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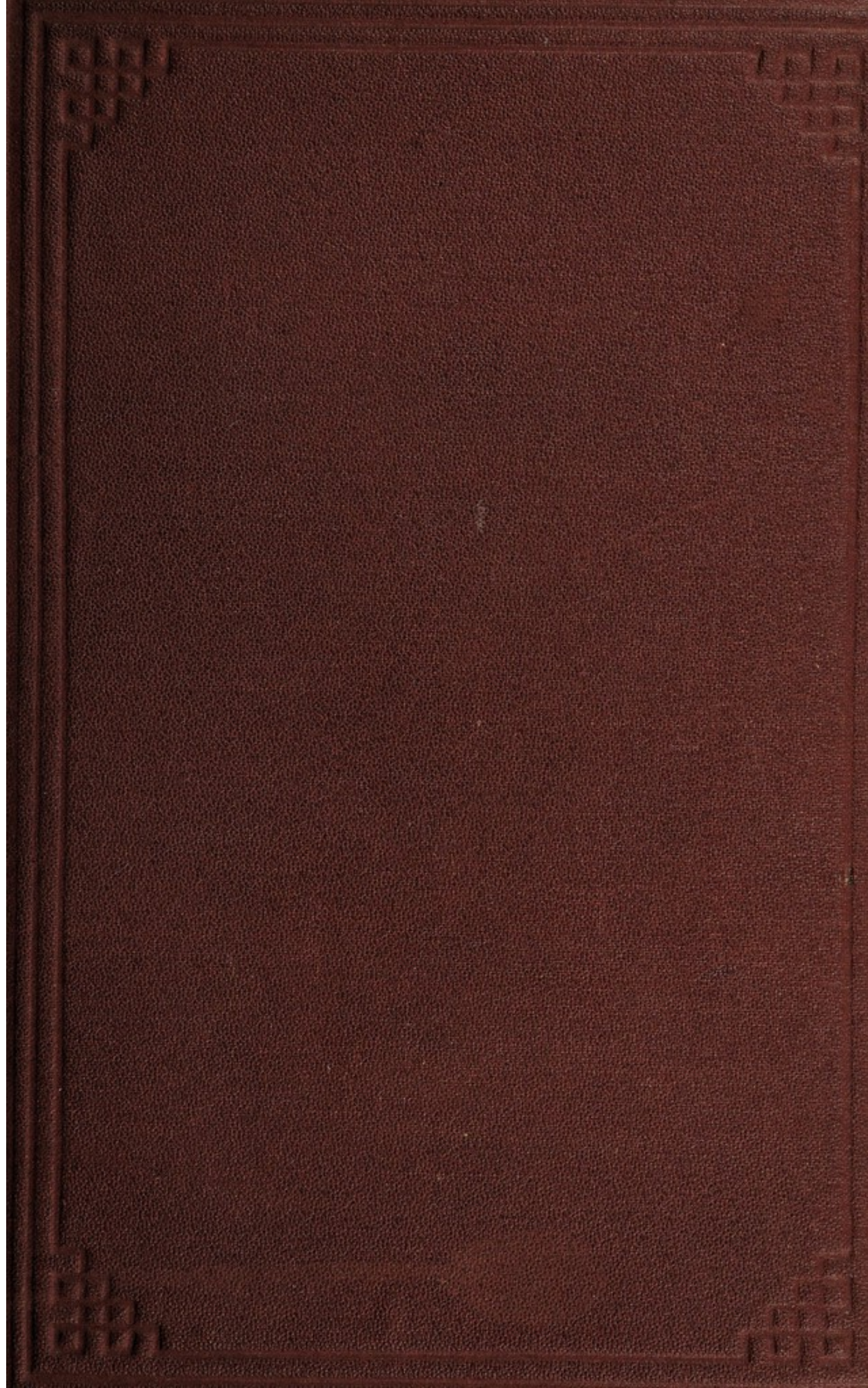
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ON
DISEASES OF THE STOMACH,
THE VARIETIES OF
DYSPEPSIA,
THEIR DIAGNOSIS AND TREATMENT.

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P R E F A C E.

IT is now ten years since I published some "Pathological and Practical Observations on Diseases of the Abdomen," a work in which I detailed the examination and investigation of numerous instances of disease; but it has since been intimated to me, that my own experience, without these pathological observations, would be useful to the practitioner, and in the present small volume, the result of many years of experience in hospital, as well as in private practice, is placed before the notice of my readers.

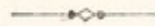
There are some truths which are continually impressed upon the mind of the physician, and perhaps none more forcibly than the importance of endeavouring to *cure the patient*, rather than of merely seeking to *treat the disease*. There is an unity of morbid, as well as of healthy action in the living organism, for one part cannot be affected without the sympathy of the whole; and thus, whilst the present work is exclusively devoted

to some clinical observations upon gastric disease in its various forms, we have sought to regard it in its general relation to other parts of the system.

The careful analysis of individual cases leads us spontaneously to follow that mode of grouping, which is both truthful in its character, and useful for diagnosis and treatment; and the experience of the author has led him thus to classify those forms of disease, which are naturally associated together.

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ON
DISEASES OF THE STOMACH.

THE VARIETIES OF DYSPEPSIA: THEIR DIAGNOSIS AND
TREATMENT.

ALTHOUGH nearly every year new works have appeared on diseases of the stomach, still the maladies affecting this organ are so numerous, and of a character so diversified, that there is ample scope for the records of individual experience. It is not my intention to enter into the scientific and pathological bearings of gastric disease; this I have already done to a great extent in my former work on 'Diseases of the Abdomen.' My object in the following pages is rather to direct attention to the practical consideration of the subject, and to those divisions of a common disease which are brought under the daily notice of the physician. The opinions advanced are based upon facts educed in the clinical study of disease; and, if it had been thought desirable numerous instances might have been appended in support of every statement: we have preferred simply

recording the result of our own experience, leaving each one to test by individual practice the correctness of our deductions.

The organisation of the human frame is so nicely and delicately adjusted that every part maintains its harmonious relation to the whole ; and, if the attention is called at any time to the performance of any of its functions, we may rest assured that the healthy state is disturbed, and that disease in some form, however mild, has already commenced, and demands the attention of the physician. Healthy digestion is performed unconsciously ; and the physical movements, the chemical solution, and the subsequent absorption produce no sensory phenomena. The replenishment of the natural wants of the system excites a consciousness of healthy vigour, and of capacity for new exertion ; and, as exercise produces waste, the demand for fresh material, by which the deficiency may be restored, is expressed by a healthy hunger, and by a thirst which is soon satisfied.

It is the function of the stomach to carry on the work of digestion ; therefore, when *indigestion* arises we must trace it to some cause by which this natural process is impeded. To enumerate *all* the *causes* of dyspepsia we must trace the daily life of an individual from earliest years to advanced age ; and not only must we note the external and physical conditions, but the subtle workings of the mind amidst its joys and sorrows, its

gratifications and disappointments, its corroding cares and its seasons of buoyant happiness, its thirst for sensual enjoyment, as well as its highly intellectual pursuits. Were we to depict all the *varieties* of dyspepsia, we must comprehend every form from the trifling malady, which may scarcely be regarded, to those which are so severe as to rob life of its enjoyment; and even the same *symptoms* may in the one case be a mere temporary disturbance, and in the other they may indicate the commencement of serious organic disease; and, still further, the *measures* available in the *treatment* of these multifarious complaints are even more comprehensive than the symptoms; and were we to enter upon a minute detail of the whole subject, we must include the rules of hygiene, as well as those of therapeutical practice; for the diet and the clothing, the exercise and rest, the air we breathe and the water we drink are most important; and not less essential are mental rest and discipline in their effects on the physical organism. A full description of these remedial measures would lead us beyond our intended space, and we must content ourselves with general indications concerning them, still bearing in mind the fact, that they should never be placed in a position subordinate to the mere administration of medicinal substances.

As dysphagia indicates impaired action of the oesophagus, so dyspepsia is a term applied to corresponding defect in the stomach; and as the varieties of

dysphagia comprise the diseases of the œsophagus, so the forms of dyspepsia include the maladies of the stomach. The want of gastric power cannot however always be designated dyspepsia, for during the paroxysms of fever, as well as in the exhaustion of chronic disease, the stomach fails in common with every other part, and the local sign is almost disregarded in the general affection. We are fully aware of the danger attached to the special study of one class of disease; and we must ever be on our guard, lest in directing attention to the local symptoms we overlook the constitutional character of the malady.

In my former work on 'Diseases of the Abdomen' I arranged these affections of the stomach according to the physiological divisions, by referring to the various parts implicated, and then considered them in the following order:—1st. The dyspepsia arising from disorder of the mucous membrane of the stomach and its secretion; 2nd. That arising from the muscular movements of the stomach being impeded; 3rd. From an abnormal state of the vascular supply; 4th. From changes in the condition of the nervous system; and lastly from improper diet, or from chemical decomposition taking place during the digestive process. My present intention is to enter into a more minute consideration of the varieties of the disease as observed in daily practice.

The first that we shall notice is dyspepsia from

weakness, whether from general imperfect nutrition and diseased vessels, or from exhaustion of the cerebro-spinal nervous system, or from failure of the nerve of organic life ; atonic dyspepsia, as it might aptly be termed.

2nd. Dyspepsia from congestion, as observed in chronic disease of the lungs, heart, and bronchi, and also in chronic disease of the liver.

3rd. Inflammatory dyspepsia, whether arising from irritants, excesses, or improper diet.

4th. Hepatic dyspepsia, or “ bilious indigestion.”

5th. Rheumatic and gouty dyspepsia.

6th. The dyspepsia connected with disease of the kidney.

In the varieties of dyspepsia thus alluded to, the mucous membrane and its secretions are especially affected, there being either deficiency or excess in the gastric juice, or its character being changed by defective secondary assimilation or continued congestion.

We shall then describe,

7th. Dyspepsia from mechanical interference with the muscular movements of the stomach.

8th. Nervous or sympathetic dyspepsia.

9th. Dyspepsia from fermentation of, or chemical change in, the contents of the stomach, and,

10th. Duodenal dyspepsia.

Still further we shall refer to it as a symptom of more serious organic diseases, as ulceration and cancer.

In the earlier stages of these diseases the only indications of abnormal action are of a functional character, and a correct prognosis then requires the closest investigation, and a full knowledge of disease in all its relations.

CHAPTER I.

ON THE CHANGES OF DIGESTION AT DIFFERENT PERIODS
AND CONDITIONS OF LIFE.

THE phenomenon of life does not present an unvarying series of actions, nor the constant repetition of the same living functions performed in an identical manner; but we find in vegetable, as in animal life, that there are stages of existence and phases of development ever changing and progressive in their action.

In the first germ of the seed plant there is living growth of a peculiar kind, namely, the gradual formation of the germ leaf, the cotyledon, and of the rudimentary root; and, at the same time, a supply of nutriment is stored up for the period of independent and separate existence; there is a vitality in the seed which may exist for an almost indefinite period, till, by the application of the needed stimulus, fresh changes take place of an entirely different character in connection with the sprouting of the seed; then, for a time, another stage of vegetable life follows, that of growth and development. But, with the growth of the plant there are cyclical changes daily and hourly evolved, and in those plants of an exogenous kind each

year witnesses remarkable variations, for the leaves, having fulfilled their purpose, their circulation becoming occluded, they fade and fall; but on returning spring the old stock is not in the same condition as before, for the past year had left its trace; so with each yearly cycle, till at length more general decay occurs, and the old weather-beaten stock, that has withstood the stormy blasts of many a winter, succumbs and dies.

With equal distinctness of demarcation do we find that human life has its stages; we have infancy and youth, succeeded by manhood in its strength and prime, and then the gradual fading of the powers, first the physical, and then the intellectual; but the differences impressed upon the whole organism at these respective periods are accompanied with a physical state also changing, and the one is dependent upon the other. A child, with its freshness of thought, the wildness of its imagination, and the quickness of its new powers, has a brain structurally differing from that of the old man, with his maturer thoughts, and his calmer reason, whose brain is acted upon by the impressions stored up in the memory, rather than by new objective observations. The elasticity of the youthful step, and the enjoyment of vigorous exercise, are marks of strength of lung, and power of circulation, which an octogenarian does not possess; and *not less apparent* are the functional peculiarities of digestion during the different periods of life.

During the earlier months there is the greatest activity in all the functions of life, the nervous system is very easily disturbed, the muscles are readily excited to contraction and convulsive movement; the respiration is more hurried, and the heart beats with greater frequency, 130 to 140 as compared with 60 to 80 of adult life; the temperature of the body is more variable, and there is less ability to resist sudden changes.

The helplessness of infancy, and its entire dependence on the fostering care of others, is connected with a delicacy and sensibility in the organism, which is easily acted upon, and is adapted only for peculiar conditions. The physical organisation of an infant is designed for fluid food, and for its reception in a particular manner, namely, by suction; although destitute at first of teeth, the muscular development of the mouth is sufficiently complete, and the clavicle, more ossified than any other bone, serves as the support for the arms and hands, which are secondary helps in the process.

An infant is only able to digest substances of the simplest kind; and milk, the natural form of diet, is best suited for its wants. Milk not only contains hydrocarbonates, the oily part or cream, and sugar, also a heat-supplying material, but a large quantity of nitrogenous substance, the casein, and in proportion as the diet approaches this standard, is it suited for its especial purpose. Mere starchy food, such as arrowroot, rice,

the ordinary corn-flour (washed maize), only contain one ingredient of the infant's food, and are not sufficient to maintain health and to promote growth. Dr. Edward Smith in his work on 'Cyclical changes during health and disease,' has well shewn, that during infant life "there is the maximum of oxidation of the elements of nutrition, and the maximum of highly organised food supplied;" and assuming three pints of milk as the quantity taken by an infant, he estimates that the food taken is, in proportion to the weight of the body, three to six times greater than that taken by adults. A method could scarcely be conceived fraught with greater mischief to infant life and health, than the administration of hard and solid food, especially when stimulating drinks are added. Too often do we find that great irritability of the mucous membrane of the stomach and other parts of the alimentary tract is set up by injudicious diet. Vomiting and diarrhoea, feverish and convulsive symptoms, fretfulness and peevishness, wasting and general exhaustion, are found to follow these gross departures from the rules which have been naturally laid down for infant life. Another peculiarity of infant requirement is that the supplies of nutriment must be frequently given. A healthy vigorous infant should be fed every two or three hours, and if there be weakness or exhaustion, the period must be lessened to intervals of an hour, or even one quarter of an hour. It is a mistake even during the hours of night to allow

a very young infant to sleep too long without food. In the absence of the mother's milk, the ordinary substitute is cow's milk, with one-third of water, and a small quantity of white sugar; if the mucous membrane be very sensitive, ass's milk is often a better substitute; and as the child passes from month to month, its food should be thickened by the addition of some cereal grain; the best are the preparations from wheaten flour, "tops and bottoms," Robb's biscuits, dried flour, biscuit-powder, &c., but, however the food may be prepared, it is essential that it be free from any hard portions, which would be less easily acted upon by the digestive organs. If too long an interval is allowed to elapse, then a greater quantity is given at one time than can be easily digested; for although digestion is more active than at any other period of life, it is more easily disturbed; food is also absorbed with greater rapidity, and the eliminated products, as urea, are excreted in larger proportionate quantity; but if, on the contrary, the process be checked, rapid prostration and emaciation ensue, and in a few hours infant life may thus be reduced to its lowest ebb.

