than men. Many females are almost constantly at home, engaged only in sewing or some other light domestic duties, and yet their health does not seem to suffer for want of exercise. In explanation of this a number of circumstances connected with their character and habits may be suggested. Thus, even from early life, they are less accustomed to active muscular exertions than males, and which, therefore, owing to the adjusting powers of the constitution, may get to be less absolutely essential to them.

They are less inclined to intemperance in drinking, as well as to gluttony and epicurism, and their stomachs therefore have less arduous tasks to accomplish. Domestic duties being their peculiar province, they find at home—if rightly educated—constant sources of agreeable interest and excitement, which exercise a salutary influence on the moral feelings, and through them consequently on the body. Their minds are more susceptible to pleasurable impressions from slight causes; more gay, versatile, and consequently less subject to ennui; and, also, being less agitated by the cares and anxieties of business, and by the workings of ambition, they are more contented in their present state. Finally,—endowed with more nervous sensibility, and more general vivacity, slight, quick and varied motions are readily called forth by external impressions and mental feelings, which may perchance serve them in some measure instead of the more powerful muscular actions demanded by our own sex. Man wants greater space and more extended action than woman, and when like her he is shut up at home, he usually sickens both in mind and body.

Excessive bodily labor.—Physical labor, when exceeding the capabilities of the body, and long persisted in, will necessarily prepare the way for indigestion, and a train of other infirmities, and prematurely break down the constitution. Thus the poor who are obliged to labor hard for subsistence, display the tokens of age much earlier than those

in easy circumstances. By hard labor is to be understood long continued and severe muscular efforts, in relation to the ability of endurance of the individual. When such is commenced suddenly, the muscles being uneducated to it, it is almost always followed by exhaustion and injury to health. In most cases, however, the laboring classes are exposed to other deleterious influences, as of unwholesome and irregular diet, intemperance, exposure to inclemencies of the weather, &c., and in this country at least, I much doubt whether physical infirmities are often to be ascribed to the exclusive operation of the cause I am considering.

Labor in early life, is particularly inimical to health, and the full and equable developement of the different parts of the animal body, and dyspepsia, and various other maladies, and premature death may follow in its train. Working animals, as the horse for example, are not put to the draught until their bodies have acquired a due developement. This being a matter of interest to their owners, they are consequently not slow to understand its importance. But almost every writer on health has insisted on the danger of premature muscular labor. Tissot referring to the too early work to which the children of peasants are forced, says that "they wear out, in a manner, before they attain the ordinary term of manhood; they never arrive at their utmost strength, nor reach their full stature; and it is too common to see a countenance with the look of twenty years,

joined to a stature of twelve or thirteen. In fact, they often sink under the weight of such hard involuntary labor, and fall into a mortal degree of wasting and exhaustion." *

"The employment of young children," says Mr. Thackrah, "in *any* labor is wrong. The term of physical growth ought not to be a term of physical exertion. Light and varied motions should be the only effort,—motions excited by the will, not by the taskmaster,—the run and the leap of a buoyant and unshackled spirit. How different the scene in a manufacturing district! No man of humanity can reflect without distress on the state of thousands of children, many from six to seven years of age, roused from their beds at an early hour, hurried to the mills, and kept there, with the interval of only forty minutes, till a late hour at night; kept, moreover, in an atmosphere impure, not only as the air of a town, not only as defective in ventilation, but as loaded also with noxious dust." †

Influence of particular postures of the body in producing indigestion.—Certain classes of mechanics, as the shoemaker, watchmaker, tailor, engraver, &c.; as likewise young women engaged in sewing, are in the habit of bending forward to their work, and thus compressing the stomach between the other viscera of the abdomen and diaphragm, the

* On Health, vol. 2d, p. 38.

† Effects of Trades on Health.

requisite freedom of its motions becomes impeded, and the regular egress of the chyme interrupted. When therefore this stooping position is assumed soon after eating a full meal, the various tokens of imperfect chymification will frequently be manifested, and daily practiced, may, either of itself, or by aiding other causes which are perchance operative, at length permanently prejudice the integrity of digestion. These remarks will in like manner apply to clerks who accustom themselves to lean forward on their desks to write, and who, when pursuing their occupations immediately after dinner, oftentimes experience pain in the head, flushing of the face and other signs of disorder in the stomach. An uprightness of the body favors the facility of action in all the organs both of the chest and abdomen, and which is of the utmost importance to the perfection of their functions. Unnatural restraint of the chest from dress must, by forcing down the diaphragm, abridge the space occupied by the digestive organs, and consequently impeding their motions and the freedom of their circulation, may thus lay the foundation of dyspepsia as well as of diseases in the thoracic organs.

Excessive and premature mental labor. — So intimate is the relation between the mental and bodily functions, that whatever tends to harm the former will endanger the welfare of the latter. But severe intellectual efforts are so commonly united with anxiety and the workings of strong passions,—with confinement, irregularities in regard

to sleep, and improper diet, that it is not always easy to assign their true share in the production of dyspepsia.

Numerous instances might be adduced of men, distinguished by the amount and profundity of their mental labors, who, being temperate and regular in their habits, have continued to enjoy sound health, and have arrived at great ages. The ancient students and philosophers appear to have possessed firmer health, and to have lived longer than those of modern times. One reason may be that they prosecuted their studies more in the open air, many of them being peripatetics in the literal signification of the term.

Our higher powers were doubtless designed to be exercised and improved, and hence we may rationally infer that a temperate employment of them is salutary. There is in truth no function belonging to our constitution whose moderate exercise is not conducive to its general welfare. If, however, the intellectual faculties are overstrained, then various moral and physical infirmities will be likely to ensue, and among the latter, dyspepsia is not the least common. The improvement in the health of digestion, and indeed of all the functions, following a relaxation from close mental application of any sort, cannot but be a matter of the most familiar remark. Still a material difference is observed in the capability of different persons to bear mental labors, which may in part be referrible to habit, and in part to the native vigor of the

constitution, or perhaps of the brain in particular. Diversity of mental labor would appear to be less wearing to health than concentrated application; the mind like the body being relieved by change.

Severe application of the mind in early life, from interfering with muscular exercise, so essential at this period to the healthful developement of the various functions, and probably also from other causes, almost inevitably impairs the vigor of digestion, and in truth of the whole system, and under its influence, the unfortunate individual grows up pale, infirm and dyspeptic. The mind can seldom be prematurely developed except at the cost of its own, and the general powers of the system; whence it is that prodigies of erudition in childhood too frequently become imbecile, both morally and physically, in later life.

The studies of childhood ought therefore to be light, and, as far as may be, rendered matters of amusement instead of tasks. This is the period proper to exercise the senses and the memory for words, or, if I may so speak, for accumulating the raw materials of knowledge, to be compared, abstracted, compounded, in short to be worked up into various new forms in proportion as the mental and corporeal powers progress to maturity.

It is particularly necessary to the future welfare of growing children that they be not long confined in any one posture to their studies; but amusing exercises of the body should frequently alternate,

and as far as practicable, be associated with the education of the mind.

Errors in diet.—That much of our food, owing in a great measure to improper combinations, is difficult of digestion, will hardly be disputed. Experience has fully confirmed the fact, though the reasons are not always plain, that different articles of diet, in themselves wholesome, are, by admixture, and other influences to which they are subjected in the hands of the cook, rendered very indigestible. This may be owing to chemical, or simply to mechanical changes, thus produced. Wheat flour, for example, wrought into good bread or biscuit, forms an article of diet very easy to be assimilated; and further, let sweet and fresh butter be spread upon it, and it still is easy of digestion. But if the flour be blended with butter previously to cooking it, the stomach will act upon it much less readily. And the same is true if melted butter be united with the bread after it has been baked. Here some chemical change is probably effected in the butter by the agency of heat, prejudicial to its character as a diet. Fresh curd, also, is far more easy of digestion than the cheese into which it is wrought. But I need not multiply instances of this sort, as enough will present themselves to all such as have delicate stomachs. There are also numerous simple articles of food in common use which are very hard to be converted into chyme. Such indigestible substances when habitually and freely employed, especially by the sedentary, may

in the end permanently injure the healthy tone of digestion.

Certain articles of food ordinarily wholesome, are, owing to some constitutional peculiarity, highly indigestible in particular individuals, and which are therefore to be scrupulously avoided by them, otherwise dyspepsia will be very likely to result. An incapability, however, of digesting particular articles of food, generally wholesome, is very commonly among the first indications of the malady.

Dyspepsia, however, though often generated by errors in the quality, still I conceive it more frequently to depend on excess in the quantity of our food. Whenever more aliment is habitually, or frequently taken, than can easily be transformed into chyme, the welfare of the digestive function is endangered. But as different constitutions vary remarkably in their powers of digestion, and apparently also in their demand for nutritive materials, no fixed rule can be laid down in respect to the quantity of food proper for different individuals, even under like circumstances.

When too much food is habitually taken, that is, more than the ends of nutrition require, the stomach accustomed to a certain degree of distension, experiences a sense of emptiness and discomfort unless subjected to it, and thus a factitious want is established, and the system, until the digestive powers begin to yield, furnished with excess of nourishment.—The votary of the table, if young

and healthy, may perhaps pursue his excesses for some time without manifest injury; and his muscular strength perhaps increasing, and his body becoming fat and plethoric, and his countenance ruddy, he is often deceived into the belief that he is in high health, when his body is close verging on the borders of disease. After a longer or shorter persistence in his course, according to circumstances, the digestive organs begin to give way, and dyspepsia is at length established. It is not always however that he is first warned of the danger of his habits by the impairment of digestion, but hemorrhages, rheumatisms, and gout may precede, or his life may be cut short by acute inflammation of some vital organ, or a sudden stroke of apoplexy.

It is a fact familiar to medical men, that improper distension of any hollow organ, tends to weaken its tone, or natural contractile power, and excessive eating may therefore operate in this manner to impair the function of the stomach. We may thus account for the disturbance of digestion often following the use of those articles of food which are liable to swell under the influence of heat and moisture. In respect to the quantity of such, too, we are very liable to commit mistakes, since that which is perhaps at first productive of no uncomfortable sensation, may in a little while be followed by a distressing sense of fulness. New bread has the property referred to, and Dr. Paris mentions nuts as also possessing it, and in a remarkable degree. Thus we also see how it is that fermenting

drinks, or such as contain fixed air, oftentimes disagree with the stomach when it is weak.

Celsus believed, and with him many other of the ancients, that excess in eating was even a more frequent occasion of disease than intemperance in drinking. But the mistaken supposition that the more food is eaten, the more nourishment will be furnished to the body, and that the more nourishment it obtains, the stronger and healthier it will consequently become, is so prevalent, that errors in relation to the amount of aliment are constantly committed. The strong must eat largely to keep their strength, the weak that they may gain it, and thus are originated a thousand infirmities among mankind which are ascribed to any but their rightful cause.

Few but must have remarked the prevalent disposition to overload the stomachs of children, and too often with food of the most unfitting character. If a child is out of temper, he is soothed with cakes and sugar plums, and if he is good, it is in the same manner that he is rewarded. Most persons in short seem to fancy that the best way in which they can indicate their love for children is to surfeit them with dainty food, and it is thus that the future infirmities of the stomach are too frequently originated, and the blessing of a healthful constitution sacrificed to the weak fondness of parents and friends. If children are confined to a plain diet; debarred from stimulating condiments; never urged to eat contrary to the manifest prompt-

ings of their natural inclinations, and kept agreeably occupied, there will be little hazard to them of injury from excess in eating.

Rapid eating.—The mode in which eating too hastily may operate as a cause of indigestion was referred to when speaking of mastication. The stomach under such practice has often to perform a labor which properly belongs to the mouth; and beside, it is far more likely to be overloaded, observation having adequately proved that when it receives the food slowly, and thoroughly masticated, it more distinctly indicates when enough has been eaten. Furthermore, under hurried eating, food is apt to be taken into the stomach at too high a temperature for its welfare.

Among the numerous vulgarities which English travellers have been pleased to attribute to Americans, rapid eating is seldom omitted, and it must be granted that in respect to our meals we are great economists of time. Most persons, however, who are engaged in active occupations, are liable to fall into this habit. Thus Mr. Thackrah, an English writer, remarks—“The way in which men of business take their meals is also highly injurious to health. It is far too hasty. Many seem to be always travelling by the stage, and expecting every moment the summons of the coachman. The Arabs say, that ‘he who does not take care to chew his victuals, hates his life.’ And the adage is too often verified in this country, by the gastric disorders which result from a want of mas-

tication." * Now among us almost every one is engaged in business, and which being paramount in interest, eating is apt to be regarded but as a profitless duty, and therefore to be despatched with all possible speed.

The circumstance of our most important meal coming near the middle of the day, in the midst of business avocations that are willingly interrupted but for a short period, and which are all the while engrossing the thoughts, contributes to the hasty manner in which this is ordinarily eaten. Those also who are not hurried by business, from the contagiousness of example—or may-be to secure their rightful share of food, or to avoid the awkward predicament of being left alone at table—usually fall into the same practice.

The rapidity with which the students of our colleges, and more particularly the inmates of boarding schools, both male and female, are in the habit of eating, is particularly striking, and if not immediately productive of dyspepsia, may often contribute to its future developement. Those instructors who have full charge of youth, should always allow them sufficient time for their meals, and, both by precept and example, teach them to avoid the vulgar and unhealthy practice of *bolting* their food like hungry animals.

* Effects of Trades on Health.

Deficient nourishment.—It is absolutely essential that a supply of nutriment be furnished the body sufficient to compensate the expense of its materials consequent to the performance of its vital functions; otherwise it grows feeble and wastes, and with the general energy, that of digestion must consequently decline. The stomach may moreover suffer from defect of stimulus to elicit its full and healthful action, since a part will generally diminish in its powers when an inadequate demand is made for their exertions, and be strengthened by all exercise within the limits of its ability. Nature allows to our different organs when in health, an energy equal to the accomplishment of all that is required of them in the economy; but suffers it to be retained only on the condition that it be called into action. Thus a sufficiency of healthful nutriment is directly, as well as indirectly, necessary to the maintenance of the needful vigor of the function of digestion. Every organ, indeed, to maintain its healthy powers, requires a competent supply of its natural stimulus, as the heart, of the blood,—the lungs, of the air,—the stomach, of the food, &c. Hence it is probable that an occasional excess is less hurtful than a uniformly poor and scanty diet, since the system by its different emunctories can throw off what is superfluous, and restore the rightful balance between expenditure and supply; but has no adequate means of compensation for absolute deficiencies of nutriment. Hippocrates says—“In the choice of regimen, more evil results from abstrac-

tion than from a small excess. A thin, frugal, and over-exact regimen accords not even with the man in health, who grievously supports the privation. Hence, in general, the superiority of a due refec-tion over that which is deficient." * The more opulent classes of society, who can procure a regu-lar supply of wholesome food, are less subject to disease, and last longer than those whose poverty restricts them to a poor and scanty diet. Other deleterious causes are to be sure operating upon these latter, still that mentioned is not among the least active of them.

CHAPTER XVI.

CAUSES OF DYSPEPSIA CONTINUED.

Distilled spirits.—Some of the most painful cases of the complaint I am treating are often witnessed among intemperate spirit drinkers. Indeed it can

* Aphorism, 5th.

hardly be otherwise than that an unnatural and acrid stimulant from day to day immediately impressing the stomach, and imparting a morbid influence to the whole nervous system, should after a while induce the various sufferings of dyspepsia. The *moderate* but daily use of ardent spirits is more likely to occasion chronic indigestion, than even excesses, when only occasional. In the case of the latter, the stomach and general system violently impressed, react against, and in a measure throw off the morbid influence, and the interval of abstinence which follows, allows them time to rally their healthful forces. But in the former case, every day the offending cause being applied, and new mischief committed, and no chance afforded for restoration, the nervous and digestive energies more surely yield, and a train of moral and physical sufferings ensue, whose true origin may not even be suspected.

The habitual employment of tinctures, unhappily denominated medicines, has oftentimes, more particularly among females, acted as an insidious and unsuspected occasion in the production and aggravation of indigestion, as well as of numerous nervous affections. It should ever be borne in mind that the menstruum of all medicinal tinctures is common rum.

Fermented liquors. — Among the fermented liquors, wine is most frequently productive of dyspepsia. The strong malt liquors, as porter and ale, when liberally indulged in, endanger digestion,

but their tendency is more particularly to create a plethora of the system disposing to apoplexy, diseases of the heart, and various inflammatory complaints. The use of malt liquors is with us not sufficiently extensive to be ranked among the common causes of dyspepsia.

The stronger wines, or such as comprise a relatively large amount of alcohol, are the ones most often instrumental in destroying the health of digestion. These, when of a bad quality, or recently adulterated with spirits, are particularly prejudicial. There are some wretched mixtures sold under the name of wine, of which a few glasses even will disorder the most healthy stomach. It is therefore important, if a man must have his wine, that he look well to its quality. The pure light wines, employed in France, Spain, and Italy, containing but a relatively small amount of alcohol, are not remarked to be particularly prejudicial to digestion. Other things being equal then, the danger to health from indulgence in the use of wine, will be in proportion to the amount of alcohol belonging to it.

It must be granted, however, that alcohol is somewhat mollified in its qualities when intimately blended into the constitution of wine, and hence a given amount of it taken in such combination, appears to exercise its peculiar effects on the system less forcibly than when separated by distillation. Thus the appetite for food is longer retained, and consequently the pleasures of the table are more

highly estimated by the wine, than by the spirit-drinker. The body of the former, too, instead of wasting, as usually happens with that of the latter, will oftentimes suffer from excessive repletion. After a time, however, determined by various incidental circumstances, the nervous system becomes shattered, and the digestive organs being weakened, and no longer adequate to those artificial efforts, which are so often the boast of the *bon vivant*, their function can only go on under the most scrupulous attention to diet and regimen, and more or less of the painful sufferings of the rum-drinker's dyspepsia commonly supervene. Such is likely to be the result of the liberal use of wine, still under a vigorous constitution and active habits of life, it may be for a long time counteracted, and in occasional instances may never happen. Let me here observe that in some constitutions, wine is seldom well borne, but is apt to turn acid in the stomach, and to excite headach and other disagreeable symptoms of indigestion. When there is a disposition to acidity of the stomach, wine is particularly unsuitable.

Tea.—This herb, in infusion, is, among ourselves, almost universally employed with the evening meal, and is generally esteemed as a grateful and refreshing beverage. "In enumerating," says Dr. Paris, "the advantages of tea, it must not be forgotten that it has introduced and cherished a spirit of sobriety; and it must have been remarked by every physician of general practice, that those

persons who dislike tea, frequently supply its place by spirit and water." *

The two principal species of the teas of commerce, are the black and green. Owing principally to a volatile oil which they contain, they are both stimulating to the nervous system. This oil is evaporated, and consequently the exciting effects of the tea lessened, in proportion as the period of infusion or boiling is protracted. Tannin existing among the other constituent principles of this herb, it possesses in union with its stimulating, a slight astringent property.

Green, having a larger proportion of volatile oil, is a more active stimulant than black tea. When taken strong, it excites the nervous system, cheers the mind, awakens the fancy, and occasions wakefulness. The effects of it, however, differ in different individuals, probably in proportion to the degree of nervous susceptibility. In rare instances depression of the feelings uniformly succeeds to its use. In some, nervous tremors, vigilance, and morbid fancies, invariably follow the drinking of strong tea at night. Now such unnatural excitation and disturbance of the nervous system, if often produced, cannot but be injurious to health. Excessive tea-drinkers, therefore,—and such are more especially met with in the female portion of the community,—are very liable to nervous infirmities,

* On Diet.

as palpitations of the heart, watchfulness, tremors, &c., and also to disorders of digestion.

Some physicians are disposed to attribute the injury often occurring to digestion from the abuse of tea, in part at least, to unnatural distension of the stomach from the large quantity of fluid swallowed. This, to be sure, in the manner which has already been explained, may exert some influence when tea is drunk very largely, nevertheless I am inclined to believe that the evil is generally to be ascribed to the peculiar properties of the tea itself.

"It has been often alleged," observes Dr. Cullen, "that some of the bad effects imputed to tea are truly owing to the large quantity of warm water which commonly accompanies it; and it is possible that some bad effects may arise from this cause: but from attentive observation I can assert, that wherever any considerable effects appear, they are in nine of every ten persons entirely from the qualities of the tea; and that any like effects of warm water do not appear in one of a hundred who take in this very largely."* The high temperature, at which some persons drink their tea, may be an additional cause of injury to the stomach.

Tea can be viewed only as an article of luxury, and whose stimulus is required by the system

* *Materia Medica.*

from the influence of habit alone. Still so intimately has its use become blended with our social habits, and so many happy domestic associations are called up by the steaming odors of the teapot, that he must indeed be a bold reformer, who would attempt to banish this beverage from the family circle.

In childhood, however, it should certainly be avoided, since at this time no one can contend that artificial stimulants are needed, and milder fluids, as milk and water, be substituted.

Coffee.—Most of the remarks which have been made on tea will apply equally to coffee. This excites the mind, contributes to wakefulness, and when habitually taken strong, and freely, tends to disorder the nervous system and the function of digestion. The French are in the practice of taking a small cup of clear coffee immediately after their dinner to excite the stomach and promote digestion.

It has appeared to me that even more persons suffer disturbance of the nervous system, and of the digestive function, from the free use of coffee than from that of tea. Many whose stomachs are delicate almost always experience flatulency, acidity, or other morbid effects, when they drink it. Its action on the nervous system seems to be somewhat different from that of tea, and palsies have often, and not without reason, been ascribed to its free and long continued employment.

Various torrefied grains, as peas, beans, rye, &c. are sold under the name of coffee, and are much used in our country villages, and among the poorer classes of people. These of course exercise but little other stimulant effect than what arises from the high temperature at which their infusion is drunk.

Tobacco.—That tobacco is naturally unsuitable to the human constitution is inferrible from the various morbid phenomena, as nervous tremors, nausea, giddiness, general debility, &c., which even a very small quantity of it at first produces. The system will, to be sure, become in a measure seasoned to its use; and so may numerous other instances be adduced in which, under the influence of habit, the human body is rendered partially insensible to the action of noxious agents; but because they no longer produce their acute effects on the constitution, it by no means follows that they have become wholly innoxious. The permanent inhabitants of low unhealthy situations, where malaria, or a poisonous influence exists in the atmosphere—as in Italy, Sicily, and many of the southern portions of America,—are not like strangers, liable to acute fevers; but their feeble, emaciated, or bloated bodies, and their pale and jaundiced complexion, declare that the poison, though gradually and insidiously, is still working its influence. And so in those addicted to the excessive use of tobacco, though not experiencing its violent narcotic effects, nevertheless the health of digestion

and of the nervous system, may be gradually yielding to its chronic influence.

Every practical physician must, I think, have remarked how speedily some sallow, nervous, emaciated dyspeptic subjects will recover their digestive energies, flesh and natural complexion, simply by abstaining from their accustomed employment of tobacco. We to be sure, meet those who use tobacco very freely, and are at the same time in the enjoyment of good health, and so also do we find healthy persons dwelling in the midst of noxious miasms, but such, in both cases are to be regarded as exceptions only to a general rule, in which, either from native vigor, or some peculiarity of constitution, or from incidental counter-acting agencies, the customary influences have been resisted

Those however, who use tobacco, do not always, in respect to its quantity, keep within the limits which habit has rendered immediately innocuous, and hence, may at times experience its more acute effects on digestion and the nervous system. And again, owing to a difference of susceptibility to its influence, even the same quantity may vary in the intensity of its effects at different times. Just so it is with malaria;—when from incidental causes it either becomes unusually developed, or the disposition to be effected by it is increased, then the fevers which for the most part only attack strangers, also effect those who have been long seasoned to its ordinary influence.

The abuse of tobacco may operate in several ways to injure the powers of digestion. As by its morbid action on the nervous system, and the great waste of saliva which commonly attends it, the necessity of which fluid in digestion has already been explained. The rapid secretion, too, of saliva which is excited, causes it to be more dilute and watery, and probably, in consequence, less perfectly adapted to its ends in digestion; and its qualities are further, and positively injured, by the impregnation which it receives from the acrid principles of the tobacco. The abundance of saliva, moreover, called forth by the unnatural stimulation of its glands, must make an exorbitant draught on the blood, and will thus tend to reduce the body and weaken its different functions.

The vigorous and active, from their superior powers of vital resistance, oftentimes employ tobacco freely and habitually for a long course of years, and experience no obvious inconvenience from it; whereas in the more delicate and sedentary, its morbid effects are very soon felt in the nervous and digestive function.

Different constitutions certainly display a difference of susceptibility to the action of tobacco, and the same thing is also remarked in respect to opium and other narcotics. Thus some persons very readily acquire a fondness for it, and seem to experience no obvious inconvenience from its moderate employment. Others on the contrary become

less easily addicted to it, and heart-burn, eructations, loss of appetite, headach, and nervous agitations, are very apt to follow its use, even in small quantities. Those who labor under, or are disposed to dyspepsia, can seldom employ tobacco, however temperately, with impunity.

The use of this weed by young boys, and which generally grows out of their ambition to imitate the practices of men, cannot be too strongly reprehended, not only as being an odious habit, but as preparing the way for dyspepsia, and numerous other bodily infirmities in future life. Beside, it causing a waste of the fluids of the body by the saliva, and consequently a dryness of the mouth and throat, intemperance in drinking is endangered by it.

That certain morbid states of the system are benefitted by the use of tobacco, is probably true, but I believe they are of far more rare occurrence than is commonly imagined.

Snuffing tobacco is less hurtful than other modes of using it, for the reason that less is in this way taken into the system. Still even such practice when carried to excess, may occasion loss of appetite, with other symptoms of indigestion. More or less of the snuff, mixed with the secretion of the nostrils, is carried back with it into the fauces, and thus gets into the stomach, to the injury of its function. The snufftaker, therefore, cannot claim an entire exemption from the deleterious effects of tobacco on his system.

"Among other effects," says Dr. Cullen, "of excess in snuffing, I have found all the symptoms of dyspepsia produced by it, and particularly pains of the stomach, occurring every day. The dependence of these upon the use of snuff became very evident from hence, that upon an accidental interruption of snuffing for some days, these pains did not occur; but upon a return to snuffing, the pains also recurred; and this alternation of pains of the stomach and of snuffing having occurred again, the snuff was entirely laid aside, and the pains did not occur for many months after, nor, so far as I know, for the rest of life." The same author also tells us of a lady, who, long accustomed to take snuff, found at length that snuffing much before dinner destroyed her appetite; and finally that even a single pinch taken at any time previous to it, wholly deprived her of the desire for this meal. But when she abstained entirely from snuff before dinner, her appetite remained as usual. *

Abuse of medicine. — The injudicious use of medicine is doubtless the occasion of no little injury to the human constitution. As all active medicines tend to disturb the natural movements of life, they are never to be resorted to before cautiously inquiring whether the end will warrant the means. In other words, whether the evil they are designed to oppose is more serious than what

* *Materia Medica.*

they themselves will probably induce. Let it ever be remembered, too, that nature of herself is fully adequate to the removal of trifling and incidental difficulties; or requiring at least only negative aid, that is, the avoidance of all impediments, as improper diet, exposure, &c., to her recuperative efforts.

Few habits are more adverse to the welfare of the constitution, than that of applying to medicine for every slight disorder, since the necessity for it growing with its use, it is oftentimes contributing to the very evils it is intended to remedy. Thus, if for every trifling disturbance of the stomach and bowels we call in the assistance of emetics, cathartics, or stimulants, these organs, accustomed, if I may so speak, to depend on foreign aid, will in a measure cease to avail themselves of their own energies under embarrassments. The physical as well as the moral powers should be educated to a certain degree of self-dependence. But active medicines are also injurious in a more positive manner, operating both as local irritants, and to produce various sympathetic derangements in the system.

There has ever existed a class of nervous valetudinarians, in whom a pain or an ache, or the least ailment can hardly exist, unless the pill-box or essence bottle is called into requisition. And it is quite amusing often to hear them expressing their astonishment that their health can be so poor when they are constantly taking such quantities of medicine.

Some persons are in the daily practice of overburdening the stomach, and then swallowing medicinal tinctures or pills to help it to get rid of its unnatural load. Hence it is that we so commonly see dinner pills advertised for sale.

There is another absurd practice still existing to some extent, that is of taking medicine, as salts, sulphur, mercury, &c., at certain seasons, even when the system is in ordinary health, to purify the blood and clear it from humours, as it is commonly expressed. Some persons even get into the habit of being bled every spring, under the supposition that it will advantage their health. Such practices grew originally out of ignorance and false theory, and have certainly much declined in recent times, and the sooner they are wholly abolished the better will it be for the health of the community. If in the spring of the year, for example, when, as often happens, the appetite diminishes, and some lassitude is experienced, with occasional slight headach, and a few pimples appear on the face, persons would confine themselves to a plain, digestible, and laxative diet, and exercise freely in the open air, they would thus, and without violence to the constitution, more effectually establish their health, than by any medicine or courses of medicine which they could employ. Be it ever remembered that by tampering with what are called preventive medicines, real diseases may ultimately be produced. Let me here be understood, however, as censuring only the injudicious use of medicine; there are states of

the system in which when employed under the superintendence of those who understand its powers and its application, it may beget the most fortunate results; but it is too potent an instrument to be ignorantly tampered with, and the injury to health from its unskilful use can hardly be computed.

The free employment of medicine in early childhood cannot be too strongly censured. Many an adult owes his dyspepsia, and perchance numerous other physical infirmities, to his mother's medicine closet.

Some children are virtually brought up on medicine. If the stomach happens to be slightly disturbed, or the belly to ache a little, a stimulating stomachic, or a cathartic, or may-be even an emetic, is immediately administered. Stimulants and tonics, too, are far too freely employed in childhood, exciting the stomach to unnatural efforts which will be followed by a correspondent debility, and when persevered in, inevitably occasion a permanent reduction of its healthy powers. A particular medicine composed of rum, opium, camphor, and a few other stimulating ingredients, called paregoric, finds a place in almost every nursery, and with which numerous children, in the early years of their existence, are very bountifully supplied. The opium which it contains serves to soothe pain, and lull to sleep, and hence arises the temptation to its use. In some families it is not only administered as a panacea for almost every ailment, but

is also made subservient to the convenience of attendants. Though a child, to be sure, may have slept nearly the whole day, nevertheless it is very hard that a mother or nurse should be disturbed by it all night when so certain a remedy is at hand. Some children even become so habituated to its narcotic influence, that they are almost uniformly sleepless and irritable when free from it. An important evil, too, attendant on the use of this compound, is its tendency to constipate the bowels, thus begetting a necessity for cathartics. That paregoric may, under occasional circumstances, be useful to children I shall not dispute, but its habitual employment is certainly most unnatural, and hazardous to health. It is important that tinctures of all kinds be particularly avoided in childhood, since in addition to the injury which they may do to digestion, they tend, in a measure, to educate the taste to the use of spirituous drinks.

Constipation of the bowels.—Costiveness is doubtless manytimes mistaken for a cause of dyspepsia when in reality it is but one of its early indications. But since it is necessary to the health of the function of the alimentary canal as a whole, that each of its offices be accomplished in their consecutive order, if from incidental causes, as negligence, the particular quality of the food, &c., a costive habit be acquired, symptoms of indigestion will very frequently ensue.

Insufficient and irregular sleep.—A certain quantity of sleep, varying in different constitutions, at

different periods of life, and under the influence of circumstance, is indispensable to health. Sleep rests us from our cares, soothes our moral and physical disturbances, and when tranquil and in adequate amount, gives renewed life to all the functions. Take from man sleep and hope, as some foreign writer has said, and he must become the most wretched of beings. Few causes tend more surely to impair the digestive powers, wear out the constitution, and bring on premature old age, than frequent watchings and irregularities in our repose, and though their more obvious effects may for a time be resisted by the vigorous, yet the health of digestion, as well as of the whole body, must ultimately yield under their influence. The pale and haggard countenance of the watcher, which morning reveals, plainly shows how great a draught has been made on his vital powers. Those of delicate constitutions, after a sleepless night, generally exhibit a white coat on the tongue, with other signs of impaired digestion.

Persons whose occupations interfere with the requisite periods of their sleep, are apt to be pale and emaciated, and are oftentimes dyspeptic. Many students materially injure their health by the lateness to which they protract their studies at night. I have already stated a nervous watchfulness to be a common symptom of dyspepsia, but it may also, when originating from other sources, operate as a cause of it.

Persons of feeble digestion, in particular, seldom bear well irregularities, or losses of sleep. Indeed the circumstance of their slumbers being disturbed in the night, will oftentimes quite unfit them for the duties and enjoyments of the ensuing day.

Children, during their growth, demand more sleep than adults, and it is essential to their health, and the proper developement of their systems, that its necessary periods be not abridged.

Excessive sleep, however, should likewise be avoided; its tendency being to weaken digestion, dull the senses, and to enervate all the moral and physical powers. It is seldom that great sleepers have much activity either of mind or body.

Long continued nursing is sometimes followed by dyspepsia of a very aggravated character.

CHAPTER XVII.

CAUSES OF DYSPEPSIA CONCLUDED.

Mental affections and passions.—The mind like the body is susceptible of various pleasurable and painful sensations, called affections or passions,

according as they are mild or intense. Passion is derived from the Latin word *patior*, meaning to suffer, or to be acted upon or affected, either pleasantly or painfully; hence literally employed, it would imply any mental affection, still it is generally applied only to the more intense feelings of the mind, yet to what degree they must rise to pass the boundaries of an affection and become a passion, will of course depend upon an arbitrary decision. It is only, however, the more exaggerated moral feelings that can be regarded as threatening health.

The importance of the passions as a source of disease is not always duly estimated. The physician, though cautious enough in his inquiries respecting the physical causes of ill health, too often neglects those of a moral nature. And the patient, also, though free to expatiate on the former, is often silent as the grave in reference to the latter. He may be oppressed by a family trouble of too delicate a nature to be divulged, or by one exclusively his own, and which, from being undivided and solitary, weighs the more heavy on the heart. The physician by adroitly drawing out the secret troubles of his patients will often obtain new light to guide his treatment of their physical maladies.

The influence of moral causes on the health is particularly remarked in advanced stages of civilization and refinement, when men's relations are intimate, and their interests contend, and their

nervous susceptibility is exalted. Thus the unceasing anxiety of mind,—and few feelings are more consuming to the health—is clearly discovered by the hurried step, and the pale and contracted countenance of many of the inhabitants of commercial towns who are deeply engaged in business operations. “Though,” says Mr. Thackrah, “we can scarcely adopt the doctrine of a foreign philosopher,—‘that a thinking man is a depraved animal,’—we may without hesitation affirm that inordinate application of mind, the cares, anxieties and disappointments of commercial life, impair the physical powers, and induce premature decay. The various disorders, generally known under the name of indigestion, disorders dependent on a want of circulation of blood through the bowels, biliary derangements, constipation, and headach, are well known to be the general attendants on trade, closely pursued. Indeed, in almost every individual, this absorbing principle produces one or other of the various maladies to which I have alluded. More marked is the effect when anxiety is added. This greatly reduces the functions of the stomach; it produces flatulency, and often diarrhœa.” *

In regard to the nature of the passions I may briefly state, as all that is necessary to my present purpose, that they are painful, pleasurable, and mixed or compound, in which last, pain and pleas-

* Effects of Trades on Health.

ure are either blended together, or consequent to each other. Very many of our passions, either naturally, or incidentally belong to this last division. Thus love, which in itself is pleasurable, is usually more or less mixed with jealousy, which is painful; so also is hope with fear. Even under the full gratification of our most ardent passions, it is seldom that we are wholly free from apprehension of change, or of the supervention of the painful ones, so true is it that unallayed pleasure belongs not to our nature.