Many of the preparations sold as infants' food are destitute of its most important ingredient, and consist merely of starch. This is insufficient for healthy growth, and unless a large quantity of milk be added to supply the deficiency, the health is impaired. So sensitive, indeed, is the infant organism, that after a

few hours of severe diarrhoea, an infant becomes cold and almost pulseless, its countenance is haggard and wasted, its muscles are flabby and soft, and unless the cause of exhaustion be checked life will quickly cease; the passage of coagulated milk through the pylorus will sometimes suddenly produce collapse, resembling that which follows the administration of an irritant poison. Again, a few doses of an exhausting remedy, such as tartar emetic, will render an infant pale and prostrate, and in not a few instances it will destroy life; for, although the vaso-motor nerve is more active than at any other period, its power more quickly ceases. The same excessive irritability is found in the cerebro-spinal system of nerves; thus, a small dose of a narcotic such as opium suffices to induce fatal convulsions; and just as a child walking alone more easily falls when the foot trips, because the height of its centre of gravity is less, and the radius of the circle described by that height as a radius, is smaller, so the circle of the living functions in an infant is also smaller, but performed with more rapidity, and with greater facility are those cyclical movements disturbed in their course.

The condition of the glands connected both with primary and secondary assimilation are undergoing remarkable changes during the earlier years of life. The liver, a gland notoriously connected with the digestive process, is relatively much larger during infant life than at a subsequent period; before birth its

proportional weight to the rest of the body is said to be as 1 to 18, and at about four or five years of age it attains the proportion which is afterwards maintained, that of 1 to 36. The mesenteric glands are very large and distinct; they are more vascular than at any other period of life, and their function appears to be connected with the elaboration of the chylous fluid after absorption by the lacteal vessels, and prior to its discharge into the blood. If a non-nutritious diet be administered, low organised or strumous product is very prone to occur in these parts, and the same result is found if the system be exhausted from other causes. Again, stimulants and irritating food so disorder the mucous membrane, that acute hyperæmia in these mesenteric glands quickly follows. They may even be felt through the abdominal parietes, and when diarrhœa and general exhaustion exist at the same time, the malady is very apt to be mistaken for organic and incurable "tabes;" and although the enlargement may be merely hyperæmic, there is great liability to the deposition of inorganic product of a strumous kind. If health be restored, the old diseased glands will be found in subsequent years as a semi-cretaceous mass.

In *youth*, whilst growth is rapidly advancing, the digestive organs are taxed to furnish materials, not only to maintain ordinary wear and tear, but to supply that which is needed for additions to the frame; and if the blood be rendered unhealthy, and growth

impeded, then, there is a greater tendency to the deposition of strumous product, and all its attendant degenerative changes. Many instances of consumption have arisen from the nourishment during months of residence at school being of an improper kind, or so unsuited to the taste, that it was altogether refused; functional integrity soon becomes disturbed, growth is defective, and low organised deposit takes place under a very slight exciting cause. A large quantity of suitable nourishment is essential at this period for the natural activity of youth and the healthy development of the frame, as much as the system can digest and assimilate; whilst stimulants, and a diet which panders to the appetite rather than supplies requisite material for the growing organism, should be avoided.

In an ordinary state of health malt liquors and wine are both unnecessary and injurious; and if the system be exhausted by disease, more than usual care is required in their administration.

During the strength of *manhood* there is less energy, but greater uniformity in the process of digestion. The development of the system has attained its maximum, and the functional activity is less powerful than during infancy and youth, but more so than in the declining steps of advancing years. The lungs are fully developed, and the larger quantity of air inspired, and of carbonic acid exhaled, indicate a condition of system capable of bearing vicissitudes of temperature more easily. Longer

intervals suffice to elapse between the meals, and larger quantities are taken. Dr. Edward Smith has educed some very interesting facts, especially bearing upon digestion in ordinary adult life, that, "in the morning hours digestion and assimilation are performed in their most natural and therefore most healthful manner, and that period especially demands an abundant supply of nutriment;" and to quote again from the same talented author, "that the rate of pulsation and respiration, and the evolution of carbonic acid were found to be the greatest in one or two hours after breakfast, and at about four or five hours after the meal it was reduced to the lowest point of the working day, a point about ten pulsations higher than that of the lowest period of the night." But although digestion is more active at the earlier part of the day, and least so in the evening, still it is an unwise plan for those who are engaged in pursuits involving much intellectual and physical fatigue, to allow the whole afternoon and evening to elapse without partaking of some sustaining diet; it is not sufficient to take a substantial mid-day meal, without anything of a really nourishing kind afterwards, for the sleep is less refreshing, in consequence of greater exhaustion during the night. The processes of digestion are often, and that very properly, lost sight of, and doubtless much irregularity and indiscretion are borne with impunity, still, the penalty is afterwards paid; irregularity and excess cannot be continued without future

detriment; and many of the forms of severe dyspepsia are produced and perpetuated by inattention to the simplest rules of diet or regimen.

The quantity of food required by the system ranges from twenty-two to forty or even forty-five ounces of solid food, and eighty to ninety-five ounces of fluid. The solid part must contain albuminous substances, fatty substances, also carbo-hydrates and salts, the second and third forms being especially used in the system for maintaining animal heat. Still these alone will not suffice, unless some fresh vegetable food or fruit be commingled; and we frequently find that disease is caused or aggravated by the avoidance of vegetable diet altogether. This fact we have often witnessed in those who from actual or supposed weakness of the stomach refrain from all fresh vegetable substances, as requiring greater digestive power.

Dr. Parkes in his work on 'Hygiene,' quoting from Moleschott, gives the following table, as showing "the water and food required daily for a working man of average height and weight;" but in those who take more generous diet, the albuminous and fatty substances may be half as much more:

	Grammes.				Ounces avoir.			
Albuminous substances ..	130	..	..	..	4.587			
Fatty	84	..	..	..	2.964			
Carbo-hydrates.. ..	404	..	..	..	14.257			
Salts	30	..	..	..	1.058			
	648				22.866			
Water	2800	..	..	..	98.580			
	<u>3448</u>				<u>121.446</u>			

and again, that 104 grains of nitrogenous substances equal to 3·671 ounces is the lowest amount a working man ought to have. The least amount for active life, according to Dr. Parkes, is 1·4 to 1·5 ounces of dry nitrogenous substance, but with this weight and strength are lost.

Still the quantity and even the quality may be all that is desired by the physiological chemist, but the stomach may refuse to receive it, or to deal with it in a friendly manner, because the palate is offended, and the sameness and character of the diet is opposed to the tastes and wishes of the patient; the idiosyncracies of diet are best known to individuals themselves, and in abnormal states of disease these peculiarities become marked with increasing distinctness.

In advanced years the activity of life gradually lessens, and the physical organisation presents corresponding change. The arterial vessels which carry the supply to every gland gradually become opaque and rigid; the glands themselves waste, and are comparatively inactive; and although the higher powers of mind and thought may remain still in their full strength, it is impossible to hide the habiliments of age. The drier and more shrivelled aspect of the skin is an indication that the minute sudoriferous glands are inactive; and, the mucous membrane of the alimentary tract, a mere inversion of the external investment, is likewise wasted, it becomes much thinner, its glands smaller, and in fact,

the mesenteric glands are with some difficulty found; the same mesenteric glands, which during earlier life are so essential in the elaboration of the chyle, before it is poured into the blood. The digestive process is feebler during advanced life than at any previous period; and this lessened functional power is accompanied with an inability to take the same vigorous exercise as formerly. During the strength of earlier life, when the respiratory act was in its full energy, it would seem that effête materials could be rapidly removed, and at the same time warmth and heat maintained; in age, the cycle of functional life slowly revolves, till it ceases altogether, or is stopped by the slightest impediment.

The actual condition of the stomach itself in its atrophied glands expresses the fact of lessened power; the muscular coat is often wasted, unless there be some impediment to the passage of food at the pylorus or elsewhere, when the increased power required is followed by hypertrophy. There is a marked contrast in the condition of the involuntary fibre of the alimentary tract in early and advanced life; in the *former* period contraction is readily induced, and the stomach at once empties itself by vomiting; so also the intestines hurry on their contents, producing diarrhoea, and muscular contraction will even impel one part of the intestine into another, causing intussusception; in the *latter* period, flatulent distension takes place from the lessened contractive power; and the distension becomes a cause of

constipation, dyspepsia, and of general distress. The sacculi of the colon and the appendicæ epiploicæ become enlarged, and unable to empty themselves, and concretions form in the bowel, although natural relief may take place daily.

The mucous membrane is more vascular, the valvulæ conniventes and villi of the intestines are in their full activity in early life; but in age, the arteries are diseased, the circulation sluggish, and the absorbent system wasted and comparatively inactive. We find, also, that in age the pancreas has a larger quantity of fibroid tissue, as another indication of ceasing energy. The liver and kidneys undergo like changes; and still further, in the examination of the large central ganglia of the sympathetic, there is a manifest difference in the appearance of the cells at the extremes of life, for in old age the cells are dark, and often loaded with pigment, as if the vital mechanism were gradually coming to a state of rest. This diminished energy requires that the supply of food should be more constant, and that long intervals should not elapse: it is often noticed that headache, disturbed vision, and symptoms resembling threatening apoplexy or paralysis, arise from an insufficient nutrient supply; and the mistake is sometimes made of exhausting by powerful purgatives, mercurials, or even actual depletion, when ammonia or stimulants would be more appropriate.

Some of those who have attained to advanced age are

very unwilling to depart from the habits of earlier years; it is with them very important that, during the hours of the night some bland nutriment should be taken, if there be wakefulness; and although late heavy meals are very undesirable, still the exhaustion of the night hours are often followed by impeded circulation and faintness. It is thus, that the heart, during the night, not very rarely ceases in its action altogether; and the man who had retired to rest without any consciousness of danger is found in the morning lifeless. It is equally injurious so to excite and oppress the system by improper diet and stimulant, as to endanger the integrity of the minute ossified vessels of the brain, and thus cause an apoplectic attack.

In advanced life sudden changes and excitement are borne with great difficulty, and as in the earlier years, exhaustion is easily induced; with steady and slow pace the revolutions of functional work may move on, but with any violence to the system the powers of life will cease altogether.

In old age, as in infancy, we find that some remedies must be used with great caution, thus mercurials and powerful purgatives more easily cause great depression; and it would seem that opium will so act upon the urino-genital organs, as to produce retention of urine.

The atrophied condition of the glandular organs connected with the stomach, to which we have already

referred, and the weakened digestive power, render the use of condiments sometimes of great service, and the stimulating effect of wine rightly administered assists in the maintenance of health. These agents, which in infant life irritate and disturb, now give that additional stimulus which the fading powers of life require.

There are some conditions of ordinary life which require notice, for the digestive process is in them strangely modified; and the whole system sympathizes with the important processes that are being carried on, we refer to pregnancy and to lactation. The former state induces remarkable change in the vaso-motor or sympathetic nerve of the abdomen; there is the closest union between the uterus and the stomach; a state of irritability is frequently induced, so that the stomach rejects its ordinary supply, and it does so especially in the morning, the period at which digestion is generally most active. This irritability of the gastric surface is sometimes so severe that all food is rejected quite independent of mere pressure on the viscus; the months of gestation are periods of wearisomeness and distress; the gastric disturbance, however, at once ceases on delivery. In some cases the disturbance of the stomach has been referred to the secretion from the kidney becoming disordered and changed, and this, in some instances, is doubtless an aggravation of the symptom. Again, direct pressure greatly increases the distress of this kind, but neither of these conditions suffice to explain the state

we refer to ; it would seem as if the large nerve ganglia supplying the abdominal viscera were disturbed by the greater energy of the uterine plexus. Again, there are those in whom conception at once removes all symptom of indigestion ; so that pain and flatulence, which for many months previously have induced indisposition, are no longer felt, and there is the enjoyment of health and strength not experienced at other times. Unfortunately in some of these instances one trouble returns as soon as the other trouble is over, and before physical strength has been thoroughly regained, the digestive process is again impaired ; the uterine activity of function seems to induce equable and healthy action of the stomach.

But, although there may be irritability of the stomach, digestion is often sufficiently active, and the symptoms are actually relieved by partaking of nourishment. It would seem as if the gastric juice were secreted in excess, for the sickness and heartburn, &c. may be relieved by a little bread or biscuit. These facts tend to shew that the closest sympathy exists between the stomach and the uterus.

Care should be taken as to the diet at this time ; nourishment without excess, especially in stimulating beverages, is more likely to be followed by healthy and vigorous offspring, and by the more easy completion and recovery from parturition itself.

After delivery, the digestive process soon becomes more than usually active ; and skilful accoucheurs of the

present day have ceased to follow the starvation system, as if child-bearing were a state of active disease. In most instances, however, it is well not to excite the system by a too generous diet, nor by stimulants, whilst absolute rest of mind and body is the state most conducive to speedy restoration. The activity of digestion during lactation is often very remarkable, and a generous diet is to many persons essential, if nursing is to continue.

Although too much stress has sometimes been laid upon substances as likely to be injurious to the newborn babe if partaken of by the mother, there is no doubt that the milk is very quickly changed by both food and medicine, and the infant may be in this way influenced beneficially or otherwise. As to medicines, saline aperients taken by the mother become absorbed into her blood, and enter the milk, the infant thereby suffering pain and diarrhoea. Opium is said also to influence the child, but this has doubtless been exaggerated. In an instance of a lady a few weeks after confinement to whom the hyposulphite of soda had been given in solution to relieve excessive flatulence, the medicine, in itself nearly tasteless, soon showed its character by producing sulphurous eructation, so that the mother maintained she had taken sulphur, and the infant suffered griping pain and vomiting, the vomited milk also smelling of sulphur. Numerous instances might be adduced to show how easily the infant is

thus affected, although the parent might be quite unconscious of any disturbance in her own system.

Each period of life has its own peculiarity stamped upon it, and when the natural rules of health are broken through, the result is soon experienced in a general disturbance of the system. These periods may be regarded as climacteric in their character; gradually the boundary lines are passed as years revolve, and each succeeding step is attained. The term climacteric is often especially made to that time in female life when menstruation ceases. Andral and Gavarret have stated that the carbonic acid evolved during the catamenial years remains the same, and on the cessation that there is for a time a slight increase of carbonic acid evolved. However this may be, there is no doubt that a marked change in the system takes place, and symptoms are produced due to this organic alteration. The gastro-intestinal tract sympathizes in the changes as well as the nervous and circulatory functions: headache, sense of oppression, flushes of heat, throbbing of the heart, sometimes irritability of the stomach and bowels, are often induced. The time ranges from 45 to about 53, and imperceptibly passes into a condition of more uniform health; then for several years an almost stationary condition is attained, gradually passing into the period of old age.

In men the commencement of old age is oftentimes marked by indications of change that have also received

the name climacteric, but commencing at a somewhat later period, 53 to 60 or from 56 to 63—a time of unsettled health—at the close of which a sort of equilibrium is again attained, unless organic disease have already sapped the remaining strength.

CHAPTER II.

ON THE GENERAL SYMPATHY OF THE STOMACH IN DISEASE.

IT is the tendency of the clinical study of any isolated class of diseases, or of the affections of any particular organ, to exclude the consideration of other portions of the body, as if one part could be separated from the other. The nervous system is so connected with every individual structure that it sympathizes with changes in them, and may be thrown into a state of general disturbance by a comparatively trifling injury. The important function of respiration becomes affected when there is general febrile excitement; and in some functional diseases of the nervous system the respiration becomes as rapid as the pulse. Again, the central organ of the circulation, the heart, is equally susceptible of changes induced by sympathy with other structures; but it is not the mere fact of organic and functional sympathy to which we would draw attention, but to the equally important fact that the sympathy of one part with another is *not equally* intimate. This truth will be more apparent if we consider what is meant by this term of sympathy, and what are some of those means by which in the human frame it is brought about. By the word sympathy we mean

that an organ of the body may become functionally disturbed by irritation of a structure external to itself: in this way severe pain and abnormal sensation may be induced in parts far removed from the original seat of disturbance. This sympathy will be generally found to be regulated by one of three things,—1st, it is in proportion to the direct nervous connection of one part with another; 2nd, it is in proportion to the connection of function; 3rd, it is in proportion to the mutual dependence of one organ on another for its vascular supply.

Amongst these sympathetic affections arising from *disease of the stomach*, we will first notice disturbances in the *cerebro-spinal system*, and these sympathetic symptoms may be arranged as follows:—

Affections of the cerebrum, by which the mind, the memory, and the perceptions are changed.

Of the senses, so that the sight is perverted, the hearing disturbed, the smell changed, taste rendered unnatural, and ordinary feeling altered from its normal condition.

Of the spinal system, so that irregular muscular movements are produced by gastric irritation.

Affections of the cranial and spinal nerves, inducing pain or numbness in the head itself.

The mind is dependent for the fulfilment of its ordinary phenomena upon the functional integrity of other parts. The organism by which the mind operates

is easily disturbed, and it has long been acknowledged that the stomach easily affects thought and judgment, reason and memory. Whilst digestion is going on the mind is less active, whether the effect be due to a larger quantity of blood being sent to the stomach, or to the blood being altered by the influx of new material; and in states of exhaustion, the slight additional disturbance to the vaso-motor and cerebro-spinal system of nerves, is sufficient to induce a sense of faintness or of actual syncope. If the contents of the stomach be difficult of solution, or of a too stimulating character, these cerebral modifications are still more manifest; and if such be the case in ordinary health, during dyspepsia the faculties of the mind become more evidently disturbed. Mental oppression, and an inability to exert thought with the ordinary energy, is a common symptom, and the powers of reason and judgment often become perverted. The hypochondriac sees everything under an erroneous aspect, and forms his judgment accordingly. The manner in which the *Senses* are disordered by gastric disturbance is very remarkable. The functional alterations of the sight are not always identical. There may be a general haziness, but more frequently sight is perverted by irregular vision or partial obscurity, so that only part of an object is discerned, or irregular zigzag lines are noticed, or spots of an object become quite indistinct, or half a word is discerned; again, sparks of light may be perceived, or

even the colour modified. To some patients one or other form of disturbed vision is the certain effect of disordered digestion, and the kind of attack is recognised by the character of perverted visual phenomenon.

Some care is however required, lest the symptoms of commencing organic disease of the eye—such as the various forms of amaurosis—be ascribed simply to mal-assimilation. We have known instances where most valuable time was in this way lost, and measures which might have greatly retarded the organic changes in the retina needlessly postponed, till irreparable mischief was done.

The sense of *hearing* is not less easily disturbed, and the perception is either generally diminished and partial deafness induced, or there is noise in the ears of various kinds and degrees,—singing or whistling, humming or droning, the noise of bells, of steam, of falling water, &c. These symptoms sometimes become extremely distressing, but are frequently of a purely functional character, and, although not the only cause, the stomach is often greatly at fault in these cases. States of anæmia, and exhaustion, and organic disease of the ear itself, must be regarded in an altogether distinct category.

The sense of *smell* is less easily recognised as undergoing change from stomach disturbance; and the sense of *taste* is perverted oftentimes in a direct manner by change in the buccal secretions; thus, during indi-

gestion, the natural alkalinity of the saliva is lessened, and patients often complain of a sour or bitter taste in the mouth. But beside these, there are other changes more directly affecting the gustatory nerve; substances are said to taste differently, and this sense is sometimes almost benumbed.

The sense of *touch* and ordinary feeling is often strangely implicated in functional disease of the stomach. Thus in many cases a general extreme irritability of the cutaneous nerves is induced, or especially the nerves supplying the palm of the hand and the sole of the foot; but beside these there are local affections arising from gastric disturbance of a sympathetic kind, but probably due to direct nervous connection; the little and ring fingers become painful and hyperæsthetic in indigestion. This affection is probably due to the closer connection of the sympathetic nerve with the ulnar, which supplies those fingers, rather than with the median; a local pain, about one inch in superficial extent, is often complained of below the left mamma, and this is to be attributed to the splanchnic nerves—which are the large nerves of the semilunar ganglion, and thus connected with the stomach—having their origin from the lower dorsal nerves, commencing with the 5th or 6th, which same dorsal nerves send sensitive branches below the breast. Again, the sense of oppression and weight across the chest in indigestion is of a sympathetic kind, and is

explained in a similar manner. But not only do we find hyperæsthesia induced thus sympathetically in gastric disease, but actual anæsthesia, so that the fingers may become transiently benumbed.

Other parts of the nervous system are intimately connected with the stomach. We have already referred to hyperæsthesia, local or general, and to conditions which might be mistaken for commencing paralysis; but still more grave sympathies are found, especially in young subjects, or those in whom the nervous system is easily disordered. Crude semi-digested food in the stomach has often been the exciting cause of violent convulsions in children: it would seem, as if the connection was so intimate, that the peripheral irritation in the stomach sufficed to produce the most severe convulsive movements of a general kind, even epileptiform in their character.

Of a distinctive kind, but differing from the sympathetic affections already noticed, are the pains in the head, in the course of the branches of the 5th nerve, at the forehead or vertex, or in the lines of distribution of the branches of the 2nd and 3rd cervical nerves at the sides of the head and at the occiput. It is common enough to have severe frontal headache, as the effect of excess and consequent indigestion; but in numerous other instances pain in the head is induced, sometimes at the forehead, on one or other side, or centrally; in many cases of exhaustion, with feebleness of digestive

power, the pain is at the vertex; and in others, especially of a rheumatic and gouty character, the pain is at the occiput: when lateral it has been designated *hemicrania*; with some a sense of coldness of the head is induced.

It is a common symptom of *dyspepsia* to find abnormal sensibility in the branches of the 5th nerve, supplying the face, and the branches of the 1st division are more frequently affected than the others; thus itching of the nose, pain in the eye, &c., are familiar illustrations of the fact. As to the converse of these symptoms, numerous cerebral diseases induce gastric irritation and change. After concussion of the brain a very common symptom is violent vomiting, and some of the most irritable conditions of the stomach we have ever witnessed, have arisen from abscess in the brain.

In threatening *hydrocephalus* of children the stomach is often disturbed, and the dangerous, nay even fatal, mistake is made of considering a terrible disease as a trifling "*bilious attack*;" and when this inflammatory disease has become severe, it is often noticed that the least attempt to raise from the recumbent position is followed by violent vomiting. The same symptom is observed in strumous disease of the brain. Again, during the premonitory symptoms of *apoplexy*, especially in some of the more severe forms, vomiting comes on.

Another instance of this sympathetic connection between the brain and the stomach is shewn in mental disturbance and anxieties. Bad news will entirely destroy the appetite, and great mental distress places the digestive process almost in complete abeyance. In mania the appetite is changed, digestion altered, the bowels confined, and sometimes the strangest substances swallowed.

The connection of the stomach with the lungs and heart may be regarded in a threefold aspect:—

1st. As it regards the entrance of nutriment into the system: if, from irritability or inability to receive the supply required for the maintenance of health and strength, the blood becomes 'impoverished, then a low organised product is more likely to form in the lungs or glands, as strumous tubercle, thus leading secondarily to phthisis.

2nd. In reference to the nerve supply to these several parts: the pneumogastric, one of the most important nerves in the body, from the character of the organs to which it is directed, is largely distributed, both to the stomach, the lungs, and the heart; and in addition to this, the connection of the large semilunar ganglia, which sends branches to the stomach and abdominal viscera, is a very intimate one with the pulmonary and cardiac ganglia of the vaso-motor nerve.

3rd. The action of these important structures, the lungs and heart, in the circulation of the blood, has a

direct effect on the function of digestion; for, if the course of the blood be impeded by disease of the lungs or heart, the portal system of vessels becomes necessarily congested, the secretion from the mucous membrane is changed, and digestion is embarrassed.

From one or other of these reasons we find that there is a very close sympathy of the stomach with the lungs and heart; thus indigestion frequently produces hurried breathing and dyspnœa, with dry cough; and as to the heart, the symptoms are often so distinctive, that it is difficult to convince patients that they are not suffering from organic disease; palpitation of the heart is thus induced, and irregularity, which greatly alarms the patient, and even faintness or actual syncope, if the heart be feeble. The converse symptoms are equally important, and early disease of the lungs, especially from peripheral irritation of the branches of the pneumogastric by miliary tubercles at the apex of the lung, is often accompanied by excessive irritability of the stomach, so that the practitioner may suppose that the stomach is at fault; the diminished nourishment increases the constitutional weakness, and thus leads to a rapid increase in the original disease; too often the mistake is made, "that it is all stomach," and many of the so-called cases of gastric phthisis are of this kind. In whooping-cough a similar connection between the stomach and the lungs is noticed, and the former becomes almost as irritable as the latter;

the spasmodic cough is very often accompanied by actual vomiting.

In chronic bronchitis, and in obstructive disease of the heart, whether from the state of the valves or the muscular tissue of the heart, gastric symptoms arise from the third cause mentioned, namely, from interference with the free circuit of the blood, and the consequent distension of the gastric veins. The capillaries of the stomach thus become intensely injected, a thick layer of catarrhal mucus is secreted, and digestion is greatly hindered.

In acute disease of the heart and of the pericardium the stomach sometimes becomes irritable.

The stomach is so closely connected with the liver in the function of digestion, that one organ can scarcely be seriously disordered, without the other becoming more or less implicated; but there are other conditions which shew the closest sympathy, independent of their functional connection. The violent vomiting that is induced by the passage of a gall stone is due, not only to the direct transmission of spasmodic contraction from the involuntary fibres of the duct to those of the stomach, but it also arises from the connection of the hepatic and gastric filaments by means of the pneumogastric and vaso-motor nerves.

In diseases of the kidney the gastric disturbance is susceptible of a two-fold explanation; in some forms of acute renal disease, as calculus, the violent vomiting is

from the connection of the renal nerves with the gastric; but in chronic Bright's disease of the kidney it has been shewn, that the secretions of the stomach become unusually irritating from the presence of urea.

In Addison's disease of the supra-renal capsules (*melasma supra renale*) irritability of the stomach is often present; and although, after death local irritation and superficial ulceration of the mucous membrane have often been detected, we regard the direct nervous connection as having the more important causative relation.

The sympathy of the stomach with the urino-genital organs is so well known that it scarcely needs comment; and this is due to the same nerve union, namely, the hypogastric plexus with the semilunar ganglia. Diseases of the bladder and prostate are often associated with gastric and general symptoms, due to the vasomotor nerve, as rigors, irritability of stomach, hiccough, &c.; and the changes in the uterus and ovaries are often marked by characteristic irritability; sometimes the extreme sensibility of the stomach continues during the whole period of utero-gestation, whilst in other cases digestion is performed more comfortably and effectively during gestation than at any other period. We have known all the symptoms of dyspepsia disappear as soon as conception has taken place, and they have remained in entire abeyance until parturition has been completed.

The lining membrane of the alimentary tract is continuous with the skin, and in one sense it is external to the living organism, so that the stomach and other parts of the intestinal canal have been spoken of as inversions of the external investment; the intimacy of their connection bears out that form of expression, although the union between the stomach and the skin does not require continuous irritation to explain the phenomena.

At the onset of nearly all the exanthems the stomach sympathizes, and vomiting is a common symptom. Thus the commencement of erysipelas, of small pox, of scarlet fever also, is often thus indicated; and equally distinct is the sympathy in *chronic* forms of cutaneous disease. How often do we find in lichen and in eczema that the gastric symptoms increase when the irritation of the surface is lessened; and in other conditions, disturbance of the stomach will greatly increase the cutaneous malady, thus in children, strophulus, lichen, and eczema are greatly aggravated by gastric irritation, and by muco-enterite.

In the forms of nettle rash from the crustacea, &c., it might be said, that the irritation on the skin is due to the absorption into the blood of irritating extraneous material.

We can scarcely designate by the term sympathy, in the sense in which we have hitherto used it, the anorexia, and the inability to digest food, which occur

during fever, whether intermittent, or continued, or during the febrile state of symptomatic fever. In these conditions the stomach is affected in common with the whole system, all the glandular organs have their action retarded, the blood is modified, and the whole organism is disordered. The furred state of the tongue is often expressive of a general condition, rather than a mere local indication of the state of the digestive mucous membrane.

With sympathies so widely pervading the whole system, it is not surprising that gastric disease should present most varied indications in the disturbance of other organs; and, in like manner, that gastric phenomena of an abnormal kind should result from irritation, far removed from the stomach itself. The closest circumspection is required to discriminate between sympathetic affections, and those of a strictly local origin.

CHAPTER III.

ON THE SYMPTOMS OF DISEASE OF THE STOMACH.

IF we were to judge alone by the severity of the symptoms in diseases of the stomach, constant mistakes would be the result, especially in the earlier stages of disease; for in functional maladies, that is to say, those in which no structural change can be detected, the symptoms are often extremely urgent. The irritability of the stomach may be excessive, so that every portion of food is at once rejected, the pain may be severe, and the general distress constant, although the ailment is curable, and of a comparatively slight character.

It will be well to consider seriatim, the symptoms which are present in diseases of the stomach, and their relative value. The two symptoms which are regarded as of especial diagnostic value are vomiting and pain* in the region of the stomach. We have already referred to the intimate connection of the nerves of the sympathetic plexus with all the abdominal viscera, and with the spinal nerves; and this connection serves to explain the uncertain indications of these symptoms.

* The remarks on pain and vomiting are in great measure taken from my larger work on 'Abdominal Disease.'

As a sign of disease, *pain* is of doubtful value; oftentimes it is a certain guide to the locality, if not to the character of morbid action; at other times on the contrary, its presence misleads, or its absence disposes us to under-estimate changes which may be going on in the system. Generally speaking we find that the mucous membranes, except where they approach the outlets of their respective canals, are free from ordinary sensibility, and may undergo very marked changes in their condition without any painful manifestation. Acute disease may take place in the mucous membrane of the kidney or bladder with complete immunity from suffering. A similar fact is observed in relation to the parenchymatous viscera; thus the substance of the liver and the kidney is often changed in a marked degree; and if disease, such as abscess, arises in their structure *without* much distension, the patient may be unconscious of morbid change. On the contrary, in serous membranes an opposite condition is found to exist; almost any change is appreciated, and in sudden or acute disease, the pain is often extremely severe in its character. All physicians well know the stabbing pain of pleurisy, the agony of acute peritonitis, and the intense suffering of severe synovitis. In each of these latter diseases, rest is a very essential element in the alleviation of the malady, and this rest can be attained to a great extent without the cessation of life. In pericarditis, on the contrary, we find, as was shewn

many years ago by Dr. Addison, that there is an absence of pain, unless there be pleurisy occurring at the same time. In the pericardium, however desirable rest may be, it is impossible, as the heart must beat as long as life lasts.

Pain.—In reference to pain as an indication or non-indication of disease we have to remark,

I. That acute inflammation and disease of the stomach may exist, with entire freedom from pain, if the mucous membrane only be affected. Acute gastritis is generally regarded as an exceedingly rare form of disease, excepting when produced by irritant poisons. This may be the case; but we are of opinion, that in many instances the absence of pain has led to this belief. In the gastro-enteritis of children, and not very unfrequently in that also of more advanced life, conditions of great irritability with cessation of the right function of the stomach, and probably with hyperæmia, must be regarded as closely approaching the character of gastritis. However this may be, we have evidence from the action of irritant poisons, that, while the mucous membrane is only affected by them, pain may be entirely absent, excepting that which is consequent on the violent muscular action exerted in the act of repeated vomiting. Thus, in a patient who had taken a large dose of oxalic acid, violent vomiting, with failing pulse and a sense of exhaustion, were produced, but no pain. In a few days, after taking demulcent

forms of diet, she completely recovered. In an instance of poisoning by strong sulphuric acid, where a large portion of the mucous membrane of the stomach was destroyed, although the patient survived eleven days, she did not appear to suffer from any pain at the stomach. The same fact was still more strikingly shewn in a case of poisoning by chloride of zinc, in which life was prolonged for three months. But the absence of suffering was most remarkable till eight days before death, and the pain then induced was evidently caused by the formation of an abscess in the left hypochondriac region. I have witnessed the same immunity from suffering in poisoning by arsenic and by corrosive sublimate; and we are warranted in the belief, that acute disease may take place in the mucous membrane of the stomach without any pain.