Numerous of the painful passions, in a state of society, owe their existence to the pleasurable ones,—we feel the former because we have enjoyed the latter, and hence it is often the case that we might be happy had we never been so, or could we annihilate all remembrance of the past.

It is probable that most of our passions, could they be analyzed and traced up to their simple elements, would be discovered to have some direct or indirect reference to self-preservation, or to the continuance of the species. Thus many of the malevolent passions when closely considered, are found but an exaggeration, or modification dependent on our artificial relations, of those originally intended to preserve and defend our own existence. In the civilized state, however, they take on such numerous modifications, and are so multiplied by our social and artificial wants and relations, that their study becomes one of no little intricacy. The same passion, indeed, often receives different names

according to its intensity, as fear and terror, grief and despair, &c.

All the passions appear to grow out of our wants, instinctive or social; and by many, self-love is regarded as their prime mover. But my concern with them relates only to their effects on the bodily functions.

The passions are the subject of great abuse, and are consequently the source of a vast many of the ills under which we suffer; but, when properly regulated, they tend to advance man's nature, and contribute in numerous ways both to health and happiness. They are the sun whose beams, though they sometimes scorch and wither, serve to warm and gladden our whole moral and physical constitution.

"On life's vast ocean diversely we sail,
Reason the card, but passion is the gale;
Nor God alone in the still calm we find,
He mounts the storm, and walks upon the wind."

It may be affirmed as a general truth that pleasurable passions are salutary, and painful the reverse. But then the former even, when intense, may be fraught with the most serious consequences both to health and life. The mixed passions may be friendly or inimical to health according as pleasure or pain preponderates in them.

The usual and obvious physical operation of painful passions is to cause the fluids to abandon the surface, and consequently to become accumu-

lated about the internal organs. Hence with the general depression of the vital energies following them,—there is a suffocative sensation in the chest,—the heart and lungs feeling oppressed, and straitened in their actions,—with a frequent sighing to get relief. Beside those in the chest, various uncomfortable feelings may also be produced in the abdomen. Every one knows how pale, cold, and contracted the skin becomes in profound grief, or under the influence of terror. The latter passion is indeed oftentimes accompanied with a roughness of the skin from its great contraction, compared to goose flesh, and with a general chill, and tremor of the body. When sweating occurs, as sometimes happens in the intense painful passions, it is generally associated with paleness and coldness of the surface. Thus we occasionally hear the expression from persons who have been greatly alarmed, “I am all in a cold sweat.” The nervous influence would also appear to be correspondently determined to the internal organs. Under the joyful passions, however, contrary phenomena are witnessed, there seeming to take place a universal expansion in the system; thus the blood flows freely to the surface, and permeates readily the extreme vessels, and the circulation, respiration and all the physical functions go on with freedom and tranquillity. The common expressions then, to expand with joy, to swell with pride or self-satisfaction, to be puffed up with vanity, to shrink with fear, are not altogether figurative.

Now an inequality in the distribution of the circulating fluids is always unfriendly to health, and whenever they become unduly accumulated upon the internal organs, the functions of these are very liable to suffer disturbance, and even their physical integrity may be endangered. And on the other hand, nothing is more conducive to the free and harmonious play of the various parts of our organism, than a ready circulation in the extreme vessels, and a just equilibrium of vital action. The passions doubtless, also act in a more direct manner on the nervous system, depressing and disturbing, or elevating and equalising its power, according to their nature, and thus through it influencing the welfare of the economy.

It occasionally happens that even the painful passions when violent, will occasion a transient reaction, accompanied with vital expansion, in which case their influence becoming more diffused, is weakened in relation to any individual organ. Hence when anger and grief explode, or burst forth into violent action, and vociferation, their consequences are always to be less dreaded.

———"The grief, that does not speak
Whispers the o'er-fraught heart, and bids it break."

Broussais conceives that when expansion happens in anger, it is owing to a certain degree of enjoyment combined with it, and produced by the desire of revenge which he conceives may be a pleasure in anticipation. Be this as it may, the

general truth must be admitted, that the painful passions tend to concentrate vital action and are unhealthful, while the pleasurable favor its expansion, and equable distribution, and are consequently salutary. To be satisfied of this we need only contrast the countenance of the confident and hopeful, with that of the anxious and despondent. In the former it is bright and expanded, and the blood plays freely in its extreme vessels; in the latter it is pale or sallow, contracted, and expressive of internal pain.

That,—other things being equal,—the different passions may especially influence particular organs, is, to say the least, highly probable; nevertheless it is those which are delicate and predisposed to disease that are apt to display the most remarkable susceptibility to the effects of the baleful passions.

Few functions are more affected by the moral feelings than digestion and nutrition. Who ever enjoyed a keen appetite and good digestion, when oppressed with grief, disturbed by anxiety, or agitated by envy, jealousy, or revenge? Let a person in the enjoyment of a most delicious feast be unexpectedly apprized of some grave misfortune, and who cannot foretell the result? He now turns, perhaps even with loathing, from the viands which but a moment before he tasted with so much pleasure, and should he attempt to eat, owing to the dryness of his mouth and throat, he will find the deglutition of solid food to be exceedingly difficult. If too he had already eaten freely, vomiting, or

what is more usual, the various phenomena of disturbed digestion may ensue. Dr. Beaumont observed that anger, and other violent mental emotions, would sometimes occasion an unnatural dryness and redness, and other morbid appearances in the mucous membrane of the stomach, giving rise to temporary indigestion.

That the different secretions subservient to digestion are affected both in respect to quantity and quality under the influence of turbulent and afflicting passions, is not to be disputed. Thus it is to the scantiness, and visciduity of the secretions of the mouth and throat that the frequent swallowing and disposition to drink, and the thick, husky and difficult articulation,—the usual concomitants of acute grief and anger,—are referrible. There is furthermore a good deal of authority to show that the bite of an animal when enraged, owing to an acrimony induced in the secretions of the mouth, is apt to occasion a more irritable and dangerous wound than when he is less excited by passion. Many cases are on record of wounds inflicted under such circumstances having proved fatal; and instances even of hydrophobia are said to have followed the bite of the dog when violently angered.

Diarrhœa, and bilious vomitings, sometimes follow terror, anger, and severe grief.

Such then being the immediate and obvious effect of the intense and disagreeable passions on the appetite, and digestion, need we wonder that under their protracted operation,—that when cares

and anxieties long disturb the moral tranquillity, or sorrow weighs stubbornly on the heart, that dyspepsia, and in the end more grave disease of the digestive organs, should be superinduced.

Ambition, a passion dwelling to a greater or less extent, in every human breast, and particularly operative in advanced society, is probably a more common source of dyspepsia than is generally suspected. This is a compound, or mixed passion, and it is to the painful feelings, so often blended with it, and growing out of it, that its baneful effects are to be ascribed. An evil of ambition is its unquenchable, undying character. Love and many other strong passions, are satisfied, and even surfeited by fruition, but the hunger of ambition grows but the more by feeding. In society it assumes a thousand forms and modifications, according to the temperament and character of its possessor, and the incidental circumstances in which he is placed. When moderate and rightly directed, it proves a wholesome stimulus to exertion, and may favor the healthful action of the different functions of life. But when inordinate, the mind will be perpetually agitated by the painful contentions of hope and fear, and if success is unequal to the wishes and anticipations—and how rarely is it otherwise!—then come the noxious feelings of disappointment, shame, jealousy, envy, and perhaps even despair, working their baneful influence on digestion, and all the other functions of life. The sallow and anxious brow, with the dismal train of

dyspeptic and nervous symptoms, so often witnessed in the aspirants for literary, professional, or political fame, are manytimes owing, in part at least, to the intense workings of the passion I am considering. And could we always detect the secret springs of ill health and premature death, disappointed ambition would probably be found to hold no diminutive place among them. How few have moral or physical force adequate to bear up under the blighting of high ambitious aspirations ! and how many are destined to experience it !

The more uncertain and difficult to be achieved are the aims of ambition, the greater of course will be the hazard of disappointment ; hence those in pursuit of literary and political fame are the most frequent sufferers among its votaries. That ambition, however, which, founded on benevolence, leads men to aspire to the fulfilment of high moral duties, or which aims at excellence in virtue, and the advancement of the good of mankind, meeting with the least rivalry, and the fewest obstacles, is least liable to be mixed with the painful passions, and its gentle and satisfactory excitement may be conducive to the wellbeing both of the moral and physical constitution.

There always exists in advanced society a class of individuals of morbidly keen sensibility, whose feelings readily respond to the slightest influence, and are almost constantly exaggerated into passions. In such, neglect, or harsh expressions, or even an unkind look from those they love, may be

sufficient to excite grief and chagrin, and will thus oftentimes destroy the appetite and impair digestion. The most trifling sources of irritation, too, will not unfrequently produce the same effect. To these individuals the term sensitive is generally applied, and it is necessary to be particularly guarded in our conduct toward them. But I dare say most persons will remember to have experienced at some period in the course of their lives, a reduction of appetite, and maybe even of the powers of digestion, from the unkindness and ill humour of others. Let me here remark then, that the cultivation of the amiable affections, and the exercise of courtesy and good will, is not only favorable to our own health, but also in a measure to that of others who may be associated with, and dependent upon us.

Home-sickness, being attended with great mental depression, diminishes the appetite, and when obstinate, may bring on the various symptoms of dyspepsia. In some instances, so oppressive has been its influence that life even has yielded to it; as, for example, among soldiers impressed from the peasantry, and forced from the endearments of their home into foreign lands. The effects of homesickness, however, though they may be very intense for the time, are mostly transient. But why need I multiply instances of this sort, for who is there that has never traced a relation between his appetite and powers of digestion, and the condition of his moral feelings?

The painful passions having once disturbed the health of digestion, are reacted upon and aggravated by the effect they have produced, and thus the cause and effect reciprocating their influence, are mutually cherishing each other. Hence will be perceived the importance of soothing and comforting the mind in indigestion.

It will now, I fancy, not be difficult to comprehend the distinction between imaginary and real afflictions. The former being engendered in the mind under the influence of a morbid physical condition, while the latter are primarily dependent on the agency of moral causes. Imaginary, however, are manytimes even more grievous than real calamities, and are oftener the occasion of despair and suicide.

I may here observe that the amount of suffering experienced cannot be justly estimated in different individuals, or even in the same at different times, by the absolute degree of the cause exciting it. Thus, for example, a sensitive dyspeptic subject may feel as acutely a slight mischance, as one with firm nerves and vigorous digestion, the most weighty affliction. Now to the individual concerned, it is not material whether a moral or physical cause of pain be increased, or only his susceptibility to its effect. The more combustible is a material, the less of course is the heat required to inflame it.

We now, also, perceive how, under the free indulgence in stimulating food and drink, the digestive organs experiencing an unhealthy excitement,

will tend to kindle the passions, which once set on fire, in their turn react upon and aggravate the cause which aroused them, thus contributing indirectly to their own increase; hence an additional argument to the thousands of others, in favor of temperance, both in meat and drink, and which is especially applicable to those whose temperament renders them subject to strong passions. The effect of exciting food and drink in irritating the mind, is in some individuals almost immediately produced.

Before leaving the present subject I will briefly advert to the influence of the moral feelings in the early period of our being. There is probably no time of our independent existence when we are wholly destitute of these; and the baleful passions are doubtless experienced long before they can be indicated by language. Young children are especially susceptible to jealousy, and infants sucking from the same breast, have been observed to display it towards each other; and in young children who are educated together, its manifestations will be constantly seen, and it is oftentimes a source of no little suffering to them. The partiality of parents or teachers when imprudently exhibited, may excite the most painful jealousy in the breasts of children, and hence it is important guardedly to avoid all show of it, even in reference to the physical education.

Neglect and harsh treatment are likely to occasion much moral suffering in tender childhood, and

under their continued influence the appetite and powers of digestion are liable to fail, and the general health to suffer injury. Shame, also, will often operate with great intensity at this period, and hence should never be unnecessarily excited. Children varying in their temperaments, will consequently be affected to a greater or less extent by such influences; when they are delicate, and possess high nervous susceptibility, they will feel them far more acutely, and the danger from them will be correspondently enhanced.

Children will often have their secret griefs, preying on their spirits and their health, and which, though they are so free on most other things, it may be impossible to draw from them. These are to be sure mostly transient, nevertheless they are the cause of no little suffering while they continue.

It is highly important to the physical welfare of the body, that the tempers of children be kept cheerful and happy by innocent amusements, and that a proper degree of license be permitted them in their pleasures. Hence it is better, generally, that they should associate with their mates, than be too closely confined with those who are older and more grave than themselves, whose presence is apt to be a source of restraint and uneasiness, often rendering them silent and spiritless.

There is a particular passion, which from its evil consequences, when operating on the young and sensitive, to the health of digestion, and the

general nervous system, calls for a summary notice ; I allude to fear. Children are much more exposed to the influence of this passion than we are prone to suspect, since from a sense of shame they will not unfrequently conceal it, even though it be preying on the health and depriving the mind of all its energies.

Knowing what severe disturbance may be excited in digestion, and the nervous system, as loss of appetite, jaundice, vomiting, diarrhœa, convulsions, idiocy, and even instant death, by sudden and extreme fear, we have a right to conclude that its influence often awakened, though in an inferior degree, cannot be otherwise than deleterious to health.

The practice of indulging the fancies of children with tales of supernatural terrors, which are always intensely interesting to them, should be particularly guarded against, as jeoparding their bodily as well as mental health. Feeble and timid children especially, oftentimes suffer very greatly when their fears are thus frequently awakened. On going to rest at night, under the influence of silence and darkness, which latter is always most appalling to them, all their painful apprehensions become aggravated,—afraid to look from the bed, they cover their heads closely with the bedclothes, and thus oppressed with heat, and the confinement of the air, often fall into profuse sweats. Dreadful phantoms ever and anon present themselves to their affrighted imaginations, and the slightest

noise, as that of a rat or a mouse, is magnified into some supernatural sound. On their falling asleep, such fancies take the character of realities, and hence they will not unusually start suddenly from their slumbers, screaming, and in the greatest terror, and perhaps bathed in a profuse sweat. In the morning, as might be anticipated, they awake feeble and unrefreshed. If the cause is continued, they commonly grow pale, lose their appetite, the stomach and bowels frequently become disordered, they are subject to tremors, and the least noise will excite agitation, and violent palpitations. So deep indeed may be these associations, engendered in the weakness of childhood, that darkness and silence will often renew them long after the reason is matured and their absurdity apparent.

The practice of frightening children in sport, or of playing upon their fears as a means of punishment, or to induce them to obedience, as shutting them up in the dark, alarming them with unexpected noises, or threatening them with rawhead, and bloody-bones, and other nursery spectres, cannot be too strongly censured. Equal objections hold against terrifying their minds, while inadequate to their comprehension, with the awful mysteries of religion, and particularly its future punishments. Fearlessness and self-confidence act at all periods of life as a healthful stimulus both to the mind and body, and hence such feelings should ever be assiduously nurtured. Indeed they not only contribute to, but are also among the most common

effects of good health. Thus when the health is delicate, whether originally, or from improper confinement, bad diet, &c., the susceptibility to the influence of false terrors is always heightened.

It doubtless sometimes happens that bodily infirmities in children, excited and maintained under the operation of fear, are ascribed to a physical origin, and hence they are not unlikely drenched with physic, which by augmenting the nervous susceptibility, adds to the effect of the concealed cause. Parents then cannot be too watchful in restraining their offspring during the first years of their education from the society of the ignorant and superstitious, who are ever ready to administer to their cravings for supernatural terrors.

From what has been said on the influence of the moral feelings, the importance of bringing up children in habits of virtue, and teaching them early the proper government of their passions, cannot but be justly appreciated in its reference to the health of digestion, and that of the other physical functions. Children who are improperly managed, and whose tempers are allowed to work unrestrained, will be likely to need emetics and cathartics oftener than such as are subjected to a more wise moral government. The ancient sages who wrote on health, particularly insisted on the expediency of a just regulation of the affections and passions. Thus Galen urged the importance of training up the mind during early life in virtuous habits, particularly in modesty and obedience, as

the most summary method of insuring the health of the body in future life. But there is no age in which a prudent discipline of our moral, will not be found needful to the welfare of our physical nature.

“He,” says Dr. James Mackenzie, “who seriously resolves to preserve his health, must previously learn to conquer his passions, and keep them in absolute subjection to reason; for let a man be ever so temperate in his diet, and regular in his exercise, yet still some unhappy passions, if indulged to excess, will prevail over all his regularity, and prevent the good effects of his temperance; it is necessary therefore that he should be upon his guard against an influence so destructive.” *

An unrestrained and romantic imagination, such as is oftentimes connected with uncommon sensibility and genius, being necessarily associated with intense feeling, operates, not rarely, as an adjuvant cause of dyspepsia. It is important to sound health that man should concern himself especially with the sober realities and actual duties of life; that instead of creating new worlds for himself, he should live contentedly in that already prepared for him, and so well suited to his nature. Poets and other classes of literary men are too prone to abstract themselves from the things of common life, and to exist amidst the creations of their own fancy,

* The History of Health, and the Art of Preserving it.

thus aiding other causes which may at the same time be operative, in inducing nervous and digestive infirmities.