II. Organic disease of the *mucous* membrane, as for instance cancer, may be comparatively free from pain. It frequently happens in cancerous disease of the liver, that after death tubercles or growths of a similar character to the primary disease are observed on the mucous membrane, and of which there had been no indication during life. Thus, a patient aged 60 died from cirrhosis, and after death a large villous growth was found attached to the anterior surface of the stomach; but the orifices were free. There was no complaint of any pain at the stomach, neither had she any vomiting; and it is probable that the burning

pain she had before admission into the hospital was of the character often observed in ordinary dyspepsia, for she was of intemperate habits. The freedom from any obstruction at the orifices of the stomach, and the fact that the growth involved only the mucous membrane, were, we think, the cause of the absence of pain. No supposition was entertained of the presence of this growth in the stomach during life. We have witnessed the same immunity from pain, in fact from any recognizable symptom, in extensive lardaceous degeneration of the gastric mucous membrane.

III. Diseases extending to the muscular and peritoneal coats produce severe pain, as observed in ulceration or cancer. This symptom is present as one of the most ordinary signs of ulceration, and in several instances, in which the suffering was very severe, we have found branches of the pneumogastric nerve involved in the thickened, dense, and fibrous edges of the ulcer. The pain often comes on in these cases directly after food has been taken.

IV. Over-distension of the stomach produces severe pain. The formation of the stomach and its peritoneal attachment are such as to allow moderate distension to take place during digestion; but whenever the distension becomes greatly increased, pain is the result.

V. Disease, especially of an acute kind, affecting the peritoneum is also, with few exceptions, accompanied with severe pain. In reference, however, to the position

of pain in peritonitis, it is not always a certain guide to the precise seat of injury. I well remember a young woman who was seized with sudden and severe pain at the scrobiculus cordis towards the left side, which was followed by rapid collapse. From the seat of the pain perforation of the stomach was diagnosed; it was, however, found to be perforation of the appendix cœci.

VI. Dr. Osborne has shewn that in some cases of gastric ulcer the position of greatest ease to the patient may serve as a guide to the exact seat of the disease; that if the ulcer be on the posterior surface of the stomach, lying upon the face would be the most comfortable position, and *vice versâ*. Food, on its entrance into the stomach, generally passes directly along the lesser curvature, and if the viscus be contracted, it would come in contact with an ulcer, whether placed on the anterior or posterior aspect of the median line of the curvature. If more distended, there might be less direct application to the diseased surface. In the case of severe suffering from gastric ulcer previously referred to, the patient was most easy when leaning somewhat forward and towards the left side, a position which allowed fluids to gravitate from the ulcer.

VII. In disease of the lesser curvature, even near the pyloric orifice, pain is sometimes experienced by the patient as soon as the food enters the stomach, and, in some cases, this conveys the idea of disease at the œsophageal orifice. This fact may lead to the supposi-

tion that the œsophagus is the part affected, and the erroneous opinion may be strengthened by the rejection of food almost before it has reached the stomach.

VIII. Many conditions of functional disease are entirely free from pain. It is, indeed, well for us that there is such insensibility, otherwise the least deviation from healthy action might be followed by suffering, and the strict rules of a dyspeptic be essential in ordinary life.

IX. The pain in many functional diseases of the stomach is exceedingly severe ; but it is often produced by a mal-condition of the nerves or nerve-centres, and it arises from the intimate connection of the spinal and sympathetic nerves. In some states of exhaustion the whole of the nervous system appears to be in a state of great irritability, and the sensibility of structures becomes greatly increased. We often find in these conditions that the stomach is incapable of bearing the presence of food ; it is at once rejected, or produces intense pain, or flatulent distension is set up, or a sense of fainting ; and the means best calculated to relieve are those which invigorate and strengthen the whole system. Of this class are the stomach diseases observed in connection with uterine disease, with loss of blood, exhaustion, mental anxiety, &c. ; the deficient nervous supply also interfering, perhaps, with the right secretion of the gastric juice.

X. The effect of a diseased condition of the pneumo-

gastric nerve at its centre, or at its peripheral branches, in connection with stomach disease, is of great importance, and it is probable that pain is sometimes the result. We have, however, more frequently observed vomiting, rather than pain, produced by an irritable condition of the pneumogastric nerve.

XI. In some forms of functional disease of the stomach in which severe pain comes on three or four hours after food, it is probable, as we have elsewhere stated, that extreme irritability of the pyloric orifice exists.

XII. The absence of pain often arises from the destruction of the pneumogastric nerve. This fact is sometimes remarkably shown in disease of the œsophagus, as well as of the stomach.

XIII. Pain at the epigastrium, simulating disease of the stomach itself, also arises from spinal disease, the pain being referred to the extremity of the irritated nerve.

XIV. Severe pain at the scrobiculus cordis is frequently present in chronic bronchitis and in obstructive valvular disease of the heart; in fact from any state which leads to over-distension of the cavities of the right side of the heart. In these conditions we very generally find that food produces pain and flatulence, and is very imperfectly digested; the vessels of the stomach and of the whole of the chylipoietic viscera are much engorged; and the surface of the stomach is

very generally covered with a thick layer of mucus; a state of chronic catarrh of the mucous membrane is produced. Many observers, however, attribute the almost constant pain at the scrobiculus cordis in these instances to the over-filled cavities of the right side of the heart, and we are disposed to refer part of the distress to this cause.

XV. In aneurism of the abdominal aorta, we have sometimes observed pain of an intense kind, and the disease might very easily have been mistaken for cancerous disease of the stomach with glandular infiltration, producing pressure upon the aorta. In one instance, which I watched with much interest, the aneurism existed at the position of the coeliac axis; it was rightly diagnosed, and the patient became exhausted and died from the intensity of the pain, the false sac not having given way. I dissected large branches of the sympathetic nerve spread out upon the surface of the tumour; and the intense suffering and fatal exhaustion appeared to arise from the implication of the nerve structures. No other cause of death could be found on very careful inspection.

XVI. Abscess in the parietes of the abdomen near the scrobiculus cordis, at its earlier stage, simulates disease of the stomach itself.

XVII. Disease of the pancreas, especially of an inflammatory kind, is apt to be mistaken for disease of the stomach.

XVIII. The pain and vomiting consequent on obstruction in the duodenum closely resembles disease of the stomach. Thus large biliary calculi, in some rare instances, ulcerate through the walls of the gall bladder, and become impacted in the duodenum. Other symptoms, however, when rightly estimated, will generally guide to correct diagnosis.

XIX. The neuralgic pain produced by herpes zoster or shingles may for a short time mislead, but the pain of shingles is not generally so local in its character, and extends backward to the spine.

XX. Whilst considering pain at the stomach, we are led to remark on the expression often made use of, namely, spasm at the stomach. Does such a state really exist? It has justly been said, that in many instances some crude undigested substance remains and is the source of the pain; and we have known a portion of undigested steak remain in the stomach undissolved for ten days, and no effectual relief could be obtained till it was rejected. Again, many such instances are due to distension of the stomach; others to pain in the course of the spinal nerves; in others there is contraction at the pyloric valve; but there are cases which cannot be so explained, and they are apparently attributable to a state of extreme irritability of the sympathetic nerves and ganglia, inducing unusual contractility of the muscular fibres.

As to the time and persistence of pain, we may

remark, that when arising from disease of the stomach it is generally aggravated by food. It often extends through to the back, but is less persistent in its character than when it arises from other causes.

VOMITING.—Although the causes of vomiting are very numerous, it is generally at first referred to the condition of the stomach itself, or to the parts immediately connected with it; and this opinion is so often fraught with danger that we cannot too strongly urge the importance of close investigation. The causes of vomiting are even more varied and complex than those which result in pain; and they may be divided into those which originate in the stomach and intestines, and, secondly, into those which are sympathetic in their source; to several of the latter we have incidentally referred in the last chapter.

In the *first division* we must place, as causes of vomiting,—

1. Inflammation of the stomach, gastritis, and gastro-enterite;
2. The presence in the stomach of undigested food, or foreign bodies;
3. Irritants and medicines;
4. Great irritability of the mucous membrane;
5. Ulceration of the stomach;
6. Obstructive disease of the pylorus;
7. Cancerous disease of the stomach;
8. Pressure on the stomach—as in ascites, tumours, &c.

9. Diseases of the duodenum ;
10. Hernia, intestinal obstruction, intussusception ;
11. Pharyngeal and œsophageal regurgitation.

In the *second division* are—

1. Diseases of the liver and gall bladder ;
2. Diseases of the kidney ;
3. Diseases of the supra-renal capsules ;
4. Diseases of the uterus and ovaries ;
5. Diseased conditions of the blood and general nervous system, as at the onset of the exanthems, fever, pyæmia, erysipelas, &c., ague, yellow fever, and cholera may, perhaps, be classed among these, as arising from blood change ;
6. Diseases of the spine ;
7. Diseases of the brain ;
8. Diseases of the lungs.

I. There is something remarkable in the presence of vomiting when pain is absent ; and in acute disease of the stomach, where only the mucous membrane is affected, the patient may be free from all suffering at the region of the stomach, except that produced by the violent straining of the muscles. Vomiting is a more persistent sign of inflammation of the stomach than is pain. We need only refer for confirmation to instances of poisoning by oxalic acid, by sulphuric acid, by arsenious acid, and by corrosive sublimate, cases of which have occurred without pain at the stomach ; and in the symptoms of gastro-enteritis the same immunity

from gastric pain occurs, whilst vomiting greatly distresses the patient.

II. Undigested substances often remain in the stomach for some time without producing pain, unless they pass within the pyloric valve; and we sometimes find that they are retained for many hours, or even days, before they are rejected by vomiting.

III. In reference to vomiting caused by medicine and by irritants, it is only necessary to mention, that in some instances the action appears to be one of primary irritation of the stomach, in others it is secondary, through the medium of the blood; but whether this secondary action and its consequent vomiting arise from the excretion of the medicinal substance from the mucous membrane of the stomach is doubtful; thus, tartar emetic produces vomiting when injected into the blood, as well as when taken directly into the stomach.

IV. A state of functional irritability of the stomach is sometimes induced, and is generally associated with uterine or ovarian disease, or it is produced by irritation of the pulmonary branches of the pneumogastric nerve acting in a reflex manner upon the nerves of the stomach. In these instances food of every kind is at once rejected; and it is to this condition that Sir H. Marsh has given the name of regurgitative disease, in which food is rejected without any effort, and often without corresponding emaciation. In his valuable

paper on this subject he refers to its connection with pulmonary and with uterine disturbance.

V. In ulceration, vomiting often comes on as soon as food enters the stomach, or a period of variable length intervenes, the pain increasing till the rejection takes place.

VI. In obstructive disease at the pylorus, the vomiting is generally deferred till nearly the close of the digestive process; much, however, may be done to diminish this symptom by the use of suitable diet of a fluid kind.

VII. Cancerous disease, affecting the orifices of the stomach, constitutes a common cause of persistent vomiting. It must, however, be borne in mind that it is not a constant sign of cancerous disease of the stomach; if the *orifices* be *free* it may be entirely absent, although the disease is very extensive; and again, if sloughing take place, even when the orifices *are* diseased, vomiting often subsides, sometimes in consequence of the obstruction being removed by the sloughing; at other times, apparently from the destruction of the branches of the pneumogastric nerve. Further, the period at which vomiting occurs does not always indicate the seat of the cancerous obstruction. In some instances of obstruction at the pylorus with disease at the lesser curvature, vomiting takes place immediately after food has entered the stomach, so as to convey the idea of obstruction at the cardiac orifice,

or in the œsophagus itself, and the symptom has been regarded as dysphagia rather than vomiting.

VIII. *Acute peritonitis*, especially when the gastric peritoneum is involved, is often accompanied with severe vomiting. The statement has been made that it does not take place in acute peritonitis unless the peritoneum in the neighbourhood of the stomach is implicated; but although this is generally true, it is not constantly the case. *Chronic peritonitis* is also a cause of vomiting; so also local peritonitis and effusion near the stomach. In some of these instances the stomach is affected by its direct implication in the disease; in others vomiting arises from the pressure of effused pus, or the constriction of adhesions.

IX. *Pressure* on the stomach is a direct cause of vomiting. In ascites and ovarian disease the stomach is sometimes so compressed that vomiting comes on soon after food has been taken, apparently from this cause alone; and when paracentesis has been performed, the pressure being removed, the sickness ceases. When glandular tumours in the neighbourhood of the pancreas, or disease of the pancreas itself, exert pressure on the stomach the symptoms closely resemble primary disease of the stomach, and the diagnosis is exceedingly difficult; but, since the pancreas receives a branch from the pneumogastric nerve, it is not easy to ascertain how far vomiting, in some of these cases, is due to nervous irritation, and how far it is due to direct pressure. In

those cases in which the pancreas has been diseased without great enlargement, and without pressure on the stomach or duodenum, I have not observed that vomiting is a prominent symptom. In aneurismal disease of the abdomen, the remark which we have made in reference to disease of the pancreas and its glands holds good; and the same difficulty arises in determining how far the vomiting is due to pressure, or to sympathetic irritation.

In some cases we have found direct pressure made by the patient at the scrobiculus cordis the cause of vomiting; and in an instance of a boy, some years ago, in Guy's Hospital, it was only after very careful watching, that the true character of the complaint and the deceit of the patient were ascertained.

X. As to vomiting not depending on the condition of the stomach itself, we have to refer to morbid states of other abdominal viscera; and first, to disease of the *duodenum*, as inflammation of its mucous membrane, ulceration, and especially obstruction.

There is great similarity between the diseased conditions of the first portion of the duodenum and of the stomach. A form of dyspepsia, in which vomiting, with pain at the seat of the duodenum, comes on at the close of digestion has been attributed to the duodenum; but whether this class of cases is connected with an abnormal irritability of the pylorus itself, we cannot affirm. Again, in some cases of acute jaundice, febrile

symptoms with violent irritability of the stomach arise without pain ; and the disease has been attributed to mischief commencing in the duodenum, and extending to the biliary ducts. In some fatal cases of this kind, great congestion in the duodenum has tended to confirm the idea, so also the fact that symptoms of this kind have come on after intemperance.

Ulceration of the 1st portion of the duodenum produces many of the symptoms of like disease in the stomach.

XI. In hernia, obstructive disease of the intestines, intussusception, &c., vomiting is generally present. If the obstruction be in the small intestine, the vomiting comes on very quickly ; but if the colon, sigmoid flexure, or rectum be the seat of the disease, vomiting is often postponed for a considerable time, unless irritant medicines and violent purgatives have been administered. As the vomiting continues, the ejected matters present the character of the fluids at the seat of obstruction ; and, if that obstruction be intestinal, their odour and appearance have more or less of a foecal character.

XII. The regurgitation of food, which is consequent on disease of the pharynx, larynx, or œsophagus must be distinguished from actual vomiting. By carefully observing the process of deglutition, the seat of mischief may be accurately ascertained. In paralysis of the muscles of the soft palate, and of the pharynx, deglu-

tition cannot be properly completed, and food is rejected through the nares ; so also when the epiglottis is ulcerated from strumous, syphilitic or cancerous disease, the act of deglutition is scarcely performed before the substance swallowed is violently ejected, and severe pain in the throat, and cough are set up. It is remarkable too, in these cases, how a solid bolus of food may be formed and swallowed, slipping beyond the diseased surface ; whilst the smallest quantity of fluid produces most violent pain and distress.

In obstruction of the œsophagus the act of deglutition is completed, and then regurgitation takes place. Very extensive disease may, however, affect the œsophagus without this rejection of food ; for ulceration or sloughing may have removed obstruction, or the branches of the pneumogastric nerve and the whole wall of the canal may be destroyed.

Other causes of vomiting are expressions of the general and intimate connections of the stomach ; they are properly designated sympathetic in their relationship, and their study is of essential importance in the diagnosis of disease of the stomach. As with the previously mentioned causes of vomiting we shall do little more than enumerate them, and the first of this class to which we shall allude is,

XIII. Disease of the *liver* and of the *gall bladder*. Large branches of the pneumogastric nerve extend to the liver, as well as numerous nerves from the large

sympathetic ganglia. In gall stone, violent vomiting is generally associated with intense pain; and in many conditions of hepatic disease irritability of the stomach is a frequent symptom.

XIV. In disease of the *supra-renal capsule*—*Addison's disease*—vomiting is rarely absent; but sometimes it is a sign of such prominence as to simulate primary disease of the stomach. On post-mortem examination we have found arborescent injection of the mucous membrane of the stomach, and sometimes slight ulceration; but it must also be remembered, that the pneumogastric nerve affords a branch to the supra-renal capsule, and that its connection with the semi-lunar ganglia is a very intimate one.

XV. Diseases of the kidneys and renal calculus constitute other causes of vomiting. During the passage of a calculus down the ureter vomiting is a very distressing symptom. In acute albuminuria vomiting is also associated with nausea; and in chronic albuminuria it is sometimes the precursor of a fatal termination. So severe, indeed, may be this symptom in ischuria renalis, as even to suggest the possibility of intestinal obstruction, as shown by Dr. Barlow. The vomiting in albuminuria is not only due to the direct connection of the nerves constituting the renal plexus, with those of the stomach, but to the urea excreted from the mucous membrane of the stomach and intestines. It is found to be present in large quantity in

the blood, and is separated in all the excretions and secretions; and in the stomach this abnormal excrementitious substance appears to act as a direct irritant.

XVI. Both functional and organic diseases of the uterus are causes of vomiting. In dysmenorrhœa most distressing irritability is occasionally set up; and in pregnancy, vomiting may be so severe as to exhaust and completely to prostrate the patient.

XVII. The remaining causes of vomiting arise from the condition of the nervous system, and are most interesting and important in the correct diagnosis of disease; the first of these is a diseased condition of the *spine*. The splanchnic nerves pass from the spinal cord to the large sympathetic ganglion of the abdomen, and constitute an intimate connection between these centres of nerve force; in those diseases, however, of the spine in which we have observed irritability of the stomach other sources of disturbance have been present.

XVIII. At the onset of acute diseases, especially the exanthems, fevers, pyæmia, erysipelas, &c., vomiting is often present. It is not known how this is produced, whether directly by the altered condition of the nervous system, or secondarily from the state of the blood. Sudden nervous shock, fright, &c., will produce vomiting; and in some more chronic diseases, when the blood is altered in character, as in renal disease and even gout, the same symptom is occasionally very intractable, as previously mentioned.

Dr. Graves, in his 'Clinical Medicine,' makes the following valuable remarks in reference to this subject:—"Every fever which commences with vomiting and diarrhoea, whether it be scarlatina, or measles, or typhus, is a fever of a threatening aspect; and in all such fevers the practitioner should be constantly on the watch, and pay the most unremitting attention to the state of the brain. There is much difference between the vomiting and diarrhoea of gastro-enteritis and this cerebral diarrhoea and vomiting. The latter sets in generally at a very early period of the disease, perhaps on the first or second day, and is seldom accompanied by the red and furred tongue, the bitter taste of the mouth, the burning thirst, and the epigastric tenderness which belong to gastro-enteric inflammation." He also states very truly, that in cerebral disease there is often a large quantity of bile rejected by vomiting, and passed also by stool; and that leeching the abdomen is less efficacious in cerebral inflammation than in gastro-enteritis.

Very little is known as to the proximate cause of vomiting in *cholera* and in *yellow fever*, but we sometimes find in the intermittents of our own country that it is a prominent symptom; and we have several times witnessed instances in which vomiting, excited possibly by uterine or hepatic mischief, assumed regular periodicity in those who had been exposed to miasmatic poison.

XIX. Irritation of the peripheral branches of the

pneumo-gastric nerve in the abdomen has already been referred to as one cause of vomiting in disease affecting the organs to which they are supplied; but the same nerve may be irritated at its peripheral branches in the chest, and at its origin in the brain. *Disease of the brain*, then, is another cause of vomiting, and one which it is important to bear in mind in the diagnosis of disease; too often the so-called bilious attacks of children are the first indications of acute hydrocephalus. The irritability of the stomach is sometimes so great that vomiting is at once produced when the patient is raised from the recumbent position. The diagnosis of these cases is sometimes exceedingly difficult when commencing with symptoms of true gastro-enteric disease; but it would be well if the remark of the great authority in clinical medicine just quoted were borne in mind, that "*in all feverish complaints where during the course of the disease the stomach becomes irritable without any obvious cause, and where vomiting occurs without any epigastric tenderness, you may expect congestion or incipient inflammation of the brain or its membranes.*"

In simple cerebral disease the abdomen is generally collapsed; in primary abdominal disease there is, on the contrary, distension. This difficulty in diagnosis is not, however, limited to very young subjects. In strumous disease of the brain, the vomiting is sometimes excessive; so also in disease of the ear extending to the membranes of the brain.

After concussion, vomiting comes on, and in some cases, when inflammatory disease has followed, and suppuration has taken place, this symptom is excessive. One of the most severe cases of secondary vomiting which I ever witnessed was of this kind. A man in middle life had received a blow at the back of the head; cerebral symptoms came on, and suppuration took place at the origin of the pneumogastric nerve; the membranes were adherent at that part for the space of half an inch, and about a drachm of pus was effused. The vomiting had been excessive, and anything swallowed was rejected with violence beyond the extremity of the bed.

XX. Disease of the lungs, or irritation of the pulmonary branches of the pneumogastric nerve, is the last cause of vomiting to which we refer. The vomiting in whooping-cough appears to be of this kind, and equally so that which is often present at the early stage of phthisis; the same symptom may occur in acute as well as in chronic disease of the lung. Sir Henry Marsh has mentioned early phthisis as one of the causes of the irritability of stomach, to which he has given the name of regurgitative disease; and too frequently this irritation leads to the unfortunate expression, that the symptoms of early tubercular disease of the lung are "all stomach." There may be no physical signs produced by scattered tubercles studded throughout the lung tissue, and by overlooking the true character of the

disease, the period of effective treatment, by change of climate and other means, may quickly pass by. It seems, that as the pulmonary disease advances and disorganisation takes place, this condition of irritability is lessened, although we too often find that the paroxysms of cough are productive of violent vomiting.

At the onset of acute disease, both of the pleura and of the lung, it is very frequent to find irritability of the stomach induced, with loss of appetite and furred tongue; and we have many times seen the true character of the disease entirely overlooked from the neglect of proper examination of the chest. If acute pleurisy take place on the right side, the severe pain with vomiting is at once attributed to disease of the liver; and if on the left side, especially when effusion has taken place, and when the heart is pushed over to the median line, pain and tenderness at the scrobiculus cordis is regarded as an indication of gastric complication. Proper examination will prevent these mistakes; but if the acute inflammatory disease be confined to the diaphragmatic surface, the stethoscopic signs are for a short time obscured, until the costal pleura becomes involved. In a patient lately under my care, the malady had been regarded as acute hepatitis, from the circumstance above mentioned; and in another, the complaint was said to be wholly gastric, although the left pleura was full of fluid.

Pyrosis or Water Brash is a symptom to which espe-

cial reference must be made. It is one of frequent occurrence, and it receives its appellation from the fact of the rejection of a thin watery mucus. The poorer classes of society, and especially its female portion, are the ordinary subjects of this disease, but it is not confined to them. Half a pint of watery fluid, somewhat resembling the white of an egg, is sometimes vomited or regurgitated at once; the discharge is generally neutral in its chemical reaction, and often tasteless, but sometimes it is found to be slightly alkaline, and the patient complains of its saltness. The period at which the discharge of fluid takes place varies both as to the hour of the day and the frequency of the recurrence of the attack. The vomiting, however, generally occurs when the stomach is empty, and it is accompanied with a sense of contraction and of pain at the epigastric region and at the spine. With some patients the attacks come on in the forenoon, with others during the night, at one or two in the morning, and even several hours after retiring to rest. The tongue may be clean, the pulse normal, the patient fairly nourished or anæmic and enfeebled; headache is often present, and in some instances, water brash alternates with more severe gastralgia. It may be the only symptom of disease, but more frequently it is associated with others of a distinctive character. Thus it may be present with chronic ulcer, and we have witnessed a form of pyrosis in connection with colloid disease of the stomach; still,

in simple functional disease, pyrosis may be so severe and so persistent as to lead to the diagnosis of organic mischief.

It is the opinion of Dr. Handfield Jones that pyrosis is a chronic catarrh of the stomach similar to blenorrhœa from the bronchi. Dr. Chambers, however, favours the idea that the œsophagus is the source of the discharge. We know that bile often flows backward into the stomach, and *it is possible* that the pancreatic secretion may take a similar course, for with relaxed condition of the pylorus, and contraction of the duodenum, this would readily be the case. Pyrosis often occurs during fasting, and also at night, when the recumbent position would favour a retrograde course from the pancreatic duct. The discharge is not ordinary mucus, and if it were from the stomach we should expect more generally an acid reaction.

This condition comes on after the continued use of oatmeal, and hence it is more common in the north. It may follow symptoms of chronic gastritis: it is produced by great anxiety of mind, by over fatigue, or by an over-worked frame. It also occurs during pregnancy, and it is met with amongst the symptoms of commencing cancerous disease of the stomach.

We may briefly state that the remedies which relieve pyrosis are astringents and tonics, as the sulphate of iron with the extract of logwood; quinine with aloes and myrrh; nitrate of bismuth alone, or with conium

and nux vomica; an alterative of blue pill with rhubarb is sometimes beneficial. Solution of potash, with hydrocyanic acid and bitter effusions, is of great service where there is much pain. Other astringents may be advantageously employed with sedatives, anodynes, and tonics, as the compound kino powder, catechu with morphia or opium, oxide of silver, sulphate of copper, strychnia or the infusion, tincture or extract of nux vomica.

BLEEDING FROM THE STOMACH. *Hæmatemesis*.—Another symptom of disease of the stomach, to which we must separately allude, is bleeding from the stomach, inducing either vomiting of blood, *hæmatemesis*, or its discharge by the bowels, *melæna*.

Great alarm is naturally excited by the rejection of blood from the stomach, whether in small or large quantities; but the import is very different, for whilst in some cases it is a symptom free from danger, in others it is the indication of serious, if not of fatal disease.

The causes of hæmatemesis are,

1. Ulceration of the stomach.
2. A congested or obstructed state of the portal circulation.
3. Vicarious menstruation.
4. Cancerous disease.
5. A vitiated state of the blood, as in purpura, yellow fever, typhus, &c.
6. Aneurism.

The hæmorrhage may, however, have its origin in parts connected with the mouth, the throat, and the œsophagus, arising from ulceration, cancerous disease, aneurism, varicose condition of the minute œsophageal veins; and the rejection of blood from these sources may be erroneously regarded as hæmatemesis; or, it may proceed from the nose, the larynx, and the lungs, and in some cases considerable difficulty arises in distinguishing the source of the discharge, for the blood may be swallowed and afterwards vomited.

As to the quantity of blood exuded, there is the greatest diversity; sometimes it is only recognised by the most careful, or even microscopical examination; at other times several pints, or even quarts, are rejected at once; and if a large vessel have been divided, the first hæmorrhage may cause fatal syncope. Blood, which is thus discharged into the stomach, is generally coagulated, and is often deepened in colour by the action of the gastric juice; it is devoid of the bright frothy appearance presented by blood from the lungs, which is consequent on the admixture of air. A portion of the blood in the stomach becomes still further acted upon by the gastric juice, and passes into the duodenum. As it extends along the small and large intestine the depth of the colour is increased, and at last it is discharged as a pitchy liquid stool, constituting melæna. Sometimes this black evacuation or melæna is the only symptom of hæmorrhage into

the stomach, for no blood may be rejected by the mouth; and when the blood is effused into the small or large intestine, and discharged, the depth of the colour is proportionate to the length of the tract through which the blood has passed, but it never assumes the black colour to which we have referred.

The green fluid which is sometimes vomited in states of great irritation of the stomach has been regarded by Dr. Fraser as altered blood; and the coffee-ground substance, so often rejected towards the close of organic disease of the stomach, consists also of blood which has slowly exuded, the hæmatine being acted upon by the gastric juice. In some cases of purpura a similar appearance is presented, and from a like cause. Much discussion has arisen as to the possibility of the transudation of blood through *unruptured* capillaries; but the examination of a portion of intestine distended with blood, and presenting points of ecchymosis, as found after disease of the mitral valve, will suggest the probable explanation of instances in which blood has been vomited or discharged, and in which no apparent perforation of vessels has subsequently been found. In such a portion of intestine as is present with mitral valve disease, some of the capillaries are found to be beautifully injected, whilst others are collapsed, and blood is extravasated around them, but limited by the basement membrane, thus constituting a point of ecchymosis; if the basement membrane had given way,

the blood previously extravasated would have escaped, and no ruptured vessel would have been detected. A similar action takes place in the stomach; ecchymosis is produced, but the action of the gastric juice prevents our observing the changes with the same facility as in the intestine. There is little doubt that the capillaries thus become over distended, and then ruptured in the ordinary form of hæmatemesis, when no ulceration has taken place.

In reference to the oozing of blood from the stomach, which often precedes death, it is doubtful whether obstruction on the right side of the heart, with ante-mortem coagulation, and consequent distension of the branches of the vena portæ and gastric vessels, is not associated in some cases with increased action of the gastric juice, so that the solution of the mucous membrane, which often follows death, actually precedes it.

The symptoms, which precede hæmatemesis, are a sense of faintness, followed by weight at the scrobiculus cordis; the countenance becomes pallid, the pulse compressible and failing, the extremities cold, and sometimes actual syncope takes place; vomiting is then produced, and several pints, or even quarts, of half coagulated blood are rejected; the patient becomes faint, blanched, and the bleeding is checked. After a few days or hours there may be return of hæmorrhage, till at last, in some cases, the patient appears almost

drained of blood. The subsequent symptoms are especially due to this loss, as found in other instances of anæmia; severe headache, noise in the ears, disturbed vision, dilated pupil, palpitation or irregular action of the heart, with a sharp but compressible pulse, are present. If a large vessel have been divided the first attack may, as we have before remarked, lead to fatal syncope. This sudden termination, is, however, unusual; the patients generally slowly rally, and after a few hours the black pitchy discharge of altered blood takes place from the bowels.

The character of the disease which has led to the hæmorrhage must necessarily modify the preceding, as well as the general symptoms and their termination. Thus in ulceration of the stomach, and in cancerous disease, the peculiar symptoms of those maladies are present. In aneurism a pulsating tumour may sometimes be felt, and severe local pain, or pain in the course of the spinal nerves, may be experienced. In congested portal system the signs are those of engorged liver, as shown by pain in the right side, dyspepsia, a sallow or semi-jaundiced complexion, furred tongue, occasional nausea or vomiting, impaired appetite, spasmodic pain at the stomach or in the region of the colon, constipation of the bowels, disturbed sleep, and pain in the head; enlargement of the liver and hæmorrhoids are also frequently present.