There is a sort of abstracted melancholy,—a sentimental, imaginative sadness, like Ossian's joy of grief, * into which some persons are very apt to fall; not altogether unpleasant, nevertheless if habitually encouraged, will operate to the detriment of the health. This state of the mind is often originated and cherished in young persons of both sexes, but more frequently in females, by an extravagant indulgence in, or a sort of mental dissipation as regards the works of fancy and romance.

Now the feelings being once morbidly excited by the creations of the imagination, react with an unhealthful influence on the bodily functions, and when the habits are at the same time sedentary and solitary, dyspepsia, and a train of other physical as well as moral infirmities, generalized under the name of the nervous temperament, too often ensue.

Let it be remembered that the mind equally with the body may be pampered with too luscious and stimulating aliment, and either being thus abused, dyspepsia may be superinduced. How important therefore it becomes to suppress the sickly feelings, and morbid fancies which are so apt to arise in the human mind, will now be readily understood.

* "There is a joy in grief, when peace dwells in the breasts of the sad."—OSSIAN.

Fairy lands and airy castles are but ill-adapted to our gross natures. Who ever saw a "soft enthusiast" with well-strung nerves and vigorous digestion?

"It was undoubtedly the intention of nature," says Professor Stewart, "that the objects of perception should produce much stronger impressions on the mind than its own operations. And, accordingly, they always do so, when proper care has been taken in early life, to exercise the different principles of our constitution. But it is possible by long habits of solitary reflection to reverse this order of things, and to weaken the attention to sensible objects to so great a degree, as to leave the conduct almost wholly under the influence of imagination. Removed to a distance from society, and from the pursuits of life, when we have been long accustomed to converse with our own thoughts, and have found our activity gratified by intellectual exertions, which afford scope to all our powers and affections, without exposing us to the inconveniences resulting from the bustle of the world, we are apt to contract an unnatural predilection for meditation, and to lose all interest in external occurrences. In such a situation too, the mind gradually loses that command which education, when properly conducted, gives it over the train of its ideas; till at length the most extravagant dreams of imagination acquire as powerful an influence in exciting all its passions, as if they were realities." *

* On the Human Mind.

No matter then whether the passions be unduly excited by the workings of the imagination or by realities, their effect when once awakened is still the same. Hence we see how even physical suffering may follow corrupt thoughts as well as corrupt habits.

Concluding remarks on the causes of dyspepsia.— Beside those noticed, there are numerous other causes acting in advanced society, many of which may escape our most careful research, to depress and disturb the powers of digestion. In truth every thing which tends in any way to derange the nervous system and affect the general health, must exert an unfavorable influence on this function. So intimately, in fact, is the stomach, by means of its sympathies, related with all other parts of the economy, that important disorder can hardly exist any where throughout it, and digestion remain unhurt. I have already told how dyspepsia tends to impede the recovery of local injuries; now these also when severe, or their healing process is from any cause disturbed, in their turn interfere with the health of digestion. Indigestion excited and maintained in this way, that is by other disease, is, as before said, to be regarded but as secondary or sympathetic; but as unfortunately we cannot always know when such is the case, dyspepsia must doubtless at times be regarded as an original affection, when it owes its existence and continuance to some other morbid action that is going on in the constitution.

The checking or disturbing of any habitual discharge of the body, whether natural or artificial, is particularly apt to prejudice the digestive function.

Dyspepsia mostly owes its origin to a combination of causes, still a single one, when acting powerfully, or when the digestive organs are very susceptible, may originate it.

I hardly need remark that the causes which have been enumerated are not peculiar to dyspepsia, but may also elicit any other disease to which the constitution happens, either naturally or incidentally, to be disposed. As very few diseases have a specific origin, we can generally do no more, when treating of the causes of different maladies, than to enumerate such as observation teaches to be most frequently concerned in their production. Hence the common repetition of the same causes in connexion with different diseases.

CHAPTER XVIII.

THE TREATMENT OF DYSPEPSIA.

Preliminary observations.—On the subject of the treatment of dyspepsia, I shall confine myself especially to a consideration of diet and regimen. It is seldom indeed that this complaint demands active medicinal agents,—seldom that it will withstand a prudent regulation of what are termed the non-naturals. Why then, it may be asked, do people suffer so much and so long from indigestion? The answer is obvious,—because they will not persevere in those habits which are essential to the recovery, and maintenance of their health, but will be continually, especially in regard to diet, breaking through imposed restraints. No little energy of will is required on the part of the dyspeptic invalid, always to resist, not only the urgent promptings of appetite, but perchance the importunities of officious friends, to eat what his stomach has not the ability to digest. There is a class of persons who are always tempting the sick to take food, and even in opposition to their natural inclinations. So forcible in truth, is the association

between eating and bodily strength, that it is scarcely, under any circumstances, that they can be dissociated in unreflecting minds. Hence the contests of the physician with vulgar prejudices in regulating the diet of the sick, are not the least embarrassing parts of his duty.

There are some dyspeptic subjects whom no motives can permanently restrain to prudent rules of diet. They sacrifice appetite to health for a time perhaps, get better, and then transgress, thus renewing all their sufferings. Such must take the consequences of their conduct. If the gratification of taste is of higher moment than a healthy body and sound and happy mind, let them continue in their course, and, like the drunkard, become the victims of appetite.

I wish it to be constantly borne in mind by my readers, that the following remarks on diet, &c., are especially designed for the subjects of indigestion, or those of feeble digestive powers. It is by no means unusual for the healthy and robust to ridicule the more feeble and delicate because they are particular in their diet and regimen. "Look at me," says one, "I eat hot bread, pastry, and just what I please, and only see how healthy I am! You are too particular! only live as I do and you will be well enough!" With as much wisdom might the Esquimaux savage say to the civilized man, "drink rancid blubber oil by quarts, and eat raw fish by pounds, and you will be as hardy as I am!" Shortsighted individuals always take

their own constitutions as a standard of comparison for all others, and with their usual inconsequential reasoning, arrive at the conclusion that whatever food suits them, must of necessity be wholesome for every body. It is the same philosophy, or rather want of philosophy, that also leads them to infer that a medicine which has benefitted them, must by consequence help every one else. Mankind, however, differ in the power of their stomach as well as in that of their muscles. Because a vigorous and active individual can readily digest a particular article of food, it is not a necessary inference that it is absolutely of easy digestion. For the accurate measurement of the qualities of the atmosphere we need delicate instruments, and a delicate stomach only can be a nice measure of the digestible character of different aliments.

Though the strong and hearty should ever live within the bounds of moderation, and with a just regard to such rules as tend to the security of health, yet they need not observe that cautious regularity, which is for the most part so essential to the comfort of the dyspeptic invalid.

The older writers on health, among whom Hippocrates and Celsus may be particularly mentioned, consider a rigid uniformity of diet and regimen as suited only to the valetudinarian. But that to the man in health, it is salutary to vary the diet, as well as the scenes of life. Some even go so far as to advise an occasional slight excess. That the excitement of change is to a certain extent

necessary to man's health as well as happiness, would seem to be indicated by the inconstancy of his nature. The same food, like the same prospect, or same society, wearies him after a while, and he languishes for the stimulus of novelty. Mutability seems necessary to the harmony and perfection of creation, and may be equally needful to elicit the full force of our bodily and mental powers.

The invalid even,—though the reverse is by far the most common,—may live too uniformly and exactly.

Some persons are, I think, disposed to attach too great importance, as it respects health and longevity, to the observance of over-nice rules in their diet and regimen; regulating their living so methodically,—as it were by the square and compass,—that the body finally gets so habituated to particular systems, that it feels acutely the slightest deviation from them.

That power of adjustment, or adaptation to circumstances, to which I have previously alluded as belonging in so eminent a degree to the human constitution, and as being so essential to its security, like all other faculties, is strengthened by judicious exercise; and being possessed by every vital organ, each will consequently be invigorated by its suitable activity. And on the other hand, if not duly exerted, it will languish, and thus the body may lose in a measure its capability of conforming itself even to the slight and incidental deviations to which it must necessarily at times be subjected.

All our faculties were doubtless designed for use, and the exercise of each of them, within definite limits, seems to be conducive to the perfection and vigor of the general health.

No example is oftener adduced to illustrate the advantage of exact dietetic habits than that of Lewis Cornaro. It ought, however, to be remembered that this individual possessed naturally a delicate constitution, and which he moreover so seriously injured by intemperance, that at the age of thirty-five his life was apprehended to be in danger. It was at this time that he changed his habits, and became so exceedingly temperate, and lived so strictly by rule, as to allow himself only twelve ounces of food a day. Under this course, his health improved, and he lived to an advanced age. But then the habits adapted to the originally delicate, and subsequently abused constitution of Cornaro, might by no means be the most suitable for those naturally vigorous, and who had made no breach on their systems by intemperance. Not only do different constitutions vary in their powers and requisitions, but even the same, at different periods and under different circumstances.

Let it however be cautiously remembered that though variations in our dietetic and other habits are allowable, and to a certain extent required, they are always to be confined within the bounds of moderation, or strict temperance. Their purpose is, not to fatigue and exhaust, but simply to exercise the accommodating powers of life.

Some dyspeptic invalids, filled with melancholy apprehensions in regard to their complaints, fancy that they require energetic medicines, and thus if their own physician is too wise and conscientious to resort to such, they become jealous that he either mistakes, or else feels no interest in their case, and hence they consult another, and perhaps another, and so, on the doctrine of chances, are likely to be subjected to emetics and cathartics, or to courses of medicine, which, by irritating and disturbing the stomach and nervous system, will only tend the more firmly to establish their malady. And so they may either linger on under aggravated sufferings until their existence yields to superinduced organic disease, or acquiring wisdom from sad experience, learn to trust less to medicine and more to a prudent regulation of their dietetic and other habits of life, and then get better.

There is a proneness in most persons to ascribe specific powers to medicine;—to fancy that the physician by the magic of his drugs may accomplish at once, what diet and regimen could do but slowly, and at a great sacrifice of sensual enjoyment. Hence most individuals are ready to take a potion to advance their health, whereas comparatively few will submit to any rigid restraint in their course of living.

All that is necessary to the recovery of some cases of dyspepsia, is the removal of their remote causes, and which generally existing in improper habits, are more under one's own control than those

of most other maladies. I have not unusually known persons completely relieved of troublesome disorders of digestion, indicated by headach, heartburn, &c., simply by abstaining from some hurtful article of food in which they had been in the practice of indulging, as, for example, cheese, new bread, or pastry. When, however, the affection has been lasting, the powers of digestion having long been subjected to disturbing causes, then a strict and decided plan of diet and regimen, perseveringly followed, will alone avail. A spring but transiently bent by an extraneous force, will, on such being removed, at once resume its straightness, whereas if long pressed upon, its restoration may require that it be bended for some time in an opposite manner.

General remarks on the diet suitable in dyspepsia.—The diet needs to be varied in different cases, and even under different circumstances of the same case of this malady. To imagine that exactly the same rules in regard to food are applicable in all instances, is to assume that every constitution is alike, and that dyspepsia is always of the same nature. An observing individual soon learns what diet is best adapted to his powers of digestion. In truth the faults here of most dyspeptic subjects are rather dependent on the will than the judgment.

Sometimes the stomach manifests unnatural irritability, under which circumstances a mild farinaceous, or milk diet, is most agreeable to it. And on the other hand, it will occasionally exhibit an

unwonted torpor, when a somewhat more exciting diet may be demanded.

Every function of the body has a power, in a degree corresponding with its necessities, of varying its mode of action under the influence of habit. Of this we have numerous examples in digestion, the stomach learning to conform itself especially to particular articles of diet, and hence habit is never to be overlooked in the treatment of its disorders.

Particular idiosyncracies are likewise to be taken into the account in the establishment of dietetic rules. By idiosyncrasy is meant a peculiarity in the system generally, or in one or more of its individual parts, causing them to be affected by particular agents in a manner different from what experience ordinarily teaches. When mental horror or disgust is thus aroused, the term antipathy is employed. But my concern lies only with idiosyncrasy as it belongs to digestion. It is a familiar fact that certain kinds of food, which are generally grateful and wholesome, are, in individual instances, offensive both to the taste and stomach. In some constitutions the use of honey, even in very minute quantities, is invariably succeeded by pain and cramps in the stomach, colic, and other signs of acute disorder in digestion. In others, cheese will uniformly produce aggravated disturbance in the same function. A case is recorded of a boy in whom eggs were always followed by a poisonous effect. Instances exist in which particular kinds

of fish, cause certain eruptions to break out on the skin, as erysipelas, and nettle-rash.

Idiosyncracies may be innate or dependent on native constitution, or may originate in the associations either of childhood or later life. Thus if a person has been surfeited on a particular article of food, or has used it as the vehicle of a nauseous medicine, it may for a long time, or perchance ever after, be disgusting to the taste and sickening to the stomach. Idiosyncracies vary materially in degree in different constitutions, and habit will often do much to conquer them. Articles of food then which adequate experience has taught to disagree with digestion, however mild, wholesome, and nutritious may be their established character, should never be persisted in.

Simplicity in regard to the food is of essential importance in indigestion. I mean, not in regard to its proximate principles, but that a variety of different substances, either separately, or compounded in the hands of the cook, should not be indulged in. The objections to such indulgence are—First, the greater chance there is that among the variety an indigestible article will be present. Second, if several dishes are employed, more is likely to be eaten, since the appetite, though sated on one, may still relish another. Third, different alimentary matters when combined, will sometimes experience chemical changes rendering the mass more indigestible than either of its constituents would be singly. Lastly, it has been suggested that as different ali-

ments vary in their solubility in the stomach, when a number are taken, their solution will be in different states of advancement, and thus the organ being impelled to effect a sort of analysis, and to suit its action to the demands of the individual articles, its task in chymification becomes more complicated. Thus it will often be observed that substances which, when forming a part of a mixed diet, appear to be very indigestible, if taken by themselves, are promptly acted upon by the stomach; and hence it is that erroneous conclusions are very frequently arrived at in regard to the wholesomeness of particular aliments. Some persons, for example, while dieting on milk, are at the same time taking tea, coffee, and perhaps meat, pastry, &c., &c., and then come to the decision that though milk may be very good for others, yet it does not agree with their constitutions. Like observations will apply to many other simple and wholesome articles of diet, they being too often employed as additions to, not substitutes for other food.

The diet requires certain modifications according to the character of the season. Thus in hot weather, as before remarked, cooling fruits, and other vegetable substances are, other things being equal, more particularly appropriate to the system. In spring, the appetite often diminishes, particularly for animal food, and a plethoric disposition, general or local, is not uncommonly manifested, indicating especially a frugal diet; and hence the

Lent of the Catholics is doubtless a salutary institution in reference to health.

Regularity in eating.—The appetite is commonly not only better, but the stomach appears to rally its energies more effectually at the particular times when food is wont to be taken. Regularity therefore in respect to meals, should, as far as circumstances will admit, be regarded in dyspepsia.

Frequency of eating.—The intervals between the meals must be regulated by a variety of circumstances. Some constitutions naturally digest more tardily than others, and hence require less frequent supplies of food. Habit likewise exerts its influence here. Some persons crave but two meals a day, and in occasional instances one even has been sufficient. In dyspepsia, the amount of aliment that can be borne at once, will have much to do in determining the necessary frequency of eating.

The involuntary organs, though they do not, like the brain, senses and animal muscles, need long continued periods of repose, nevertheless action consumes their energies and must consequently alternate with rest. The contraction of the heart, for example, occupies, according to calculation, only about a third of the time of its dilatation; and if this latter state be relaxation simply, as many physiologists maintain, the organ has sixteen hours of the twenty-four for repose. Or if, with other physiologists, we choose to consider the heart's dilatation to be active, still, even subsequent to this, the ventricles of the organ remain quiescent for

an instant previous to a new contraction. This interval of undisputed rest, on the measurement of Laennec, the accuracy of which has not, I believe, been questioned, occupies about one fourth of the time expended in contraction and dilatation, thus allowing six hours to the heart for repose. It is probable that every part of the economy needs some intermission in its action, longer or shorter according to the frequency of its recurrence, and to such general law the stomach can scarcely be viewed as offering an exception.

It is an important inquiry, whether, under our ordinary habits, the stomach is not kept in too continued exertion to be consistent with its full health and vigor. The frequent saying that one should eat little and often inculcates an error, or is certainly only applicable to young children whose food is light, and in whom digestion is very rapid. But even they will often suffer from too frequent feeding. The brain and animal muscles are competent to great efforts, if periodical and succeeded by an adequate amount of repose, whereas those which are very slight will subdue their powers when long protracted. Some would seem to believe that the stomach, if left without work, is naturally inclined to fall into mischief; but whatever may be said of the brain and muscles, I believe that this organ, in civilized life, seldom suffers from idleness.

In disease, as in fevers and inflammations for example, but little nourishment being taken at once, it must be supplied more frequently. And

the same is true in those extreme cases of dyspepsia where the powers of the stomach are so reduced that minute portions of aliment only can be eaten at a time. Still it is rare that a dyspeptic subject needs more than three meals a day. To this number, indeed, we are most of us accustomed from early life, and habit seems to render it necessary. Of these three, the most substantial should be the dinner. But let this rule always be adhered to,—that one meal be digested, and a certain time afforded the stomach to recover its powers before another is taken.

A solid meal should never be eaten when the body is fatigued, neither should it be followed by any severe exercise.—The energies of all the organs are reduced when the body is in a state of fatigue, and hence the functions are each accomplished with less vigor. Under such circumstances too the appetite for solid food is commonly diminished, indicating plainly that the stomach is not in a condition to receive it. When a horse has been hard driven, the groom, if he understands his business, never furnishes him at once with grain, but allows him perhaps a mess of gruel, and then lets him rest for a time sufficient to recruit his exhausted powers preparatory to his substantial meal. It is well known that his life would be endangered by a contrary practice.

Subsequent to exercise then, unless it has been only sufficient to elevate without exhausting the vital powers, the vigor and equilibrium of the

actions of the system should be restored by rest previous to indulging in a solid repast. If a hearty meal be taken at the close of a day of fatigue, feverishness, nervous restlessness, and various unpleasant symptoms of indigestion are very apt to disturb the night. The evening meal therefore of invalid travellers should principally consist of some mild and warm vegetable decoction, as gruel, or a solution of arrow root.

Fatiguing exertion immediately after a substantial meal is exposed to equal objections, exhausting and disturbing the energies of life which are then especially needed to contribute to the function of the stomach. Relaxation from all severe physical exercise for a certain time after eating, unless the food taken has been very sparing, is therefore particularly needful for such as are subject to indigestion. The custom of immediately hurrying from dinner to their active, and often arduous duties, so usual among our men of business, cannot,—except they are unusually temperate in their diet—but tend to the prejudice of digestion. In fact their very indisposition to such practice is a sufficient argument against its expediency. To cite again the example of the horse, every one conversant with this animal well knows that not only his health, but even his life is exposed to hazard, by driving him hard immediately subsequent to full feeding. It may possibly be said that the dyspeptic subject being compelled to eat sparingly, such remarks are not applicable to him; but then I

answer, that in digesting his few ounces of plain food, a greater relative demand is often made on the energies of the system, than in the healthy individual by his pound of more gross aliment.

A solid meal ought not to be taken when the mind is suffering under fatigue or agitation.—Such is the intimacy between mind and body, that either one being spent with labor, the other will necessarily participate in the exhaustion. Thus let an individual of delicate digestion eat a full dinner in the midst of the fatigue of intellectual efforts, and difficult and imperfect chymification will almost uniformly follow. If the mind then has been severely tasked, it should, like the body, under similar circumstances, be permitted to rest a while before a substantial repast is indulged in. So, also, if the feelings are much perturbed, solid food, especially flesh, should be eaten with the utmost caution. The most prudent course will be to employ only some mild vegetable decoction, until they have recovered in a measure their composure. Mental labor and agitation are also equally prejudicial immediately subsequent to a meal. In truth it is ever difficult, certainly in delicate constitutions, for energetic actions to be maintained in distinct and important parts at one and the same time.

Another consideration of special moment to the dyspeptic invalid, is that the mind during a meal, enjoy relaxation, or be as much as possible withdrawn from the cares and anxieties of business,

and interested in the sensual impressions it is experiencing. The enjoyment of our food ever serves as a wholesome stimulus to its digestion. Beside, by fixing the attention on what we are doing, instead of eating like automatons, we shall be likely to masticate more perfectly, and to swallow more slowly. The necessary animal operations are to be controlled by, but not sacrificed to the intellectual. "To every thing there is a season, and a time to every purpose under the heaven."

Quantity of food to be taken.—In all cases of indigestion, prudence in respect to the amount of aliment is to be scrupulously regarded. Any substance, indeed, even stale wheat bread, may become indigestible if taken too abundantly. Some subjects of dyspepsia indulge the absurd error that they may eat as much as they please of an article if it is advised by their physician; seeming often as though they anticipated some other and more positive advantage from it than what would arise simply from its fitness as an aliment. Hence it is that the most wholesome food will manytimes, owing to abuse in respect to its quantity, fall into unmerited disrepute. A feeble dyspeptic invalid perhaps takes a quart of milk at once, and finding his stomach disturbed by it, arrives at the conclusion that milk is not good for him. Whereas if he would reduce the quantity one half or more, his digestion might be quite tranquil under it. Dyspepsia is probably quite as often kept up by errors in the quantity, as in the quality of the diet.

No rule in regard to the amount of food can be of universal application in dyspepsia, the stomach varying in its ability in different instances, and even in the same at different times, and under different circumstances, as of exercise and rest, state of the moral feelings, conditions of the weather, &c., and hence very much here depends on the good sense, and prudent self-control of the individual.

In the disease under consideration the appetite should never be excited by stimulating condiments, or tempted by a succession of more and more highly flavored dishes, otherwise a task will probably be imposed upon the stomach beyond its powers of performance. If the dyspeptic subject will confine himself to a few articles only of plain food, and eat slowly and masticate thoroughly, he will be satisfied with much less than under the contrary circumstances; and a certain feeling of satiety, with the aid of previous experience, will mostly indicate to him when enough has been taken. It is, however, in those cases in which a morbid craving for food exists, that faults in regard to quantity are especially liable to be committed, and in such, the exercise of much firmness and self-denial is always demanded.

Food should be rendered grateful to the palate.—Other circumstances being alike, those alimentary substances which are most agreeable, appear also to be digested with the greatest facility; the gratification of the taste seeming as it were to contribute

to the good humour of the stomach. Out of the different suitable articles of diet then, such as are most grateful should always be selected.

DRINKS. A due attention to the quantity and quality of the liquids taken is of the utmost importance in dyspepsia.

Quantity.—No more drink should ever be taken than is needed to moisten the aliment, and to recompense the waste of the fluid materials of the body. The amount therefore required will be in part determined by the character of the diet. Thus an animal, is associated with more thirst than a vegetable diet, and dry food will of course demand more dilution than moist or succulent. When fresh fruits are eaten freely, they in a great measure supply the place of drinks. The liberal use of salt, and heating condiments contributes greatly to the demand for liquids. So also does eating too hastily, the food here,—as Dr. Philip explains it,—being swallowed without a due admixture with the saliva, the mass formed in the stomach is consequently too dry. Constitution, degree of bodily activity, thermometrical, and barometrical states of the atmosphere, &c., also influence the necessitude for fluids.

Drink, except in very hot weather, or under the influence of severe exercise, is not ordinarily required between the regular meals, and the habit of taking it at such time should generally be avoided. Drinking just before dinner, as practiced by some, is, if the stomach be delicate, unfriendly to chymi-

fication. Undue distension of the stomach by liquids is ever prejudicial, and the subject of indigestion, especially, should only take them in small quantities at a time.

Fluids of some sort are almost universally employed in the morning and evening, and at these periods, when judiciously used, they are generally grateful to the stomach. Some persons always crave drink with their dinner, while others care little about it. I am disposed to believe, however, that, in a majority of cases at least, fluids are taken at this meal more from custom, or preconceived notions in regard to their utility, than from any absolute necessity for them. At any rate they should never be employed unless under the natural impulse of thirst.

Character of the drinks.—The natural beverage of man, as of all other animals, is doubtless water, and were all his habits primitive and simple, none other would probably be craved by him; but it belongs to me here only to speak of the drinks adapted to those afflicted with dyspepsia. In many of the subjects of this complaint, the stomach having been long habituated to the impression of artificial stimuli, is very apt to experience discomfort from a sudden and entire abstraction of them, yet such is seldom lasting, but will ordinarily soon yield to a resolute self-denial. As a general rule, mild fluids, as pure water, toast-water, apple-water, lemonade, &c., will, on adequate trial, be found most salutary. Still instances occasionally hap-

pen where the stomach manifesting unnatural torpor, appears to demand gentle stimulation; under which circumstances some weak aromatic infusion, or a little pure wine, may be advantageously employed. But the benefit of vinous liquors will generally be found rather transient and specious than permanent and real, and hence are only to be used with the utmost circumspection. The poor and adulterated wines, let it be remembered, are uniformly injurious.

The strong malt liquors are generally hurtful in indigestion, not only from their stimulating and narcotic property, but also from comprising a nutritious matter, which becoming concentrated in the stomach, must make a new draught on its powers of digestion, and one for which it may be found quite unprepared. Hence they are oftentimes quickly followed by headach and other symptoms of gastric disturbance, when, in common language, they are said to be too heavy for the stomach. Now and then we, to be sure, meet with dyspeptic persons, especially such as are pale, spare, nervous, and disposed to watchfulness, in whom a very moderate use of strong beer is apparently serviceable, such, however, are to be viewed but as exceptions to the general rule. Our small or table beer being the weakest, is the least objectionable of these liquors.

The temperature of the drinks is a matter of no trifling consideration. In persons of delicate digestion, a low temperature of the liquids is not apt to

be well borne, and this is more remarkably the case in the evening, when the vital energies have in a measure declined. Thus a draught of cold water, or more especially of iced fluids, at this time, will not rarely be followed by a night of restlessness. Employed at any period after eating, they are very apt to excite headach, and uncomfortable sensations in the stomach. "Iced fluids," says Dr. Paris, "should not be taken, under any circumstances, by those who have delicate stomachs, especially after a meal, the digestion of which is thus retarded or wholly prevented." Their action is, by abstracting the vital heat from the stomach, which it is but little able to restore, to depress still lower its already feeble powers. I have previously alluded to the experiments of Dr. Beaumont, proving that the natural temperature of the stomach, that is about 100° Fahr., is most favorable to the solution of alimentary matters in the gastric juice out of the body, and that it is retarded by materially lessening this degree of heat. We may rationally infer then,—and observation appears to bear out the inference,—that whatever is received into the stomach so cold as considerably to reduce its natural heat, unless it has sufficient vigor of life quickly to renew it, must be unfriendly to chymification. In dyspepsia, the drinks had better be taken at a temperature not far removed from that of the body, and this is more especially necessary since their rapid passage prevents them being tempered in the mouth and

œsophagus. A range of heat from 55° to 120° should seldom be exceeded. Instances will now and then occur in which an uncomfortable sense of heat is more or less constantly experienced in the stomach, and cold and iced fluids are consequently agreeable to it; such cases, however, are oftentimes associated with an inflammatory tendency, and therefore do not always belong to simple dyspepsia. It may be laid down then as an important general rule, that the heat of a feeble stomach should be carefully economized.

CHAPTER XIX.

TREATMENT OF DYSPEPSIA CONTINUED.

IN the present chapter I purpose to offer a few more particular rules in respect to the diet in dyspepsia.

Breakfast.—The time of taking this meal is in a great measure regulated by general custom.

Thus what would be an early breakfast in England, would be a late one in America. Our most usual hours for this meal are from seven to half past seven in summer, and from eight to half past eight in winter. Some dyspeptic subjects want their breakfast soon after rising, feeling irritable and uncomfortable before it. Others again choose to delay it for a period.

In the morning there is usually a concentrated state of the secretions, noticed especially in the mouth and fauces, owing perhaps to the waste of the fluids during the night by perspiration, and hence a proportion of liquid is almost always desired; and in dyspepsia especially, the peculiarly rank condition of the secretions at this time, seems most obviously to require the dilution of mild fluids.

A large proportion of the inhabitants of France and the South of Europe, drink light wines with the morning meal, but the English and Americans generally confine themselves to tea, coffee, chocolate, or a solution of cocoa. Of these, chocolate, owing to the different indigestible materials of which it is composed, is most objectionable, and when used liberally, it is very often followed by oppression of the stomach, headach and drowsiness. Cocoa agrees much better with the stomach, and forms a very proper substitute for chocolate.

Of the influence of tea and coffee on the system, I have already spoken. The effects of these vary very sensibly in different cases of the malady I

am considering. But then they are too often abused both in regard to strength and quantity, when, however agreeable may be their temporary excitement, their ultimate tendency will be to aggravate the indigestion. Black tea is more generally inoffensive than green, from the circumstance of its containing less of the peculiar volatile and stimulating principle of this herb. Coffee, I think, more frequently disagrees with dyspeptic persons than tea. These fluids, if employed, should be taken weak, at a moderate temperature, and in prudent quantity. Many, who feel very comfortable under one small cup of tea or coffee, experience marked inconvenience when a second is drunk. Two small cups can rarely be exceeded with safety. With these liquids, cream and sugar may be employed or not, according to habit and inclination, and their observed effects.

In some cases of indigestion, where the taste could be educated to its employment, I have found an infusion of camomile to form a happy substitute for tea and coffee.

Gruel, barley water, and other farinaceous decoctions, constitute a very suitable breakfast for such as are fond of them, and can be induced to forego the stimulus of tea and coffee. These being bland and soothing to the stomach, will oftentimes keep it in a tranquil state through the whole forenoon. Gruel—I mean that made of oatmeal—is particularly well adopted to costive habits.

The most proper solid food in the morning, is stale wheat bread or biscuit, toasted or not as may suit the inclinations. Butter, if fresh, sweet and cold, and spread in moderate quantity on the bread, is not ordinarily indigestible. The action of heat upon it, as when used with hot toast, renders it empyreumatic, and more difficult of digestion. Thus, too, hot fluids taken with bread and butter, will, by injuring the qualities of the latter in the stomach, oftentimes be prejudicial to digestion. Salt and stale butter is uniformly irritating to a delicate stomach.

Bread formed from unbolted wheat flour, or of a mixture of rye and wheat, is very suitable for those who are inclined to constipation. Coarse bread, however, is more liable to be followed by heart-burn than that of finer quality. Indian bread being very prone to pass into the acetous fermentation in weak stomachs, very often excites the affection alluded to. The soda biscuit now in common use, are well adapted to such as are inclined to heart-burn.

Eggs are a very frequent accompaniment of the morning meal, and when fresh, slightly boiled, and seasoned with salt alone, are, for the most part, readily acted upon by the stomach. When taken raw they are a little laxative. If fried, or hard boiled, they become very difficult of digestion. In certain constitutions, however, eggs are uniformly found unwholesome. In some persons the yelk will agree with the stomach while the white is sure

to disturb it. Dr. Cullen observes—"we cannot at all explain the singular fact of the white of egg even in very small quantity, whether in its liquid or coagulated state, proving constantly the occasion of much sickness in the stomach of certain persons, while in the most part of other men it is an agreeable and readily digested food."* The white is generally harder when eaten than the yelk, or if not, it becomes firmly coagulated in the stomach, and is probably, therefore, in all persons, less readily converted into chyme.

Eggs, affording a concentrated nourishment, should be taken but in small quantities. Few dyspeptic invalids can prudently eat more than two in the morning.

The amount of solid food that may be proper at breakfast, must of course be determined by the powers of digestion, as well as, in a measure, by incidental circumstances, as the amount of exercise to be subsequently taken, and the time that is to elapse previous to dinner. The subjects of indigestion, however, not ordinarily having much appetite in the morning, are less apt to transgress in quantity at breakfast, than at the subsequent meals.

Dinner.—It is generally advisable that no food be eaten between breakfast and dinner; the luncheon commonly destroying the appetite for the latter,

* *Materia Medica.*

and exhausting those powers which will be wanted for its digestion. There are, however, extreme cases where but very little aliment can be borne at a time, in which an exemption from this rule must be claimed.

The interval between the first and second meal ought to be of sufficient duration to permit the stomach to free itself of the former, and to become refreshed by at least a short period of rest; and hence the hour of dinner is to be regulated by that of the breakfast. Usually six or seven hours should intervene between these meals; and in those cases where digestion is very tardy, the interval may be advantageously protracted for an hour or two longer. It is surprising to remark how greatly digestion will, in many individuals, become improved by simply extending the intervenient time of eating.

It is not unusual for the subject of indigestion to experience in a few hours after his breakfast, particularly when it has been scanty, a sense of sinking faintness at the stomach, united perhaps with nervous tremors, and a feeling of general debility; still these effects will oftentimes, if left to themselves, after a while subside, and the stomach and whole system become more tranquil and vigorous. When, however, they are very urgent, a little food may be taken to subdue them.

As toward evening the vital powers ordinarily begin to wane, and the different functions display less force than in the earlier part of the day, the principal meal should seldom be later than three

o'clock; and never so late that the labor of digestion will be continued after going to rest. Our own dinner-time varies in the country and city, from twelve M. to three P. M. The farmer who dines from twelve to one, taking his breakfast proportionably earlier, has about the same interval between his first and second meal as the citizen who dines one or two hours later.

There are various articles of food from which the dinner may be selected, according to the tastes, habits, and particular modifications of the complaint. Most persons being educated from early life to the use of flesh, it is commonly desired in greater or less quantities at this meal; and in some forms of dyspepsia, especially where there is a strong tendency to acidity in the stomach, when properly selected and prepared, its digestion is accompanied with less disturbance than that of many vegetable substances. But again there are other cases to which a vegetable diet is obviously the most suitable. A dyspeptic subject, however, should not take meat in hostility to the dictates of his appetite, merely from preconceived theories of its necessity.

The muscular fibre free from fat, and kept sufficiently long to become tender, constitutes the most digestible solid animal diet in ordinary use. Fat or oily, and tough meats are ever unfriendly to delicate stomachs, the former often turning rancid during their digestion, and the latter, owing to the firmness of their texture, which is but partially

overcome in the mouth, are not readily acted upon by the gastric juice.

The flesh of adult domestic quadrupeds is more stimulating, and commonly digested with more rapidity than that of the young, as for example, beef than veal, mutton—though the difference is here less striking—than lamb. In regard to poultry, age renders the fibre hard, tough and dry, and in many wild animals, it causes the flesh to become oily and rank. The dark meats are, as a general rule, more exciting than the light, but the latter are mostly retained longer in the stomach, and are more liable to undergo chemical fermentations.

Venison, mutton, and beef, may be ranked among the most nourishing, as well as digestible meats in ordinary use; of these, the last is somewhat the most exciting to the stomach.

Among poultry, chicken is best suited to delicate and irritable stomachs. Ducks and geese are too oily, especially when old, to be of easy digestion. Many wild fowl, as several species of the grouse, the woodcock, &c., are digested with facility, though with somewhat more excitement than the domestic fowl.