In vicarious menstruation, local congestion of the

mucous membrane, or of the edges of a pre-existing ulcer, as we sometimes find in an ulcer on the leg, leads to the effusion of blood. We may have very slight symptoms, as absence of the proper menstrual discharge, pain in the side, and periodical vomiting of blood, without constitutional disturbance, and without the blanched countenance that we find in hæmorrhage from other causes. With this vicarious discharge we not unfrequently find hysteria, neuralgic pains, and leucorrhœa, &c.

In purpura hæmorrhagica there is a blanched countenance, faintness, &c.; but we have indication of the cause in the changed character of the blood, and its effusion from other mucous membranes as well as into the skin. The hæmatine is probably acted upon, and the corpuscles broken down, so that actual exosmosis of coloured serum takes place.

During the course of fever hæmorrhage from the bowels, apparently of a critical character, occasionally takes place. The patient, who may be in a state of great prostration, with a dry and brown tongue, rapidly amends, and hence the discharge of blood has been regarded by some as indicating a "crisis" in the disease. In the cases of profuse hæmorrhage during fever, which have come under our own observation, the effusion of blood has probably taken place from ulcerated surfaces. In one instance, minute ulcers were found in the stomach, from which a profuse and fatal hæmorrhage

took place. In another instance, a young woman, whilst prostrate from typhoid fever, suffered from hæmorrhage from the bowels to a great extent; the patient became blanched, the pulse for many hours could scarcely be felt, but very slowly she completely recovered.

When blood is poured out from the œsophagus or mouth, it is regurgitated or rejected without effort, rather than vomited, and we generally find either dysphagia or ulceration of the throat.

Blood from the lungs is sometimes so retained in a vomica or dilated bronchus, that it loses its frothy appearance and florid colour, and the patient is often scarcely able to tell us whether he vomited or coughed it up. No actual cough may be produced, for the blood is easily brought up into the throat, and then spat out, or it may be swallowed and then vomited, or discharged by the bowels. In these cases, we attach much importance to the general signs of disease, and to the physical examination of the lungs and heart.

As to the prognosis in hæmorrhage from the stomach, we must bear in mind that it is rare for a patient to die from simple hæmatemesis, although such cases do occur. Patients often appear to be almost bloodless, but steadily convalesce. Still the cause of the symptom must be our guide as to its termination; sudden and large bleedings after symptoms of organic disease should always be regarded with alarm, for ulceration often

extends into the larger arteries, and the dense fibrous tissue prevents contraction of the vessels, and thus the hæmorrhage persists unchecked.

The treatment of the bleeding must be according to the cause of the disease. When it takes place from ulceration or cancerous disease, the use of styptics is advisable, alum with dilute sulphuric acid, acetate of lead, gallic acid, catechu, tincture of iron, oil of turpentine, or Ruspini's styptic may be used. But in cases where it arises from congestion of the liver, I have generally looked upon the hæmatemesis as to a great extent curative, and prescribed remedies calculated to relieve the congested liver, as a grain or two of blue pill with conium and magnesia mixture, so as to remove the effused blood from the intestines.

Ice and cold drinks are grateful to the patient, and beneficial in producing contraction of bleeding vessels; but food should be abstained from, because coagula may be removed by it from divided vessels, and hæmorrhage be again produced. After a short time, fluid demulcent nourishment may be given, but it should be in a nearly cold condition; and when there is the evidence of a cessation of the hæmorrhage, solid substances, easy of digestion, may be taken in small quantities. Vegetable tonics with mineral acids, and the milder preparations of steel will then be found of service; but we shall be often much disappointed by the various astringents, as gallic acid, alum, &c., which afford only partial relief.

Oil of turpentine, in doses of \mathfrak{mxx} , has been much recommended, and has been followed by beneficial results. It is exceedingly important, that the patient should avoid those habits or excesses which have led to the disease; but advice on this subject is generally disregarded.

In vicarious menstruation, our efforts should be directed to establish the proper and natural discharge, rather than immediately to check that from the stomach, unless it be excessive. Hip baths, steel, aloes and myrrh, change of air, exercise, the avoidance of all tight lacing or unnatural excitement, will probably restore the health. This form of hæmatemesis may, however, continue for a considerable period.

Purpura hæmorrhagica is generally best relieved by preparations of steel with acids, as the tincture of the sesquichloride of iron or the sulphate of iron, with sulphuric acid; and I have more confidence in these than in gallic acid or the oil of turpentine. The latter sometimes produces vomiting, and patients complain of its offensive character. Ruspini's styptic has in the hands of some been found most efficacious.

Distension of the Stomach and Eructation.—Amongst the symptoms of gastric disease flatulent distension and eructation are very distressing. There is usually some gaseous fluid present in the stomach even when in a quiescent state; but in abnormal conditions this becomes enormously increased. Several sources of gaseous formation have been described :—

1. That the gas is swallowed.
2. That it is produced by the decomposition of food in the stomach.
3. By the decomposition of the gastric mucus.
4. That it is evolved from the blood.
5. That it passes from the duodenum or colon or some communicating abscess.
6. It may be produced by sloughing growth in the stomach.

Ordinary food contains some atmospheric air incorporated with it, and in the act of deglutition some air is also passed downwards with the food, or even with the saliva that is from time to time swallowed. If effervescent drinks are taken, then the exhaled carbonic acid must necessarily distend the stomach. But these causes are quite insufficient to explain the cases of distension of the stomach which are frequently met with in practice. The *second* source of gaseous repletion we have mentioned, namely, the decomposition of food in the stomach itself, is doubtless frequently present in dyspepsia. It has justly been compared to fermentation; and according to the changes induced we have carbonic acid evolved from a form of alcoholic fermentation. This may be accompanied with the formation of *sarcina ventriculi* of Goodsir; and with the development of vegetable growth lactic or butyric acid may also be produced. This kind of fermentation with *sarcina* we frequently find in cancerous disease affecting the pyloric

extremity, in chronic ulcer and in spasmodic contraction of the pylorus. It may be well, however, to remark, that the presence of sarcina is not an invariable sign of organic disease of the stomach; and sarcinæ have been detected in other animal products, in the urine, in the fœces, in pus, in pulmonary abscess, and even on the healthy mucous membrane. Again, sulphuretted hydrogen gas is formed in the stomach by putrefactive decomposition of the food, and is generally accompanied by eructation of offensive gas.

Distension of a distressing kind takes place, however, from evolved gas in the stomach even although no food has been taken; and the fact of chemical decomposition does not suffice to explain all these cases. It will frequently be found in those of enfeebled digestive power, that the very absence of food induces flatulent distension of the stomach. To pass for an hour or two beyond the accustomed period of refreshment is with some, certainly followed by this symptom of fulness, if not of severe pain. Again, fermentation does not explain those instances in which from nervous excitement or hysteria great and sudden distension takes place quite unconnected with food. An explanation of these cases has been sought in the decomposition of mucus in the stomach, whilst others refer it to an evolution of gas from the blood itself.

The quantity of mucus in the stomach in an ordinary state of the viscus is comparatively small, still

it is quickly secreted, and a large quantity of saliva is swallowed; these secretions very readily undergo change. Still there is nothing incompatible with the structure of the walls of the gastric vessels, that in some abnormal conditions probably connected with exhausted function of the vaso-motor nerve, an action should take place somewhat similar to that which is the usual functional action of the capillaries in the lungs; and this view of the subject, a gaseous exosmosis from the blood, is confirmed by the character of the gas itself, as consisting especially of nitrogen and carbonic acid gases, which are always present in venous blood.

An occasional source of gas in the stomach consists in its regurgitation from the duodenum, or its passage through some fistulous communication with the colon. Gas of this kind contains a large quantity of sulphuretted hydrogen gas, and it has a fœcal odour; such instances are exceptional, and do not require further comment here. So also in instances we have known where an abscess communicated with the stomach, and the presence of offensive gas was explained by decomposing pus. And lastly, we may mention that when sloughing takes place in the stomach gaseous evolution necessarily follows.

Prominence of the epigastric region, however, does not always arise from distension of the stomach; the fulness may be deceptive, and proceed from curvature of the spine, or the parietes of the abdomen may be

weakened by constant artificial support, so that on its removal, especially if there have been firm bands around the lower part of the abdomen, distension is observed, which simulates gastric fulness. Again, enlargement of the colon is frequently mistaken for that of the stomach, and lastly, when there are effusions within the chest the depression of the diaphragm leads to greater fulness than normal in the epigastrium.

When the stomach thus becomes distended, the sensation produced is 'one of fulness and tightness, and if excessive, severe pain is the result; if spasmodic contraction of the pyloric fibres is induced, the pain which is known familiarly as "spasm" at the stomach takes place.

This painful symptom is relieved by gaseous eructation, and the discharge of flatus is promoted by stimulating antispasmodic and aromatic medicines; the relief is generally speedy, but in conditions of great exhaustion we have known the stomach to become apparently paralysed, and the distension so to increase that the viscus nearly filled the whole abdominal cavity, and the impediment to the circulation become the immediate cause of death.

In close connection with the symptom just mentioned, is an offensive *state of the breath*; and the remark is often incidentally made, that in consequence of this condition the stomach "must" be disordered. It is frequently the result of the gaseous effusion or trans-

fusion into the stomach, and small quantities are silently discharged, as opposed to more sudden eructation. There are several fallacies, which have only to be enumerated to put the practitioner on his guard:—

1. Caries of the teeth.
2. Local disease of the nose or ear.
3. Disease of the tonsil; and sometimes the secretion from these glands is quite sufficient to produce the symptom referred to in a very marked degree.
4. Ulceration of the throat or œsophagus.
5. Diseases of the lungs and bronchi; cases of offensive breath from pulmonic disease are not confined to instances of empyema and asthenic or sloughing pneumonia, but are found in chronic bronchitis; purulent decomposition takes place from the retention of mucus and pus in the more dependent bronchi, and sulphuretted hydrogen is abundantly produced.
6. Purpura. Not only in severe purpura hæmorrhagica, with bleeding from the gums, but in less degrees of purpura in connection with albuminuria and chronic hepatic disease, the breath becomes very offensive from decomposing blood, the odour is peculiar and very characteristic, and at once recognised from that dependent on gastric disease. It must, however, be borne in mind, that during some forms of indigestion, the saliva loses its natural alkaline reaction, the ptyalin more readily undergoes decomposition, and thus communicates a perceptible odour to the breath.

Sweetness of the breath is a condition very often observed in connection with gastric disturbance, when hepatic disease is also co-existent. It is very frequently, we might say almost constantly the case, that in gastro-hepatic disturbance of young children the breath has a sweet smell. But it is not confined to them alone, and is observed in older persons similarly affected. It may be that this symptom is to be attributed to those chemical changes connected with saccharine products that the researches of modern physiologists have detected.

There is still another condition of the breath to which we must refer. It is very commonly found, that in renal disease the stomach is easily disordered, and in some of these instances the breath has a peculiar odour; some have said that it has an *urinous* smell, due to the abnormal presence of urea in the gastric and other secretions. Still it is not in every case of gastric irritation with Bright's disease that this can be detected, but in some chronic diseases and in acute uræmic poisoning.

The condition of the *gustatory sense* is often some guide to the state of the digestive function. We do not refer to the state of the *appetite*, although loss of appetite is a common sign of indigestion and disordered stomach; and it is well that in acute irritation of the stomach, the appetite should be stayed, for time is thus allowed for the disturbed organ to recover, but this is not always

an advantageous symptom, for in atonic dyspepsia the inability to relish food is a circumstance which greatly retards recovery. The *sense of taste* is, however, perverted, so that dyspeptic patients complain of a sour or bitter taste, or it may be acid or saline, nauseous or sweet, arising from the conditions to which we have just referred.

The condition of the *tongue* is an indication of the state of the digestive organs, and is an important guide in estimating the changing condition of the mucous membrane. It is the epithelium upon the mucous membrane, and upon the papillæ of the tongue, which constitutes the characteristic "fur;" and since local changes are connected with the general state of the system, so these epithelial modifications indicate not only the condition of the mucous membrane, but of the whole organism.

But since the tongue receives a large vascular supply, the state of its capillary vessels point to the condition of the circulatory system, not only of the mucous membrane, but also generally; and again, the tongue, as a muscular organ, has also a general as well as a special import. We shall not attempt to describe all the morbid conditions of the tongue, and the respective diagnostic value of each, but we may allude to several general conditions: *first*, as to the "fur;" in febrile states nutrition is hindered, and the tongue has a whitish fur; if the secretions be disordered, the fur is

thicker and more distinct; if the strength be impaired, and the epithelial covering readily undergoes degenerative changes, the fur becomes browner in colour, and in great prostration it becomes even black, as in typhoid conditions of the system. *Secondly*, as to the injection of the tongue, if the mucous membrane be in an irritable and congested state, the papillæ of the tongue become congested, and often stand out distinctly from a whitish fur, the substance of the tongue is also rather less than normal. If more severe, the sides and tip of the tongue are redder than usual, and are preternaturally congested. In more chronic forms of irritation and ulceration, especially when the small intestine is affected, this congestion of the tongue is very marked; sometimes, it is merely the centre, which presents a clear reddened stripe, or there are reddened patches, or the whole tongue has a red beefy appearance; this state is often well marked in typhoid ulceration of the small intestine, and in strumous peritoneal disease. *Thirdly*, in reference to the substance of the tongue itself, in irritable conditions the muscle is contracted as we have just mentioned, but in atonic dyspepsia, in feebleness of the system generally, as we find in anæmia with loaded colon, the tongue appears large, and is indented by the teeth.

The appearance of the tongue is, however, modified by the state of the mouth. A decayed tooth will produce a fur upon that side of the tongue, and an irregu-

larity of the tooth may cause local redness or ulceration; nor must we lose sight of local disease of the tongue itself. In cynanche tonsillaris the whole mucous membrane of the mouth is involved. In some diseases of the nose the buccal mucous membrane becomes chronically red and congested. Again we find that in mercurial poisoning the salivary mucous membrane and its glands are inordinately affected. In syphilis and cancerous disease also, local disease of a peculiar and distinctive kind is often present.

In some irritable conditions of the stomach, we find that aphthous ulceration takes place in the mouth; and this state is sometimes present with general disorder of the digestive organs.

The next symptom of *gastric* disease, or rather of indigestion in its various forms, is a *disordered condition of the bowels*. Sometimes we are told that the bowels act with great regularity, and that the evacuations are of a healthy kind, but more frequently we find that constipation exists; that there is difficulty in obtaining ordinary relief without some foreign help; and when, as is often the case, there is more general disturbance of the chylo-poietic viscera, and the liver and pancreas are also disordered, the evacuations become irregular, sometimes loose and changed in appearance, pale or deeper in colour than natural; and when intestinal affection also exists, the discharges are light or frothy, mixed with

decomposing mucus, with changed epithelial products, or even with blood.

A morbid *state of the urine* is an exponent of secondary assimilation rather than of any primary defect in the digestive process; but still it is exceedingly important in gastric disease carefully to note the state of the renal secretion. Disorders of the stomach at once react upon the kidney and bladder, especially if there be any undue sensibility of these parts. Disturbed primary assimilation, the formation of a cruder chyle, and the absorption from the stomach of irritating products, are an additional tax on the excretory organs; it may be that an unusual quantity of lithates in the urine express the separation of effête material; but if there be organic disease of the kidney or calculus, if there be any tendency to chronic cystic disease, to stricture of the urethra from any cause, then the gastric disorder is severely felt. In gouty dyspepsia the urine contains an abnormal quantity of uric acid, and equally expressive are its indications in rheumatism, and in the imperfect digestion connected with hepatic and renal disease, with cardiac and pulmonary affections, with functional and organic disease of the brain, and diabetes.