Broiling, roasting and boiling—I mean in plain water—are the best methods of cooking meats. Prepared in the last way, however, a considerable proportion of their nutritive principles being dissolved in the water, they are rendered less stimulating and nourishing than in either of the other modes. Mutton is thought to be more tender and

juicy when boiled in hard than in soft water. Fried meats being united with empyreumatic oil, are particularly improper for all persons of feeble digestion. Flesh should always be cooked to such a degree as will diminish the cohesion of its fibre sufficiently to secure its easy mastication. All rich gravies and sauces are to be avoided, and the principal condiment employed should be salt, simply sprinkled upon the meat while cooking, or after it is brought upon the table.

Fish is less nutritive and stimulating than flesh, for which reason it is much better adapted to some forms of dyspepsia. The large, coarse and oily fish are very hard of digestion. The salmon, for example, is rich and nutritive, but owing to its oily nature, is not readily acted upon by delicate stomachs. The character, too, even of the same fish differs at different periods, and may at times even become very unwholesome, and hence to be good it must be in season. Most of our small river and lake fish when fresh, are in general readily digested. Dr. Paris says, alluding to fish,—“Firmness of texture, whiteness of muscle, and the absence of oiliness and viscidities, are the circumstances which render them acceptable to weak stomachs.”

A weighty objection to the use of fish is the mode of their preparation for the table; they being usually fried in oil or lard, and when boiled, being eaten with melted butter, and various rich sauces and heating condiments. Hence, as commonly served, they are a highly improper dish for the

dyspeptic subject. They are of most easy digestion when boiled in plain water, and taken with salt, or salt and vinegar. Dr. Paris thinks that the potato, with perhaps the exception of the parsnip, is the only vegetable that should accompany a meal of any species of fish, and that fruit had better not be taken with it by the invalid. Milk he tells us is likewise another incompatible aliment, the most serious diarrhœa having followed such mixture.

Fish, however, are not equally wholesome in all constitutions. Eruptions or efflorescences on the skin, in certain persons, uniformly follow the employment of some varieties of them, even when they are apparently good.

Many sorts of shellfish have been a good deal praised as both nutritive and digestible, but the oyster is the only one which I conceive proper to be employed in dyspepsia, and it is questionable whether this has not attained a reputation for its digestible qualities somewhat beyond its merit. Some persons would almost seem to fancy that the oyster possesses even specific virtues in indigestion. Habit has much concern in attaching us to this article, and may also conduce in a measure to its readiness of digestion. Under the idea of their harmlessness, oysters are manytimes eaten to excess, and at improper periods, and hence injurious consequences have not unfrequently followed them.

Oysters should be taken fresh and moderately warmed. When cold they are often oppressive to

a weak stomach,—probably from too rapidly abstracting its heat,—and when cooked, becoming hardened, or firmly coagulated, they are thus rendered more difficult of solution. Stewed with butter and condiments, they are exceedingly improper.

The dyspeptic subject should always bear in mind that if he takes fish, it is to be, not in addition to, but as a substitute for meat.

The vegetable substances almost universally employed with dinner are bread and the potato. In regard to the qualities of bread in dyspepsia I have already spoken, and I need only say therefore that it is very properly used with the meal I am at present considering. The potato, if of good quality, and properly cooked, is to almost every one a wholesome vegetable, and may be made to supply in a measure the place of bread. When prepared, it should be dry and mealy, and of such tenacity only as just to bear being taken up on a fork. If watery, or waxy, it is both unpalatable and indigestible. When mashed and impregnated with butter, or other oily substances, its digestible qualities are also much impaired.

Plain boiled rice is a vegetable substance mostly easy of digestion, and is but little disposed to pass into the acetous fermentation. But as it rather conduces to constipation, it is not adapted to all habits. Turnips when boiled are commonly ranked by writers on diet as quite digestible, and to most

persons they are so, nevertheless I have met with not a few exceptions.

Puddings, if they are to make part of the dinner, ought to be plain, light, and taken without butter, or rich sauces. Bread or biscuit, or rice, simply boiled, may be employed. Tapioca and sago also form wholesome puddings. Rye hasty-pudding eaten with molasses is a laxative diet, and consequently often salutary for such as suffer much from costiveness.

The objections to the pudding are that we are not apt to make allowance for it in the first course, and that to render it palatable it is almost always served with sweet and indigestible sauces.

Of the dessert, a dyspeptic subject ought never to partake, since it generally comprises indigestible substances, and beside, in all probability, enough has already been eaten.

I have of course been able to notice, and in a summary manner, but a comparatively few articles of food, since a full history of dietetics would in itself occupy a volume. Still I trust that the dyspeptic invalid will be able to select his dinner from the bill of fare which has been presented to him.

My previous observations on the subject of drinks will supersede the necessity of speaking further of them in this place. I would merely repeat therefore, that the natural inclinations, uninfluenced by habit or theory, ought alone to determine the use of liquids with the dinner.

Evening meal.—This should be mostly liquid. Some warm and mild fluid taken a few hours after dinner, is generally grateful to the stomach and favorable to its healthy action. Thus headach, resulting from labored digestion, is oftentimes speedily relieved by the warm fluids which are habitually used at this time. Tea is the most usual evening beverage, but those subjects of dyspepsia certainly who are nervous, and inclined to watchfulness, will find advantage in substituting for it a less stimulating fluid, as thin gruel, barley water, bread-water, or some other bland vegetable decoction. Black tea, if this beverage cannot be dispensed with, is, for the reasons previously made known, to be preferred, and even this should be drunk weak and only in moderate quantities.

For food, stale bread, or biscuit should alone be employed; and when digestion is very slow, as sometimes happens, all solid aliment had better be dispensed with. The period of this meal must be determined in a measure by that of the dinner, as also by the hour of retiring to rest.

The practice so prevalent in our country villages of loading the tea-table with all sorts of food, as toast swimming in butter, dough-nuts fried in lard, sweet cake, preserves, various kinds of pastry, with the addition often of beef-steak, fried ham, eggs and broiled chicken,—I do not exaggerate, for I have hundreds of times seen even a greater variety than I have mentioned—cannot but be dangerous even to those in the best of health. It

is therefore particularly important that the dyspeptic valetudinarian of the city while sojourning with his country friends in pursuit of health, should keep himself as much as possible from such hospitable repasts, lest the temptings of the luscious viands, aided by the urgent solicitations and beseeching looks of the kind hostess, cause him to lay up tribulation and anguish for the ensuing night, and to awake in the morning—in the language of Cowper—“like an infernal frog out of Acheron, covered with the ooze and mud of melancholy.”

Nothing should be eaten after the third meal, unless that distressing gnawing, or sense of emptiness in the stomach, to which I have already alluded, becomes so great as to threaten the interruption of sleep if not alleviated, when a very small quantity of the mildest vegetable food may be taken. That certain disagreeable sensations at the stomach are at times speedily relieved by swallowing a few mouthfuls of simple aliment, must I think have been observed by almost every one who has been much afflicted with indigestion. The mode in which this relief is produced varies, probably, under different circumstances. The food, as before said, may unite with, and dilute acrid and irritating matters which happen to be present in the stomach. And again, bland farinaceous aliment may sometimes sooth distress and irritation here from an emollient influence like that exercised by a poultice on a painful external part. And finally,

if the organ is suffering from unnatural actions, those which are healthful may thus be called forth and established. Thus nausea and vomiting, continuing after the offending cause has been removed, will oftentimes be allayed by a piece of biscuit, or any mild food that can be retained on the stomach long enough to restore its natural digestive motions. I have often found, too, that a little pure salt, or some substance strongly impregnated with it, as a small portion of dried codfish for example, will, by eliciting the natural function of the stomach, tend to remove its disagreeable sensations. Headach when resulting from slight indigestion may in this way occasionally be relieved.

Fruits.—These, except in tropical countries, are rather classed as articles of luxury, than as a necessary part of our diet. Many of the fresh subacid fruits, however, when ripe and tender, constitute, especially in the warm seasons, a very grateful aliment; and in certain forms of dyspepsia are particularly wholesome. Thus the stomach is often agreeably excited by them, and chymification consequently favored; and to the liver and bowels, when torpid, they act as a very salutary stimulus. Some dyspeptic persons uniformly improve in their health during the season of fruits.

To some constitutions, however, fresh fruits are never wholesome, and I have known persons in firm health, who could not eat even a ripe apple without suffering disorder in the stomach and bowels.

In those instances of indigestion associated with irritable bowels, or in which there is a proneness to colic, or to pains in the stomach, raw fruits are always to be used with caution; still, even under such circumstances, they are sometimes attended with benefit when prudently employed, excluding, as it were, disorderly, by exciting regular actions.

It is customary with many to take wine, brandy or heating condiments with fruit; but if it cannot be borne without such correctives it had better be abstained from.

The apple, when fully ripe, tender and slightly acid, may be ranked among our most wholesome fruits. When this is baked or roasted, it is rendered still more digestible, and may be safely taken with the periodical meals. The pulp alone should be eaten, the husks, according to my own experience, frequently serving to irritate and disturb the stomach when feeble.

Many varieties of the pear, when ripe and tender, are also quite digestible, though I think somewhat less so to persons generally, than the apple.

Strawberries are to most people—for I have remarked some striking exceptions—wholesome to the stomach, as well as agreeable to the palate; but the cream and sugar with which they are so commonly united, is oftentimes injurious. The raspberry is likewise a delicate and digestible fruit; and so also is the grape when its pulp is tender, and its seeds and husks are excluded.

Of the stone fruits in common use among us, the most easy of digestion are the peach and apricot. Cherries are more exceptionable, yet when eaten moderately and without the skins they are not generally hurtful. Plums are still less digestible, and should never be indulged in, except very sparingly, by the subjects of indigestion.

All fruits when preserved, or cooked with sugar, are unfriendly to weak stomachs, and are allowable only for their laxative properties when such are required, and are always to be used with much caution.

The period of taking fruit is a matter of no trifling consideration. Many persons relish fresh fruit with their breakfast, and if the inclinations lead to it, there can be no objections to its employment at this time. The intervening time between breakfast and dinner, as a few hours before the latter meal, is very suitable for it.

Immediately subsequent to dinner, fruit should never be partaken of by dyspeptic persons, since at this time the stomach is very likely to be already tasked to the utmost of its ability, and the gas also which is usually extricated from fresh fruit may create such distension of it as will embarrass its requisite actions.

Cold and raw fruits eaten in the evening, from their refrigerant effect upon the stomach, and the uncomfortable distension of it which they often create, are very apt to be followed by a restless night.

The preceding rules of diet will of course require to be modified to harmonize with different varieties and degrees of the affection. In many cases an exclusive diet of bread, or some other farinaceous article, and milk, is found to be the most salutary. And again, a purely farinaceous diet, as bread, rice, gruel, arrow root, tapioca, &c., appear most in accordance with the state and capabilities of the stomach. And finally, such may be the weakness and irritability of this organ that only dry toast, or a rusk, or perhaps a little fresh curd or cream, can be retained by it. Such however are extreme cases, and which, it is to be feared, are verging to more serious disease than simple indigestion, and hence demand the immediate superintendence of the physician.

CHAPTER XX.

TREATMENT OF DYSPEPSIA CONTINUED.

General observations upon exercise.—No course of management can promise success in dyspepsia unless combined with judiciously regulated exercise.

In fact a simple change from sedentary to active habits is not unfrequently all that is needful to the recovery of the soundness of digestion.

The importance of exercise to the health of the body and energy of the mind was rightly appreciated by the ancients, and hence gymnastics constituted an essential part of national education in ancient Greece, and the example was closely imitated by the Romans. Plutarch tells us that it was the exercises in the field of Mars, and the fatigues of war, that rendered Julius Cæsar—though his constitution was originally feeble and delicate—the most bold and active warrior. Active habits commenced in early life will often give firmness to the most imbecile constitution. This law of action is inscribed most deeply and visibly in our constitutions, and if we disregard it, our just retribution will be infirmity, disease, and too often moral corruption. Well has it been said, that an active life is the rampart of virtue, and the ægis of health. All our capabilities are perfected, and all our energies wax stronger, when subjected, within the limits of safe endurance, to exercise and exposure. The tree which has grown up unsheltered from the agitation of the winds and the storm, may play gracefully amid the tempest which would uproot the more protected and less hardy native of the forest.

One mode in which exercise may elevate the activity of digestion, appears to be by increasing the waste of the body, and consequently the requi-

sition for fresh supplies. Thus, in assimilation, or the conversion of the aliment into the different materials of the living fabric, there takes place an associate series of operations, and among which a certain relation must constantly be sustained. Destruction and renovation are uniformly progressing in the animal mechanism, and it is essential to its health,—to the maintenance of its due proportions, and proper bulk, that a just equilibrium be preserved between them. Now exercise augmenting the circulation and expenditure of the body, will accordingly increase its want of new materials, and therefore by a sort of physical necessity may stimulate the assimilative organs—under which those of digestion are of course comprehended—to more active efforts to meet such want. Thus, as I have previously stated, after long fasting, or on recovery from protracted sea sickness, fevers, &c., the system being in an unnaturally wasted state, calls urgently for fresh supplies to contribute to its restoration, and hence the frequent hunger and quick digestion so remarkable under such circumstances. It would seem to be a law of the animal economy that its different organs should, within definite limits, and when suffering from no positive lesion or physical incapacity, acquire vigor in correspondence with the requisition made upon them for exertion. Such is true in respect both to our moral and physical natures, each must respond to the stimulus of necessity. The mere want on the part of our organs for nourishment, may indeed

modify all the functions and appetites, and even the moral character,—such is the synergistic relation among the various offices of life.

Exercise may further impart a more immediate impulse to the organs of digestion, as it does, for example, to those of the circulation.

The amount and character of the exercise to be taken must obviously be adjusted by the strength and habits of the individual; and consequently no rules of general applicability can be offered on these points. The exertions however, should never be urged to painful fatigue, a moderate sense of weariness being all that is proper to be excited.

Much discretion is always required on commencing new modes of exercise, since muscles uneducated to action soon tire, and become affected with a painful stiffness which rest does not readily relieve, imparting perhaps a sympathetic disturbance to the whole system. All new exercises then should be begun moderately, and gradually increased as habit renders them familiar, and gives force to the muscles interested.

The exercise should also be varied, and different sorts united, since the mind is not only liable, after a while, to grow weary of any particular kind, but custom also tends in a measure to diminish its effect. It is always a matter, too, of important regard, that such be selected as will afford most gratification.

Exercise should also be taken regularly from day to day, and as far as practicable in the open

air. Dyspeptic invalids ought not to allow a little foul or drizzly weather to confine them within doors, otherwise their exercise abroad will be constantly liable to interruption. Beside, by habitual exposure to the open air, the body soon becomes inured to the impressions made upon it by changes of the weather. Exposure to the evening air, however, is generally to be avoided, more especially in valleys, and on the borders of rivers and lakes. The fogs of evening are always prejudicial in dyspepsia, and the chill consequent upon exposure to them is not unusually followed by a restless night. The air, however, at night, varies greatly in its salubrity in different situations, and at different seasons, but the invalid should always be well clad and exercise briskly, when obliged to be abroad after sunset.

As a general rule the forenoon, I mean the interval between breakfast and dinner, is the fittest time for the principal exercise. The air is then likely to be most dry and pure, and the body having been recently refreshed by sleep, is generally most competent to the severer exertions. There is ground also for believing that a natural exaltation of the functions takes place in the forepart of the day. Habit too may have some concern here, mankind being generally accustomed to perform their most arduous labors at this period. There are instances, however, in which, under the unnatural influence of the malady, the subject feels more inclined to exertions toward evening. In

summer, the heat is often too great to admit of much active exercise unless near the two extremes of the day.

I have already observed that no exercise, except the most gentle and familiar, is admissible immediately subsequent to dinner. It may here be mentioned that after the principal meal, if it has been plentiful, the body seems to become more susceptible to atmospherical impressions, and hence there is increased hazard from exposure at this time. This I know is in opposition to general belief, full eating being supposed to fortify the system against the influence of the weather. Celsus instructs us that when we have dined heartily we should not expose ourselves to cold, or the contrary extreme, and labor, they being much more injurious after a full meal, than when we are hungry.

In regard to exercise before breakfast, a contrariety in opinion exists, which is to be ascribed to its different effects on different persons. Some, even in good health, always suffer a diminution of their bodily and mental alacrity from any protracted exertion previous to their morning meal. Much here is doubtless dependent on habit.

The dyspeptic subject, certainly, is seldom in a state to endure any great degree of exercise or exposure in the morning until some nourishment has been taken, and when subjected to such, head-ach, and a general aggravation of his symptoms will not uncommonly supervene. Before breakfast,

too, the body being more sensible to cold, the invalid should cautiously avoid exposure to the atmosphere if damp and chilly. Still, though all severe and protracted exertions are generally improper at the period referred to, yet, the weather admitting, sauntering a little while in the fresh air, will mostly be favorable to the appetite and powers of digestion, and such a habit may readily be established.

When circumstances call for much exercise or exposure before the regular breakfast, the dyspeptic subject will ordinarily support them better by taking a small cup of milk, or even a few mouthfuls of bread or biscuit. But after all, the experience of the individual,—granting him to be judicious and observing,—must here be his most important guide.

Exercise should, if possible, so interest and engage the mind as to withdraw it, in a measure at least, from the infirmities of the body. If it is regarded as a task, and prosecuted as a disagreeable duty, much of its benefit will be lost. The offerings of a willing spirit are ever most acceptable to the goddess of health. Exercise therefore had better be taken in agreeable society than alone. For like reasons, too, it is expedient that it have some definite purpose, or be associated with the agreeable feeling that something is to be accomplished by it. Hence those pursuits of natural history, associated with exercise, which call us forth into the woods and the fields, as botany, mineralogy, &c., are

peculiarly adapted to dyspeptic invalids. They are harmless, and tend both to interest the mind and calm the feelings. "In stating the evils," says Mr. Thackrah, "attendant on a life of study, the pursuits of the naturalist and antiquary have not been mentioned; for in these there is little to reprobate, and consequently little to amend. They give exercise in the open air, and cherish that state of mind, in which there is much hope and little disappointment." And again, alluding to the naturalist, he says,—"He often effects general good: he never produces injury to society, and rarely even annoyance to individuals. Evelyn makes an observation to the effect, that a good gardener cannot be a bad subject. We may add, that a man addicted to pursuits like that, the various pursuits of natural knowledge, can scarcely be a bad man."* Let me further add, that a practical naturalist can hardly be dyspeptic.

Particular modes of exercise.—Exercise may be regarded as active, passive, and mixed, or uniting both the former. We call that active which is accomplished by our own voluntary efforts, as walking, running, jumping, &c. Among the passive exercises are ranked those motions of the body derived from extrinsic powers, and which are independent of its own voluntary exertions, as sailing, and gestation in carriages. And in equita-

* On Trades.

tion, where we are carried along by the horse, but at the same time use our muscles in managing him, and in maintaining our seat, we have an example of the mixed exercises. This division, however, can scarcely be regarded as philosophically accurate, since in the larger proportion of the exercises denominated passive, more or less voluntary action is demanded.

Walking.—Locomotion under the influence of the will is enjoyed by all the higher orders of animals, and it not only contributes to their health, but is necessary, in various ways, to the continuance of their existence. The disposition to it is in truth so strong, that it may be regarded as an instinctive want.

In early life, when the limbs are supple and the spirits fresh, and the motions unlimited by social restraints, we run and jump, and gambol in various ways, and thus gratify our want of locomotion; but on arriving at mature age, we confine ourselves chiefly to the more dignified and stately action of walking. It is to this variety of locomotion, then, which the forms of society only permit the adult, that I shall limit my remarks; not, however, but that it may oftentimes advantageously alternate with the quicker and more active sorts.

Walking is a perfectly independent exercise, and there are few, whose feet have not been crippled by tight shoes, but may enjoy its advantage.

Were we limited to a single mode of exercise, walking I conceive would be that most conducive

to the general and equable health of all the functions. Different from many of the more violent and partial exercises, it maintains the circulation at a healthy force and equilibrium, and calling the muscular system into uniform action, insures its general vigor and just developement, and consequently the beautiful proportions of the human form. Other exercises then, though they may be properly combined with, are never to be prosecuted to the exclusion of walking.

If the dyspeptic subject is feeble and unused to the exercise I am noticing, he should commence it moderately, increasing it from day to day in proportion as habit exalts the ability of his muscles of locomotion. Thus by judicious training, he who could hardly walk a mile without fatigue, may in a few weeks get to walk even eight or ten with perfect ease. Every pedestrian must be sufficiently familiar with the effect of regular training in enhancing his powers.

Some invalids unwisely urging this exercise to improper fatigue at first, and consequently suffering injury from it, acquire the notion, and which they will sometimes obstinately maintain, that it does not agree with their constitution. A certain amount of moral firmness, which all do not possess, is necessary to establish a regular habit of walking, and hence the indolent and inefficient are induced to it with difficulty. When this is the principal exercise employed, from six to ten miles daily will generally be required.

A protracted pedestrian tour, judiciously managed, the individual walking moderately about twenty miles a day, and living temperately, especially on a diet of bread and milk, and fruits, is oftentimes productive of a very happy influence upon dyspepsia, dependent especially on the regularly continued exercise and exposure to the fresh air from day to day.

It is of no trifling importance to the invalid that he select pleasant and varied walks, that the mind may, with the body, be agreeably excited. Those who dwell in the city should extend their rambles into the country, where they may breathe a purer air, and experience that tranquillizing influence which the aspect of nature ever tends to diffuse over feelings which society has not wholly perverted. And moreover the delicious perfumes there exhaled when vegetation is in activity, beside being grateful, probably act as a healthful stimulus to the various living functions. But who has not remarked how the action of the heart, stomach and lungs will often be aroused by simply inhaling pleasing and gently stimulating odors?

It is generally better to walk on uneven ground,—a greater variety of muscular motions being thus elicited,—than on a uniform surface. Thus walking in the fields is, for the most part, a more salutary exercise than on level roads. Celsus made the remark, that it is better to walk in a straight course than otherwise. Now it certainly has seemed to me that more advantage is derived from

a given walk, if distant, than when confined to a more limited space. In the former case the air is somewhat more varied, and the mind is likely to be more diverted by the greater variety of scenery with which it is impressed. We are apt soon to tire of walking about in the same circuit.

Dancing.—The dance is an exercise practiced in every stage, and by every class of society. I am not aware that any people have yet been discovered into whose amusements or ceremonies some rude form, at least, of the dance does not enter. It has hence been regarded as the expression of nature, or a dumb poetry. The beggar, the peasant, and the king equally enjoy it. Of the young, it is one of the most delightful amusements, and the aged often forgetting their characteristic gravity, relax their rigid limbs in its giddy mazes. Cato, notwithstanding his stern virtue and austere manners, is said occasionally to have practised the dance when he was upwards of sixty. And Socrates became the pupil of the captivating Aspasia, in this accomplishment as well as in eloquence, when he was advanced in life.

As this exercise is generally recommended as salutary by writers on health, and more especially for females, who indulge in fewer active amusements than the stronger sex, I will briefly remark upon its advantages and evils.

There are certainly no objections to be urged against dancing abstractly considered. Children especially, derive from it an ease and grace in their

muscular motions which few other exercises impart. The simple dance of the primitive states of society, more particularly when practised by day, on the green sward in the open air, is surely both an innocent amusement and a wholesome exercise. The family dance, moreover, continued during a few hours in the evening, and not encroaching on the period of repose, is both harmless and salubrious, unless perhaps to such as are very nervous, and irritable, who had better shun all exciting exercises soon before bedtime.

Unfortunately, however, in the luxury of advanced society, the dance loses its primitive character and is too often associated with corruption both of morals and manners. History instructs us how, in the advanced and voluptuous days of Greece, when all its manly energies were sunk in effeminacy, the dance, which was then the favorite amusement, and carried to the highest perfection, became a school of vice and immorality. In this country, however, we have not arrived at that point of luxury when, in regard to morals, we have much to fear from this amusement, still it is often abused among us, and rendered rather prejudicial than salutary to health. The principal objections to it are, that it is a diversion of the night, and hence too commonly infringes upon those hours which should be devoted to the repose of the functions. It is usually conducted in crowded and confined rooms,—in an atmosphere rendered impure by fires, lights and respiration.

Under such circumstances it being usually attended with free perspiration, and often urged to undue fatigue, the body becomes particularly susceptible to the atmospherical transitions to which it is liable to be exposed. The dance to be sure differs in the degree of exertion attending it at different periods, under the influence of fashion; sometimes being characterized by gentle waving turns and motions, or a display of the tender graces, while at others it is marked by more severe and rapid action; hence its influence in fatiguing the body will vary according as one or the other mode prevails. Furthermore, the dancers are generally tempted with unsuitable food and drink at the most objectionable period, viz. the night, and under the most improper conditions of the system—unnatural heat and exhaustion. Too much moral excitement for the invalid is also apt to be associated with this amusement, and the unhealthful feelings of envy and jealousy are not rarely awakened, continuing perhaps even after retiring to rest, and consequently disturbing the needful repose. But observe the company of a ball room at the latter period of the night, and see if their countenances bespeak a tale of health! Or mark them on the ensuing morning, and do their wan and sallow cheeks and inexpressive eyes indicate benefit from the exercise of the preceding night? In the strong and healthy, the effect, to be sure, may be but little visible, and soon subside, but in the nervous and excitable subject of dyspepsia, it will be far more severe and lasting.

The dance then, as ordinarily managed, is, to say the least, a very questionable exercise for a dyspeptic invalid.

The waltz, especially, should be proscribed, since quick circular motions being unnatural to the body, are liable to produce sickness and vertigo, and their general tendency, I apprehend, will be to disturb digestion if it be delicate.

There are various other exercises of a still more active character, which, practised with prudence, will oftentimes be attended with advantage. Such are digging, chopping and sawing wood, fencing, swimming, bowling, cricket, battledoor, &c. To active sports belong the additional advantage of affording diversion to the mind.

Equitation.—Riding on horseback is associated with both active and passive exercise, and it is generally very valuable to such as have been trained to it. To most people, too, it imparts more enjoyment, and is regarded more in the light of an amusement than walking; and those who are feeble can continue it longer, thus obtaining the advantage of more protracted exposure to the fresh air. Its effect, beside, in exciting the liver is very marked, and hence in all cases of indigestion suspected to depend on a sluggishness or obstruction of this organ, its practice is especially advisable. It is not, however, adapted to every form of dyspepsia, in some cases it being almost uniformly followed by headach and disagreeable sensations in the stomach. It is never to be practised imme-

diately after dinner, its effect at such time being, to most persons, more prejudicial than that of walking.

The severity of this form of exercise varies according to the pace of the horse, and the practice and skill of the rider. Those who are feeble and unused to equitation, should at first ride slow, and on a horse of easy gait. But though this exercise in some forms of the malady I am considering, may have certain advantages over walking, and in most cases may be usefully combined with it, nevertheless, I conceive it, as an habitual exercise, to be less conducive than the latter to an equilibrium of healthful power in the various functions. When equitation is followed too exclusively in early life, while the bones are yet soft and growing, the lower limbs are not apt to display the same development and handsome proportions, as when more naturally and actively used. Thus individuals who, from their youth, pass much of their time on horseback, are not uncommonly bow-legged, and are almost always bad walkers.

Inflammation of the kidneys, and other complaints of the urinary organs are occasionally excited by hard and long continued equitation, and it ought therefore to be practised with great prudence by those inclined to such affections.

The passive exercises most commonly employed, are riding in a carriage, sailing, and swinging, and upon which therefore I will briefly remark.

Riding in a carriage.—This method of exercise may often be employed to diversify the more active sorts. And there are cases associated with much debility, or incidental circumstances precluding those varieties already considered, where this must be mainly relied upon. The short and rapid concussions here transmitted to the body, tend in a measure to excite the functions; still the exercise from riding in easy vehicles, and on smooth roads, particularly when accustomed to it, is but small, and a great share of the benefit is derived from the exposure to, and rapid passage through the atmosphere, which latter, especially,—dependent perhaps upon the frequent changes of air with which it is associated—is strikingly salutary in its influence on the system. Hence, in addition to its affording more exercise, fast riding is generally superior to slow. I need hardly state that an open vehicle, the weather admitting, is always to be preferred.

Sailing.—Under this head will be embraced what remarks I have to make on the general effects of voyaging in dyspepsia.

The degree of exercise in sailing will obviously be governed by different circumstances, as the roughness of the water, and size of the vessel. The motion of the ship of course imparts an impulse to the body, and must beside, oftentimes call for considerable muscular action to maintain the equilibrium of it; whence comes the sense of weariness so soon felt by passengers, especially in the muscles of the back, from walking, or even standing on a

ship's deck at sea. In rough weather there is a continued exertion of numerous muscles both by day and night to preserve the position of the body. Now such constant action, even though gentle, cannot but be salutary in dyspepsia. The continued passage too, through the fresh air may also contribute to its salubrity. Sailing moreover calms the nervous system, and disposes to sleep, and hence the irritability and watchfulness of dyspepsia often become remarkably relieved under its influence.

At sea, and this is no unimportant advantage, the condition of the air in respect to heat and moisture being adjusted by the mass of waters, whose range of temperature is quite limited, will be less subject to sudden and great vicissitudes than on land, and hence the salutary influence of a pure and equable atmosphere may be almost constantly experienced. Perhaps, too, the salt dissolved in the sea vapor, and which must be constantly absorbed into the system through the medium of the lungs, may in particular cases, at least, be favorable to the functions of assimilation. Of the importance of salt in digestion I have previously spoken, and in certain forms of dyspepsia evident benefit arises from its free employment.

Sea sickness, when not continued to extreme exhaustion, is, in some varieties of dyspepsia, of obvious utility; such is particularly the case where it is dependent upon, or accompanied with obstruction or inactivity of the liver. Here the effect of

nausea and vomiting is, by increasing the flow of bile, to relieve the oppressed hepatic vessels, and consequently,—as those acquainted with the physiology of the abdominal circulation will readily comprehend,—to facilitate the course of the blood through the different organs subservient to the function of digestion.

The appetite of the subject of indigestion, when he is free from sickness, will generally be observed to experience a remarkable improvement on ship-board ; and it is apt to become particularly keen, and digestion also to be rapid on recovery from sea sickness. And when nausea and vomiting have continued more or less constantly through the whole passage—unless the latter has been so severe and persisting as materially to impair the powers of the stomach,—the appetite and digestion mostly become eager and active on landing, and oftentimes almost on the instant when the sickness ceases. Voyaging then I conceive, with occasional exceptions, to be highly useful in dyspepsia, and, in a more particular manner, if associated with marked imperfection in the hepatic function. Those whose constitutions have become shattered by intemperance, or by exposure to the influence of tropical and unwholesome climates, and who are laboring under the train of disagreeable symptoms denominated bilious, will not unusually experience astonishing improvement in their appetite, flesh, strength, looks and spirits, from long voyages, if they are at the same time temperate in their habits.

Swinging.—This is a very gentle exercise, something analogous in its effects to sailing, and when it diverts the mind, and can be prosecuted in the open air, it may be usefully practised. But it should never interfere with, or take the place of, more active exercises.

Friction of the body.—This, in relation to its effects, is nearly allied to exercise. Brisk friction of the skin, by means of a brush, coarse cloth, or any moderately rough substance, continued till a general glow of warmth is produced, tends to invigorate digestion, and most dyspeptic invalids will find their account in practising it two or three times daily. It is especially indicated in such as are liable to unnatural coldness of the surface generally, or of the extremities. If the customary exercise is necessarily suspended, this may answer, in a degree, as a substitute for it. To the importance of a natural and active state of the cutaneous function I have already alluded.

Management of the mind.—A judicious exercise of our mental faculties being conducive to virtue and happiness, must consequently be favorable to health. If the dyspeptic subject has no interesting object of pursuit,—if his mind is vacant and inactive, then gloomy and discontented, if not wicked thoughts, will be likely to make it their abode. The feeling that life is without aim or purpose is of all others the most insupportable to a moral and intellectual being.

Dyspepsia tending to engender and nurture feelings of despondence, it is therefore especially requisite in it that the mind be as far as possible preoccupied, or engaged by agreeable business, or, in defect of such, in innocent amusements. But though it should be pleasantly occupied, all undue fatigue and anxiety is to be carefully shunned. Dyspeptic persons often derive great advantage by relaxing for a while from the anxieties of business, and substituting in their stead varying and pleasant excitements, and when the mind has been gloomy and care worn, from interrupting as far as possible the train of customary associations. Hence we in part account for the marked advantage often obtained from visiting watering places, and others devoted to relaxation and amusement.

A careful moral treatment is strongly indicated in those examples of indigestion characterized by great mental depression, for although this be referrible to a physical source, still moral means will produce upon it an assuaging influence, and thus lessen the morbid reaction upon its original cause,

CHAPTER XXI.

TREATMENT OF DYSPEPSIA CONTINUED.

Journeying.—Journeying is associated with the important advantages of protracted daily exercise, and exposure to the fresh air, and also with continued changes of atmosphere. It is, beside, connected with new and constantly varying impressions and consequently excitements, and thus tends to withdraw the thoughts from the real and imaginary cares and troubles of life. Under its influence, when sufficiently long continued and prudently conducted, the most happy results are generally produced. Thus, the skin becomes warmer, and more clear, bright, and ruddy; the countenance more expressive and healthful; the sleep more sound and tranquil, and the temper, if it had been before irritable, and gloomy, more even and cheerful, and the whole body grows more vigorous, and its susceptibility to atmospherical vicissitudes is remarkably diminished.

To insure the benefits of travelling, it ought, as far as possible, to be rendered pleasurable. Hence it should be conducted in pleasant society, and in

countries especially, which abound in sublime and beautiful natural scenery, such tending to elevate the physical functions in correspondence with the moral feelings. All the cares of business, too, should, as far as possible be banished from the thoughts.

In journeying for health, undue exertion either of mind or body should be avoided, and more especially on first setting out, before the system has become habituated to the exercise, and the new circumstances to which it is subjected. It ought always therefore to be commenced moderately, the efforts being increased according as the physical capabilities become elevated under its influence. As a general rule it had better be suspended by sunset, the air afterwards becoming damp, chilly and unwholesome to the invalid. The regular and customary hours of rest, too, are ever to be scrupulously observed, otherwise the power of the body to endure the exposure and exertions of the day will be much diminished.

The methods of travelling must of course be governed by the circumstances, tastes and habits of the individual. Changes, however, are often useful. It is important especially that walking occasionally alternate with riding, since from the uniform position in the latter, the muscles, especially of the back, are liable to become stiff and even painful.

Some imagine that while journeying it is unnecessary to restrict themselves to rules in their

diet, and acting on this mistaken idea, may oftentimes forfeit in part, or even altogether the benefits of the measure. Though, to be sure, the powers of digestion commonly soon begin to improve, still the general principles in regard to diet previously laid down, are not to be neglected.

It sometimes happens that no improvement is evident during the continuance of a journey, more especially if hurried and fatiguing, yet afterwards, the functions reacting under the influence previously imparted to them, the digestive powers and general health will display a remarkable advancement. In occasional instances several days even may elapse before the advantage becomes distinctly marked.