During the earlier part of the digestive process, the urine has been shown by Dr. Bence Jones to undergo remarkable change; it loses partially its acidity, and may even have an alkaline reaction. It is well also to

remember the interesting observations of Dr. Edward Smith, namely, that in children, in whom waste and oxidation are proportionately in excess, there is a larger quantity of urea present than in adults and in aged persons; and the same observer remarks, that in summer also the quantity of urea excreted is larger than during the winter months. Oxalic acid, with lime in the form of beautiful crystals, is often present in the urine of the dyspeptic, even when no article of diet containing that acid has been taken. In atonic dyspepsia we have an excess of phosphates, and the crystals of the ammonio-magnesian phosphate.

Other symptoms of gastric disease are connected with the *vaso-motor* or *sympathetic nerve*, or with the connection of that nerve with the *cerebro-spinal system*. Many of these we have alluded to in speaking of the sympathies of gastric disease: as the *disturbance of the senses*; the *irritation of the extremities of the alimentary tract*; itching of the nose and mouth or of the anus; the *irregular pains or perverted sensations of the extremities*; the *disturbance of the heart and of the respiration*, producing in the one case irregularity of the pulse and distress, in the other dry and irritable cough; the *irregular flushings of heat*, and *burning of the hands and feet*; and, lastly, the disordered workings of *the brain* in its important functions, so that the dyspeptic becomes excitable and restless or depressed and melancholic, his days passed in wearisome inertia and his nights in restless dreams or in

continued watchfulness. These symptoms, the burden of the dyspeptic, we have already spoken of, and need not further dwell upon them than to remark, that in functional disease the severity of the symptoms and the distress of the patient are often out of all proportion to the magnitude of the affection.

CHAPTER IV.

ON THE GENERAL TREATMENT OF DISEASE OF THE STOMACH.

IN no class of diseases is it more important to regard the system in its entire character than in the maladies before us, and amongst these general considerations the *state of the mind* stands foremost, for as long as that is unsettled and disturbed, mere medicinal treatment will have very little effect in relieving the symptoms. Intense mental anxiety will cause such an irritability of the stomach that the meal is at once rejected, and the only effectual remedy is to calm the mind, and to remove the causes of anxiety. Mental repose has a wonderful effect in conducing to the healthy performance of digestion. Anxiety will destroy the appetite, so will pleasurable excitement or intense exercise of thought; but as soon as the stimulus ceases, it is followed by a sense of exhaustion. Amidst beautiful scenery there may be no sense of bodily fatigue, whilst the mind is entranced; hunger is not experienced, but when at length the excitement is lessened, the exhausted system may be unable to take the required refreshment, or, if taken, there is the inability to digest it.

Sudden alarm, unexpected news, whether pleasurable or painful, take away the appetite, and may even induce *rejection* of food. In the treatment of these gastric maladies, perhaps more than in any other, the confidence of the patient in the skill and diagnosis of the practitioner is an essential element of success. Without that confidence, every suggestion will probably result in an aggravation of the symptoms, and with it the simplest placebo will sometimes suffice to relieve functional disease.

The *effect of climate* is very perceptible in stomachic disease. A damp relaxing atmosphere, a locality upon clay, where moisture is retained and preternatural humidity induced, have a marked influence in perpetuating the symptoms of gastric affection, especially where atony exists, where the powers are enfeebled, and where a strumous diathesis renders the functions generally more easily disturbed. A dry bracing air tends to invigorate and to strengthen, and to the dyspeptic accustomed to a damp, confined situation, it will often suffice effectually to ameliorate his symptoms. It is scarcely necessary to refer to the injurious influence of impure and miasmatic conditions of the atmosphere, as affecting the gastric in common with other functions of the body. The ideas handed down to us from past centuries as to the *influence of the season* upon the health, have been confirmed by the scientific observations of Dr. E. Smith, that there is the greatest amount of general vigour in

the spring, and the least at the autumnal season ; and he infers, that the greater quantity of effête material during the summer months leads to the frequency of diarrhœa and intestinal diseases.

Amidst the multitudinous *occupations* of ordinary life there are some which tend in a greater degree than others to induce gastric complaints. Sedentary pursuits, especially when associated with late hours, and with pressure upon the stomach, greatly impair healthy digestion ; and too often the necessities of the system are disregarded, and insufficient time allowed for meals, or they are taken at too long intervals. Again, several hours spent in a hot and oppressive atmosphere, containing an excess of carbonic acid, produces a sense of exhaustion and oppression, and the organic functions become less energetic. Some professional duties involve great irregularity as to the hours at which food is taken, and the strong and vigorous system can alone bear with these repeated disturbances without injury.

As to numerous *mechanical* occupations, some are injurious from pressure upon the scrobiculus cordis, and from constrained position, as with the shoemaker, the tailor, the hand-loom weaver ; in others the air is loaded with dust, but in these the respiratory organs suffer more severely than the digestive ; and, lastly, the exhaled fumes may be of a poisonous character, as with lead, mercury, phosphorus, &c.

Many of those whose trade requires the tasting of

cheese, butter, sugar, &c., become affected with troublesome dyspepsia. In general, an out-door occupation is better than one requiring confinement; and that which is connected with vigorous exercise is better than one which demands a constrained position.

Another valuable agent in affording relief to the symptoms of functional disease of the stomach is *change of scene*. The mental effect produced by travelling tends in a powerful degree to act upon the functions of organic life. The locality may be really less healthy than the home, but the change is beneficial; the diet may be less digestible, but it is more easily assimilated; and it often happens that, when the thoughts continually revert to an organ affected with apparent or with real disease, anything that will draw the attention into other channels promotes cure or relief. Still more marked is the beneficial effect of change, when the anxieties of professional and commercial life are left behind, and when the confined atmosphere of a large town is exchanged for the invigorating influence of sea or mountain air.

Lastly, we must refer to the ordinary circumstances of the *dwelling* as greatly affecting digestion. In some cases, we almost involuntarily ask ourselves, How can any one live in rooms so over-heated and ill-ventilated?—with a deficient quantity of oxygen gas to renovate, and an excess of the excreted carbonic acid—it may be with the impurities of town gas, added to the defect of a

small sleeping apartment. The strength becomes impaired, and a relief to the sense of exhaustion is often attempted by the use of alcoholic stimulants, which still further interfere with sound digestion.

Having made these brief remarks as to the general treatment, we pass on to those measures which directly affect the stomach.

CHAPTER V.

ON THE REMEDIES FOR INDIGESTION, AND THEIR ABUSE.

It would almost seem that during the last few years there is a mania for new remedies, and that the charm of novelty casts into disrepute those means which had previously been found of an efficacious character.

The remedies we possess are more than sufficient if we knew how rightly to use them ; and we are able to effect more by regulating the physiological conditions of digestion, than by confining ourselves to the mere administration of medicines.

The remedies of diseases of the stomach may be divided into four classes.

1. Those which regulate the work the stomach has to perform.
2. Those which increase the digestive power by the addition of some of those agents, chemical or otherwise, which are naturally in operation during the digestive process.
3. Those remedies which remove the impediments of digestion.
4. Those general remedies which only act upon the

stomach in a secondary manner; but to this latter class we have already referred in the last chapter.

In the *first* class of remedies for gastric disease—namely, those which *regulate the work the stomach has to perform*—we find agents more powerful than any other in counteracting diseased action and functional irregularities. The numerous questions suggested by the requirements of the system as to diet and exercise become doubly important during functional disturbance, but there are several facts to be borne in mind which it may be well to notice *en passant*. Digestion must be regarded as not confined merely to the stomach, for it really commences in the mouth, and extends beyond the stomach. Starchy substances begin to undergo chemical change as soon as they are incorporated with the saliva; and although it is said that this change continues in the stomach itself, in that viscus it is rather nitrogenous food that undergoes solution. It seems probable also that the gastric juice is especially secreted under the stimulus of food, or from the intermitting action of the vaso-motor nerve. The experiments and observations made on Alexis St. Martin are most interesting on this subject, in whom an accidental perforation through the parieties of the stomach enabled Dr. Beaumont to watch these otherwise hidden processes, and a table was the result of his research, showing the length of time each substance required for its solution; but this knowledge is a very imperfect guide in the treatment of

the forms of indigestion. Other considerations are of paramount importance. Thus we have to consider :—

The proper intervals of food and the importance of regularity.

Its right quantity.

Its thorough mastication.

The quality of the food and the changes by cooking.

The necessity of variety.

The effect of exercise on digestion.

The interference produced by mental excitement.

1. The proper intervals of food might be considered in reference to health and disease, and in relation to the age and habit of the patient. In early life it is necessary that supplies of nourishment be administered very frequently. At first every two hours; the interval is gradually increased to three and then four hours. At first by night as well as by day; but the nightly repetitions are gradually lessened till they cease altogether. Again, in very advanced life, the intervals of the meals must be again lessened, and food taken even during the night. This is very important in the feebleness of advanced life; the stomach is unable to bear very ample meals, and exhaustion is the result of long-continued abstinence.

The majority of persons in ordinary health take three substantial meals during the day, at intervals of from four to five hours, but some regard two meals as ample for the necessities of the system, and by

habit this arrangement can be borne without any discomfort.

During disease, however, the stomach is unable to bear the rules of ordinary life, and the system may require other methods. In states of great exhaustion it is necessary that food be given very frequently, varying from every two hours to every quarter of an hour; and we have known many instances of otherwise fatal exhaustion in serious disease averted by the assiduous attention to this repeated administration. In irritable conditions of the stomach, where ingesta produce pain and cause their rejection, small quantities of bland nutriment are capable of being borne, whilst solids in the ordinary quantities are quite inadmissible. But it is not sufficient to allow of proper intervals between the meals; regularity as to the hours are needed, especially in the dyspeptic; to dine at every hour of the day, from noon till late at night, is an effectual method of producing and of perpetuating dyspepsia.

It has often been said that a larger quantity of food is taken than is absolutely needed; and this is very apt to be the case when the meals are hurried, and when the appetite is tempted by a great variety of dishes. We have already referred to the absolute quantity of food required by the system; but in this respect there is a great difference in health and in disease. Imperfect mastication greatly increases the work of the digestive organs; for when the portions of

aliment are thoroughly divided they are more easily dissolved by the gastric secretions; and when left in large crude masses, they remain in the stomach even for many days, irritating and producing severe spasmodic pain. The action of the saliva upon the starchy portions of farinaceous food is also facilitated when sufficient time is allowed for the food to be thoroughly mixed.

Again, the diet may be so changed by the modes of preparation as to be hard and indigestible, or be so acted upon by heat and admixture with other substances that secondary chemical action is very soon induced, and indigestion is the result, or if it have already existed, the malady is greatly aggravated. It might seem strange, that if the diet be in itself of a suitable character it is still important that there should be variety; nevertheless change is needful for several reasons. The requirements of the system may demand for a short time the avoidance of animal and even of vegetable food, but if there be a too long continuance of farinaceous substances, the palate may become wearied till the stomach refuses to digest them; and so with the ordinary diet, it may be well adapted for the system, but be quite unpalatable. This needful variety in diet is often overlooked in laying down rules especially for the dyspeptic; and some of those things that may be in themselves less suitable may be found really more easy of digestion, because more agreeable to the palate.

If active exercise be taken soon after a meal, unless

digestion be rapid and in thorough integrity, flatulence is very likely to be induced, and sometimes severe colic is the result. Semi-digested portions are more easily extruded through the pylorus, fermentative changes are caused in the small intestine, and pain distresses the patient. The constant repetition of these practices—namely, hurried meals and active exercise immediately afterwards—induce oftentimes persistent dyspepsia. Not only should every meal be partaken of slowly, but a short time should elapse before active exertion is made. This is one among other reasons why the confirmed dyspeptic is greatly benefited, and able to pass his usual bounds, when on the Continent, and away from his usual avocations. He will sit down at the *table d'hôte*, occupying perhaps more than an hour at his repast, instead of the usual twenty minutes or quarter of an hour. But one or two hours afterwards, moderate exercise promotes the digestive process; those portions of food which have undergone solution have probably passed the pylorus, and the stomach is less distended than when digestion is at its commencement. During the performance of any function in its full energy, more blood is sent to that part; thus, whilst digestion is going on the pulse beats more quickly, but if at the same time the brain is actively at work, and demanding its full supply of nutrient material, there would seem to be a hindrance to the stomach's work and digestion is less perfectly executed, and still more if the

nervous system be so engrossed that the action of the vaso-motor and pneumogastric are interfered with; the process is then rendered slow or almost checked. It is notorious that any sudden intelligence of an exciting character, whether pleasing or distressing, completely destroys the appetite, and food can scarcely be taken; and if the senses be engrossed, the mind absorbed, and the attention wholly directed to any subject, the sense of hunger is forgotten or not experienced, so that even faintness may after a time be induced. An overwhelming sorrow appears to act not only upon the mental, but upon the physical state; and if food be placed in the stomach after persuasion, it will remain as if unacted upon for a prolonged period.

How essential, therefore, that the mind should rest, and that a calmness should if possible be attained during the performance of ordinary digestion!

2. *A second class of remedies in gastric disorders are those which increase the digestive power by the addition of some of those principles which are naturally in operation during the digestive process.*

As we have before stated, digestion can scarcely be limited to the stomach alone, for the action of the pancreas and of the liver are important secondary agents. Inspissated bile has long been used, and more recently a pancreatic emulsion. Among these remedies, then, we place pepsine, hydrochloric acid, lactic acid and lactates, inspissated bile, pancreatine.

Pepsin is one of the normal constituents of gastric juice, and, with the assistance of hydrochloric acid and of lactic acid, or both, it constitutes the most important solvent of the nitrogenous portions of our diet. If this constituent be insufficiently secreted, the solution of food is imperfect, and it must remain undissolved or be taken in a smaller quantity; and the object for which pepsin is administered medicinally is to promote artificially the solution of fleshy portions of food. Thus it was introduced by Corvisart, and into England by Dr. Ballard. It has been extensively used, and many have spoken very highly of its beneficial effects; but these encomiums we can scarcely endorse, for when the vaso-motor nerve acts inefficiently, and the appetite is lost, it is far better to seek to restore these than to supply the lacking energy by extraneous help.

The gastric juice contains lactic and hydrochloric acids, which, with the pepsin, constitute the most important chemical principles of the medium by which solution of the food is accomplished. It has been proposed to promote the digestive process by the addition of these acids. For a long period hydrochloric acid, in its dilute state, has been employed, and we have frequently noticed its beneficial effect; but we find that its good result is due, not only to the chemical reaction of the hydrochloric acid as increasing the gastric solvent power, but to the effect upon the system generally, and to its local action upon the mucous membrane. Hydro-

chloric acid is invigorating to a degree beyond that which is explained by its mere acidity.

In this respect it differs from lactic acid and other lactates as medicinal agents. They are merely excretory in their character, and it is doubtful whether the lactic acid found in the stomach is really an essential ingredient. Lactic acid is abundantly produced in the secondary chemical changes which organic compounds of the food undergo, and is not in itself a beneficial and tonic medicine. Hydrochloric acid is of service in those instances especially in which we find digestion very slow, the appetite poor, the tongue large, clean, and marked by the teeth; the food often remains in the stomach partially digested, and a sense of weight or painful distension from secondary chemical change is the result. The acid, then, tends to promote solution when given soon after a meal; but in these cases, even when given independently of food, its action is serviceable, for it appears to strengthen and invigorate the vaso-motor nerve. The lactates are of no service in this respect, and they tend after their absorption to oppress the system rather than to invigorate.

The pancreatic secretion exerts an important change upon the oleaginous substances in the chyme, and, according to M. Corvisart, it acts upon the nitrogenous also; and pathological observations tend to confirm the opinion that the secretion from the pancreas, being of an alkaline character, serves, by its combination with

the elements of oleaginous food, to promote their absorption into the system. In strumous disease, and in some forms of phthisis, fat is with difficulty assimilated, and the greatest benefit is observed to follow the administration of an oil easy of assimilation, such as cod-liver oil. Dr. Horace Dobell traces the proximate cause of phthisis, &c., to some imperfect action of the pancreas, and has proposed that an emulsion should be formed from the pancreas of lower animals, and thus used that it may promote the absorption of fatty portions of food.