Conditions of the atmosphere most favorable in dyspepsia.—Some subjects of indigestion are best suited by warm, others by cold weather. It may, I think, be stated as a general position that a dry, equable, and moderately cool atmosphere, such for example as is ordinarily associated with rocky or sandy soils, and elevated situations, is,—there being no tendency to pulmonary disease—the most proper in the complaint under notice. Low, marshy, and consequently damp places, are almost always unfriendly to the health of digestion.

A certain degree, moreover, of purity in the air is of important consideration. Modern chemists have sufficiently proved that the same relative proportions of oxygen and azote enter into the constitution of the atmosphere in every variety

of situation, — in the smoky and pent up city, as in the free and open country, — in the deep and noxious valley, as on the clear mountain top. When therefore, we now speak of impure, or unwholesome air, we do not mean to imply a deficiency of its oxygen, or vital principle, nor in truth any change of relation between its constituent elements, but that effluvia or gases foreign to its necessary constitution are mingled with it.

The air in proximity with the earth's surface is probably never entirely free from unessential mixtures. A minute and variable amount of carbonic acid, or fixed air, is always detected in it. Watery vapor, too, in different proportions is ever united with it; and the aroma of plants, and more or less of the numerous gases given off during respiration, combustion, and the decay of animal and vegetable substances, are oftentimes present. Of these mixtures, the watery vapor is necessary to our existence, and the pleasing odors from many varieties of the vegetable kingdom, may be conducive to health. But then others, as some of the subtile effluvia and gases emitted from decaying organized matter, are extremely pernicious to human life, and are doubtless a source of many of the severe and fatal maladies with which we are afflicted.

The character of the air, it is obvious, must vary in different situations, as in the interior and on the sea coast; in crowded towns and in the open country, in valleys and on hills. It is doubtless, too,

affected in a measure by the nature of the soil. At night it grows more damp, and when noxious impurities exist in it, they apparently become more concentrated and active than by day. In winter it is of course more dense than in summer. Such varying conditions in this essential vital agent cannot but influence to a greater or less extent the living functions, and among the rest that of digestion. Sometimes this influence can be readily appreciated. Thus the dyspeptic inhabitant of a city will almost always gain advantage from the relatively pure air of the country. Even a very short residence in it will oftentimes effect an astonishing improvement in his looks, appetite and digestive powers, and independent, too, of any increase of the customary exercise. "Notwithstanding," says Mr. Thackrah, "the distance to which the atmospheric impurity of Leeds extends, a mile or two has a sensible effect on health. A man who has lost his appetite for breakfast while working in the centre of the town, will often immediately regain it, when he enters a similar employ at the outskirts."

Change of air.—Observation teaches the fact,—though philosophy has not explained it—that mere changes of air, even when nothing is gained in respect to its purity, will oftentimes exert a very happy influence on the digestive function. Thus a removal from the sea coast to the interior, or from the latter to the former, is not unfrequently attended with manifest advantage in dyspepsia.

And the same is true of other changes, even where there is no appreciable difference in the character of the atmosphere.

Clothing.—The body in dyspepsia should always be maintained at such a temperature as is agreeable to the sensations. The clothing, therefore, is to be regulated by the daily atmospherical vicissitudes, and the varying ability of the system to support them. The unsteadiness of our own climate demands frequent changes of dress, often even during the same day. The feet, in a special manner, should be carefully defended, and maintained at a grateful degree of warmth.

In damp and variable climates and seasons, flannel becomes a necessary article of clothing. Its utility during the day will be greatly enhanced if it be taken off at night. When worn in contact with the skin, for the sake both of warmth and cleanliness, frequent changes of it become necessary.

Sleep.—An adequate amount of tranquil sleep being of the highest moment to the welfare of digestion, the dyspeptic invalid should use “all appliances and means to boot” to secure to himself its full benefit.

The day, for reasons too plain to need enumeration, is properly devoted to action, and the night to repose, and whenever, either for the sake of business or pleasure, this order of things is inverted, the health, if not immediately, will in the end almost surely suffer.

In respect to the necessary amount of sleep, so much is dependent on habit and constitution, that no rules of universal application can be established. Few persons, unless under the influence of injudicious habits, require more than seven hours of sleep; and to many, five or six, and in occasional examples even less, afford all the refreshment that is needful. Broussais tells us that some individuals throughout the whole course of a long life are contented with one or two hours of repose; but if such instances exist, they must be exceedingly rare.

It is natural to infer that those who sleep soundly will require the least time for repose, as in them most of the animal functions are simultaneously resting, while in unsound sleepers, they rest as it were by turns; that is, portions of the nervous system are awake or excited, while others are asleep.

Dyspeptic subjects who are irritable and watchful, are often obliged to remain in bed, eight, nine, or ten hours to obtain six or seven of sleep.

Excessive indulgence in sleep will always be found injurious in indigestion, and dullness, head-ach, and diminished appetite, are apt to be its immediate consequences. It is proper therefore to rise, if sufficient rest has been obtained, on first waking in the morning, and not, as is too often practised, lie drowsing and dreaming, and encouraging enervating fancies of gloom or pleasure long

after the system has received all the refreshment which sleep can impart.

Tranquil feelings being essential to quiet sleep, all undue excitement during the evening should be scrupulously avoided. The sleeping apartment ought to be large, well ventilated and quiet. If an irritable dyspeptic invalid is disturbed by noises after going to bed, his night's rest may be completely interrupted. Lights are very improper in a bedchamber; injuring the purity of the air, and—especially in those unaccustomed to them—tending, by their sensual impression, to excite the brain.

It is furthermore highly important that the body be comfortably warm on retiring to rest, and that it be maintained so during the night by sufficient and proper bedclothes. Lying either too hot or too cold is always injurious to digestion. If a dyspeptic invalid goes to bed with cold feet, they may continue in this state even through the whole night, and the sleep in consequence be disturbed and unrefreshing. In the warm season, at least, a mattress should always be preferred to a featherbed.

It is better, as a general rule, that the night alone be appropriated to sleep. Sleeping after dinner, certainly for any considerable time, and in the horizontal posture, probably retards rather than hastens digestion. Celsus advised to remain awake some time after eating freely. Unless under the influence of habit, of fermented liquors, or of full meals of animal food, a propensity to sleep will not commonly exist during the day. It is in cases

only of much debility, and where the rest is interrupted at night, that I conceive day sleep to be admissible.

Bathing.—The bath, by cleansing the skin from impurities, contributes to the perfection of its function, and consequently to the health of digestion; and under certain modes of its application, a stimulating influence is imparted to the vascular and nervous systems, and consequently through them extended to all the functions. But the refreshment and alacrity that are usually experienced after judicious bathing, amply prove its utility. It is particularly requisite in hot weather, and when exposed to the dust, and other impurities existing in the atmosphere of crowded cities.

Bathing, however, is liable to abuse, and when extravagantly indulged in, and as a voluptuous gratification, may tend to enervate both mind and body. Such was its perversion, and such the necessary consequences, in the advanced days of Greece and Rome. Though the people of both these countries at first constructed their baths in reference to health and cleanliness, they at length became subservient to pride and sensuality. The ruins of ancient baths in Rome, as of Titus and Caracalla, as also in other parts of Italy, fully attest the height of luxury to which this gratification was carried. Those of Caracalla, for example, contained sixteen hundred cellæ, or bathing places, beside labra, or immense bathing tubs of granite

and porphyry, and the whole edifice was on a scale of the most splendid and costly magnificence. In Rome, it is said, there were eight hundred and fifty-six public baths, that is, such as might be used by the people free of expense; and some, as those of Dioclesian and Caracalla, were capable of accommodating near two thousand persons. Under the emperors, the taste was more particularly for the enervating enjoyment of the hot bath. "After the overthrow of the republic," says Dr. Currie, "the Romans consoled themselves for the loss of their freedom, by a more unbounded indulgence than ever in those sensual gratifications which had led to their fall. Of these, the pleasures of the bath formed a distinguished part, they sought every means of heightening and diversifying them, and connected them with other epicurean enjoyments. The mild and tepid immersion of the Greeks no longer satisfied them; they heated their baths to the utmost pitch of endurance; and as they rose reeking from their surface, vessels full of cold water were dashed over their naked bodies, as a high gratification in itself, and a means of stimulating the senses to gratifications still higher. Such practices could not, however, be continued without injury. In the bagnios of *Imperial* Rome, the last of the Romans, the followers of Zeno and of Cato, sought to soothe their sorrows, and were melted down into slaves; the powers of their minds became enfeebled, the vigor of their frames decayed,

and they lost for ever the bold impressions of freedom and of virtue." *

In America, however, we err in the opposite extreme. Private accommodations for bathing are by no means frequent among us, and public ones, except in our principal cities,—and even here they are not often very extensive or inviting—are generally unknown.

Cold bathing.—In the warm season, and practised with prudence, cold bathing is highly invigorating, and in many cases of dyspepsia may do much toward the restoration of the digestive energies. Thus dyspeptic subjects often derive great advantage from prosecuting, during the warm months, a regular system of sea bathing. Salt water being more stimulating to the surface than fresh, its use is more certainly followed by reaction.

The effect of cold bathing will vary somewhat according to the particular mode in which it is practised. Sudden and general immersion in cold water is always safer than a more gradual, or especially a partial subjection to its action. Thus many persons who could safely plunge into cold water, might suffer in their health were a small stream of it allowed to pass gradually down the neck and back; just as a current of cold air acting on a part of the body, is attended with more danger than general exposure.

• Medical Reports, p. 126.

The cold shower bath produces a powerful impression on the system, which, when there is strength to endure it, is highly invigorating to the function of digestion.

Sponging the body daily with cold salt water, is oftentimes attended with striking advantage to the digestive powers. Some persons even continue it through the cold season, and beside the benefit mentioned, experience in consequence a remarkable diminution of susceptibility to atmospherical impressions. It should always be brief and brisk, and the body, immediately subsequent to it, be wiped perfectly dry with a coarse towel.

The safest time for cold bathing is when the body is warm, and the functions are most active. It may therefore be prudently employed in the midst of the excitement of exercise, but not when sweating is profuse, and the system begins to experience fatigue and exhaustion. Hence it is proper in the early, but never in the latter stages of severe exercise, when the living energies are beginning to decline. The Roman youth in the heat of their exertions and excitement in the Campus Martius, found refreshment from plunging into the Tiber; and it is now a common practice among the Russians, after heating themselves in baths of a temperature from 106° to 116° Fahr., suddenly to roll naked in the snow.

The safest period for cold bathing is a few hours after breakfast. It ought never to be practised immediately after a meal, unless it has been very

sparing, the system always displaying less force of reaction when its powers are engaged in the accomplishment of chymification. Thus bathing immediately after dinner, will, in the subject of dyspepsia, very frequently be followed by chilliness, with headach, and various other symptoms of disturbed digestion. If too, the cold bath is used in the afterpart of the day, and especially at night, when the vital energies of the system are in a measure declined, similar results are liable to happen, and a restless night is the frequent consequence.

A little brisk exercise, or friction over the surface, immediately preceding and following the use of the cold bath, will contribute to the security of reaction. At first, certainly, the immersion should last but a few minutes, and should be as complete as possible. If speedily on leaving the water a glow of warmth is felt diffusing itself throughout the surface, the safety of the remedy is amply evinced. But when on the contrary, the body continues chilly for a considerable time, and languor and headach supervene, incompetency of reaction is shown, and persistence in the measure will be unsafe.

When cold bathing is well borne, and the system has become habituated to it, it may be pursued daily; but at first, it will be most prudent to employ it only every other day.

Warm bathing.—In some instances of dyspepsia, a more salutary influence is experienced from the

warm than the cold bath. Such is remarked to be the case in those forms of it connected with manifest disorder of the biliary system. Here warm saltwater bathing practised daily, or on alternate days, and accompanied with a good deal of friction on the skin, is generally a very valuable remedy.

Analogous principles, in some respects, should regulate this, as the other variety of bathing. Thus its most suitable period is between the hours of breakfast and dinner, as a few hours previous to the latter meal. Used soon after eating, it is very liable to interfere with digestion, and consequently to aggravate the dyspeptic symptoms. Restlessness, too, will sometimes follow its use at night in the subjects of indigestion.

The period proper to remain in the warm bath, is about twenty minutes, and the body ought all the time to be immersed. Its temperature should be constantly maintained at such a standard as to impart an agreeable feeling of warmth, and hence will require to be varied according to different circumstances of the system, and of the external atmosphere. Oftentimes the heat which seems too great at first, owing to its contrast with that of the air, will after a while require even to be raised to satisfy the sensations. An agreeable temperature to most persons is about 90° Fahr.; to some it is more pleasant a little above, to others rather below this point. If the bath, however, be rendered too warm, a feverish excitement, marked by a hot and dry skin, headach, restlessness, &c., will sometimes

ensue. I have not rarely noticed such effects from a hot bath taken at night with the view to promote sweating. The effects, however, of the warm bath, certainly vary in different constitutions, and under the influence of habit, and on first commencing its use, great prudence is demanded in its management. In the winter season it is of course the only form of bathing ordinarily employed.

In dyspepsia, however, unless, as before mentioned, there is marked disturbance of the hepatic function, cold bathing is generally to be preferred in the warm season; and it is more particularly proper in those cases characterized by extreme nervous irritability.

Tonics.—A class of substances generalized under this name, and supposed to increase the energy of the stomach, and through it, of the various other organs, is in very familiar use in indigestion. Vegetable bitters are the tonics most commonly employed, and at times, they obviously improve the appetite, and elevate the powers of the stomach; still in some constitutions, and in certain forms of the complaint, their effects are uniformly injurious, wherefore an indiscriminate resort to them is improper. The most gentle and safe tonics, are quassia, cascarilla, dandelion and chamomile, in watery decoction or infusion. Long persistence in their use is rarely advisable, and they are never to be taken in large quantities.

CONCLUSION.

THOUGH I have now said all on the treatment of dyspepsia, that comes strictly within the plan of the present volume, yet there are two symptoms, oftentimes very troublesome, and for the relief of which much may be accomplished by a proper management on the part of the individual, concerning which a few brief remarks in conclusion may not be unuseful. I allude to constipation and heart-burn.

Habit exercising a very marked influence upon the regularity of the bowels, periodical observances in respect to them are of important consideration. In dyspepsia, a daily dejection is commonly requisite, and such will be the more certainly insured by appropriating to it a particular period. Much may also be effected toward subduing a costive habit by a judicious choice of diet. Thus, bread made of unbolted wheat, or of a mixture of rye and wheat flour, should be selected. Two or three figs, or a few prunes, if the stomach will bear them, may be occasionally eaten with advantage. To the laxative influence of the fresh subacid fruits I

have already alluded. Molasses has also mild laxative properties, and is hence oftentimes used advantageously in the diet of those who suffer much from constipation. When candied it becomes more digestible, being far less apt to pass into the acetous fermentation in the stomach, than when raw.

A natural passage from the bowels will generally be favored by rising early in the morning, taking a draught of pure water, and then, previous to breakfast, walking a short time in the fresh air. Lying late in bed is very apt to aggravate constipation. By a cautious management of this sort, the necessity of resorting to active cathartic medicines will often be escaped, which is particularly desirable, since the relief afforded by these is mostly transient, and their ultimate tendency is to aggravate the evil they are designed to correct. That these medicines are never demanded I would by no means assert, but they certainly should be employed as rarely as possible, and only to such extent as to accomplish the purpose in view. Active cathartics are very seldom required in the present malady, except to subdue incidental symptoms, and then can be safely employed only under the immediate direction of a physician. Many of the patent cathartic pills in common use comprise mercury, antimony, and other energetic ingredients, and hence, though perhaps affording temporary relief, their final result is to impair still further the health of digestion.

Cathartic medicines, when there is a necessity for their employment in dyspepsia, should be so managed that in their effects they may imitate as nearly as possible the natural action of the bowels. Thus, taken in minute quantities with the food, and often repeated, they will usually in a little while accomplish the desired purpose; and when the bowels are once brought into a free state, unless the tendency to constipation is quite obstinate, a very slight cathartic influence daily renewed, in union with a proper regulation of the diet, will be sufficient to continue them in it. The advantage in taking these substances with the food is, that by becoming blended with and diffused through it, less irritation is experienced from them by the stomach.

Heart-burn being, in the greater proportion of cases, dependent upon an excess of acid, alkalies are generally its most effective remedy. These unite chemically with the superabundant acid, and a mild neutral salt is the result. When too the affection is owing to the irritation of fatty aliments which have become rancid in the stomach, the same remedy will likewise tend to alleviate it by combining with them and forming a comparatively bland saponaceous compound.

Carbonate of soda, or the common soda of the shops, is one of the mildest and least unpleasant alkalies, and hence is very commonly employed in heart-burn. When there is an excess of acid in the stomach, its use will be followed by an extri-

cation of carbonic acid gas, which, if the organ be not too delicate to bear the distension, will act as an agreeable stimulus to it.

Other alkalies and alkaline earths are also used with similar results. Magnesia possessing mild laxative qualities, may be advantageously employed in heart-burn when occurring in those of constipated habits. Finely powdered, and purified charcoal, taken four or five times a day in the dose of a small spoonful, will oftentimes act as a palliative of the symptom under notice. This substance may also be useful in other points of view, serving in a degree to correct the unnatural fermentation in the food, and consequently the acrid and putrid eructations, and the offensive odor of the breath so frequently connected with indigestion.

Some of the mild subacid fruits, as likewise the mineralacids, will manytimes afford relief in heart-burn, even when it arises from morbid acidity; which effect may be explained on the supposition that they promote the natural function of the stomach, and thus enable it to resist those chemical changes in the food which are the common cause of this disagreeable affection.

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