This remedy may be placed in the same category with the secretion from the liver, as given in the form of inspissated bile. Bile naturally acts as an aperient; it retards fermentative changes, and when from numerous causes the liver seems to act inefficiently, and the bowels are confined, it has been proposed as a substitute for the natural supply. These remedies are one step in advance of the philosophical remedy of phosphorized oil when the brain substance is defective.

3. A *third* class of remedies in gastric disease are those *which remove the impediments of digestion*; but these will be noticed especially in the consideration of the different forms of dyspepsia. A state of active or of passive congestion of the mucous membrane interferes with the healthy secretion of the gastric juice, and thus prevents normal digestion; or the mucous membrane becomes so intensely irritable that it cannot tolerate the

presence of food ; and to lessen this sensibility is to take away a great hindrance to the normal work of the stomach. Again, the secretion may become of an unhealthy character from other disease, such, for instance, as in Bright's disease of the kidneys, when the gastric juice contains urea ; or direct pressure may be exerted upon the stomach, so that the requisite expansion and movements cannot be executed ; and lastly, fermentative changes are in some instances induced in the semi-digested mass, gaseous and acid products are formed, and numerous distressing symptoms are the result. It is our object to ascertain what are these impediments to the healthy exercise of functional energy, and if possible to remove them. It is not by the blind treatment of any mere symptom that we can effectually do this, but rather by the removal of the causes themselves, although we may be compelled by the urgency of some particular symptom to make its relief the primary object of treatment.

Alkalies are given to diminish irritability, especially soda and potash, so also magnesia and lime in solution, nitrate of bismuth, nitrate and oxide of silver, and, at Dr. Leared's suggestion, the black oxide of manganese. Sometimes anodyne and anti-spasmodic remedies assist materially in diminishing this same abnormal sensibility—morphia, opium, henbane, belladonna.

Active and passive congestions are relieved by mer-

curials, which stimulate the glandular organs generally, and act upon the bowels, thus unloading the portal system, as well as by purgatives and by ipecacuanha. A relaxed and atonic state is mitigated by sulphuric acid, nux vomica, and tonics generally. Fermentation is checked by creasote, by the hyposulphites and sulphites, by charcoal. But these and other agents that remove the local hindrances of digestion, and facilitate the process, we shall have to notice more particularly.

4. A *fourth class of remedies* in disease of the stomach of a functional kind are those *general agents which act in a secondary manner upon the stomach*. They are amongst the most important and powerful remedies that we possess for the alleviation of these maladies. To those in whom the cares and fatigue of an active life have exhausted the strength of the system, and in whom the stomach as part of that system is in an enfeebled state, the invigorating effect of rest and change, of bracing highland and mountain air, of a complete unbending of the mind, and repose from its wonted pursuit, is more effective than merely medicinal treatment. Mental distress and anxiety are effectual barriers to digestion, and far more easy is it to prescribe a medicinal stimulant than to calm the mind and quiet perturbed feelings; and we believe, that the province of the physician extends much farther than the mere thought of the present bodily ailment, if he would restore to

healthy exercise the living organism in all its working powers.

There are medicinal substances, however, which, in their stimulant and tonic character, serve to assist in exciting the vaso-motor nerve to more energetic action.

On the Hypodermic use of Remedies, and Inhalation.
—As the most easy method by which medicines can be absorbed is through the stomach, it is generally made to bear the presence of agents which greatly interfere with its own function. Thus astringents are applied to its surface, whilst it is often expected to exert its full energy; irritants are brought into contact with it; alkalies neutralise its secretion, and thus destroy the solvent power of the gastric juice; opiates deaden its sensibility, whilst they also check its secretion. It must be confessed that the stomach is often used amiss. It is overtaxed in health, and during the progress of disease, whilst it suffers as part of the general system, it is made to bear the presence of all kinds of remedial agents—a sort of living fulcrum on which the physician exercises his powers of controlling and staying disease. But although generally a willing agent, it sometimes becomes rebellious and uncontrollable. Other methods, however, are in use, and may be applied with some prospect of success. There is the epidermic, as well as the endermic mode of administering remedies. The use of enemata might be employed more frequently than it is with great benefit, and the inhalation of remedies is a

method that has been often lost sight of because more troublesome in its application. As to the *epidermic* method, a thick layer of epithelium renders absorption very slow, so that this is one of the most tardy means of inducing medicinal action. Continuous contact upon the surface of the skin is used, as when a belladonna plaister is applied, or iodine pencilled upon the part affected; or inunction is employed, as when oleaginous substances are rubbed in, whether of a simple kind, or containing irritants, as croton oil; or the remedy may be used in the form of a bath, as the sulphurous or nitro-hydrochloric acids, and in this way nutrient material has been introduced into the system, as by bathing, or placing portions of the body in milk.

The *endermic or hypodermic* method has of late years been extensively employed, first, by Kurzack, Reid, and Rynd, for the relief of symptoms by local injection into the skin, and then for the production of general symptoms by Dr. Hunter. Modern chemistry has so separated the active principles of many medicines in the form of vegetable alkaloids, that a full dose may be administered in a very small quantity of solvent; and it must be borne in mind that the hypodermic method ensures the most rapid absorption into the system; a smaller dose is therefore required to produce the same effect as that produced by ordinary absorption from the mucous membrane. A quarter of a grain of morphia might be taken with comparative impunity by an adult,

but the injection into the cellular tissue of this minute quantity has been known to induce almost fatal coma. The best means of employing hypodermic injection is by the aid of a carefully regulated syringe, armed with a perforated needle extremity. Quinine, atropia, and aconite may be used by this method, but the latter alkaloids require extreme care.

Amongst the valuable remedies we possess for the relief of gastric disease, there are some which have in many instances, by their improper employment and abuse, produced serious results; we refer especially to the unwise use of alkalies, purgatives, mercurial medicines and ardent spirits.

Alkalies.—Some of the familiar symptoms of gastric disorder are correctly attributed to an excess of acid in the stomach, whether from direct secretion of gastric juice, or from secondary formation consequent on chemical reaction. Heartburn, and other allied conditions, thus induced, are often immediately relieved by the carbonated alkalies of potash, of soda, or of magnesia; and many persons on the return of the symptom at once resort to this palliative measure, and repeat the alkaline remedy, or the habit is acquired by some of taking an alkali after nearly every meal. In this way the solvent power of the gastric juice is greatly interfered with, for its natural acidity is destroyed; and we have known a state of general weakness and exhaustion gradually induced by such practice.

There are also other conditions in which alkalies are given with advantage, even in large doses, and for a considerable time; we allude to the presence of calculus in the kidney, to diseases of the bladder, to gouty dyspepsia, and to rheumatism, &c. The excessive use of alkalies, even in these cases, greatly injures healthy digestion, and is followed by exhaustion, pallor, irritability of the nervous system; the blood is apparently changed in character, and the relative quantity of the red corpuscles diminished. As an alkaline salt, the chloride of sodium, common salt, is an important ingredient of our ordinary food; but in excessive quantities it is not only an irritant, but when by habit the mucous membrane can tolerate its presence, the blood is changed, and we have seen marked purpurous spots covering the skin from this cause. A patient had been in the habit of thickly spreading table salt on his bread, morning and evening, nearly a quarter-of-an-inch in thickness; the purpura disappeared when the habit was discontinued, but he felt it a great deprivation to be debarred from his baneful excess of salt.

The salts of magnesia have in some instances been found in concretions in the intestine, but it is only when the carbonate or the simple magnesia have been taken in very large quantities, or for lengthened periods, that such result has followed.

Purgatives.—Few remedies afford greater relief in many forms of dyspepsia, especially those connected

with portal and hepatic congestion, than a free purgative action on the bowels; a sense of depression and exhaustion is often associated with congestion of the biliary organs, and free action is followed by renewed feelings of healthy elasticity and strength. This circumstance has led to the too frequent use of the Abernethian remedy of a blue-pill and black-draught; and it is unfortunately given when an opposite plan of treatment is required.

Again, it has been supposed that a daily relief from the bowels is essential to health, and purgatives are often given to induce this action; and when, especially in early life, constipation becomes obstinate, purgatives are unfortunately repeated, and persisted in, so as to compel a continuous effect. Irritation of the mucous membrane is the result of this mal-treatment; and we have frequently witnessed chronic inflammation of the colon, and the discharge of mucous secretion induced, so as to trouble the patient for many months.

The stimulus thus acting upon the alimentary tract must be repeated to produce similar action, and the strength of the remedy is gradually increased; inactivity of the bowel follows, with distension; for, with increased size, greater contractile power in the involuntary muscular fibre is required. This distension of the colon is a troublesome and distressing symptom, the abdomen is enlarged, the stomach is pressed upon by

the enlarged transverse colon; and it often happens that an inactive condition of the sigmoid flexure and rectum distress the patients for a lengthened period.

By entirely leaving off medicinal irritants, and using measures calculated to invigorate and strengthen the system, especially walking and horse exercise, the healthy tone of the alimentary tract is gradually regained. The diet must be regulated; enemata are often of great service, and in some cases an electro-galvanic current will act as an effectual stimulant to the enfeebled muscles.

Mercurials.—With all the vaunted improvements of modern science in therapeutics, mercurial medicines are given in a very indiscriminate manner, and most injurious results often follow their use. Because relief is produced in some cases, a furred tongue with paler evacuations than natural, or constipation, is pretty sure to have the benefit of blue-pill or calomel. In children this injudicious proceeding is the cause of hyperæmia of the mesenteric glands, and often, I believe, of strumous deposit; and in adults a form of chronic muco-enterite is induced. If the action be excessive, great prostration is soon evident; and if the mercury be continued so as to affect the system, the vaso-motor nerve is enfeebled in its action, nutrition is impaired, pallor is produced by diminished red corpuscles in the blood, general cachexia follows, and many months may be required to regain strength.

Alcohol.—Great responsibility attaches to medical practitioners in their recommendation of ardent spirits in the treatment of disease; and the public are too prone to resort to them for the immediate relief of gastric symptoms, and of weakness.

There can be very little doubt that the relief of flatulent distension of the stomach is often promoted by these means; but we especially see the beneficial result in the direct stimulant action to the vaso-motor nerve. Many lives have been saved by the right use of alcoholic liquors, but unfortunately that which the physician may prescribe as the requirement for shortening disease becomes the habit; and, however diluted they may be, ardent spirits as a constant beverage are productive of injury. And although many of the direct experiments that have been made in reference to ardent spirits checking digestion are comparatively valueless, because the alcohol was used in a strength very rarely, if ever, voluntarily taken; there is no doubt that alcohol irritates the mucous membrane, especially if given in a concentrated form, so that the mucous membrane becomes reddened, and the secretion of the normal gastric juice is checked.

From the free use even of wine and malt liquors we often find a state of sub-acute inflammation of the stomach produced; congestion of the liver and enlargement follow. This state gives place to chronic dyspepsia, very frequently to the vomiting of blood, and to a

disordered state of the whole abdominal viscera. Organic degeneration of the liver and kidneys often succeeds, or chronic ulcer of the stomach, with its attendant miseries; an atheromatous condition of the arteries and capillary vessels is another sequence of alcoholic imbibition; and this again becomes the cause of valvular disease of the heart, and it may endanger life from apoplectic effusions into the brain.

Alcohol may be a most valuable medicine, but the abuse of it entails innumerable miseries, and that which may be of temporary benefit becomes direct injury when unnecessarily continued; the temporary requirements of disease and of a failing circulation are never meant to be the guide of normal health; and if large doses of stimulant be continued, organic disease will almost invariably follow.

CHAPTER VI.

DYSPEPSIA FROM WEAKNESS.—1. FROM IMPERFECT NUTRITION AND FROM DISEASED VESSELS. 2. FROM EXHAUSTION OF THE CEREBRO-SPINAL NERVOUS SYSTEM. 3. FROM EXHAUSTION OF THE NERVE OF ORGANIC LIFE.—ATONIC DYSPEPSIA.

As an expression in the science of medicine, *weakness* is both indefinite and of various import, and we should be unwilling to make use of it in describing imperfect functional energy of the stomach did we not recognise a class of cases to which the term may be justly applied. Want of strength may be real or imaginary, real, when due to general exhaustion, imaginary, when any impediment to the performance of healthy function or the separation of excreta embarrasses the system; and when in exhaustion and general weakness the stomach cannot perform its digestive function, the feebleness is increased, because the supply of fresh formative material is cut off.

The varieties of exhaustion may be traced to three sources. 1st. *The exhaustion connected with diseased vessels*, as exemplified in advanced life. During the earlier stages of life general functional activity is

maintained at a high standard, the wear and tear of the system is considerable, and fresh increment is required for the general growth of the body; but during its later stages a contrary state exists, the organism works at a slower pace, the wear and tear is less, and it is not necessary that the same energy of the digestive organs should persist. It is well known that in old age the vessels become rigid and atheromatous, the blood is less freely distributed, and there is less ability in the economy to restore preternatural disturbance, and less elasticity of the system; as in the autumnal leaf of the tree, the nutrition changes are more sluggishly performed, the vessels gradually become obstructed, and at length almost obliterated, so that in course of time the connection with the parent stem is easily severed; thus also in advanced life functional activity lessens, till at length it fails altogether.

The same diminished power is observed in the enfeebled digestion of aged persons, as we have previously remarked; they are conscious that the function is not so energetic as it formerly was, and, indeed, they are aware that the necessity for supply is also lessened, the bodily activity is less, and the appetite for food is proportionately small. The fact of this decreased functional power is testified by the structural changes in the several organs themselves, the muscles are less vascular, they contract with less power, and

undergo degenerative changes; the inner membrane of the arteries becomes rough and atheromatous, the minute capillary vessels present highly refracting particles from fatty metamorphosis. In the nerve centres there is a larger quantity of pigmental deposit, the bones become more brittle, the fibrous tissues also undergo partial ossification, and the glandular organs diminish in size; thus in every structure there is the manifestation of the same fact, and the weakness of digestion is only a part of the general debility.

It is doubtful, whether this condition is due to the want of energy in the glands, or to the impeded flow of blood from atheromatous vessels, or to the degeneration of the nervous elements of the large ganglionic centres; still the fact remains, and it often becomes a question of the greatest importance, how the failing power of the stomach may be revived, and how renewed energy may be given. We have already stated, that the appetite in old age is lessened, but it is sometimes found that it almost wholly fails, and the other vital functions and reparative changes are reduced to the lowest degree. If food be taken, there is no ability to digest it, and it remains in the stomach, producing pain, a sense of weight and oppression; these symptoms may be accompanied by headache and faintness, and not unfrequently are followed by flatulence, and sometimes severe colic. The functions of the brain may become so disturbed, that they produce symptoms

of threatening apoplexy, as loss of consciousness, impaired or disturbed vision, and vertigo; the tongue appears to lose for a time its right muscular movement, the power of speech is gone, the words cannot be spoken, or the wrong word is substituted; numbness of the hands, or even temporary loss of power, are experienced, and these symptoms singly or together produce considerable alarm to the patient and his friends. The vessels of the brain in advanced life become rigid and atheromatous; and we often find the middle cerebral and the basilar arteries at the base of the brain resembling bony tubes; the minute capillaries in the pia mater, and in the brain substance, are similarly affected, so that it is not surprising that with functional derangement of the stomach these serious symptoms of threatening brain disease should occur.

The valves of the heart in advanced life become also atheromatous, and its muscular fibre undergoes degeneration, so that from trifling causes the action becomes irregular, and dyspnœa and palpitation are soon induced; thus patients affected with gastric disturbance not unfrequently refer the ailment to the heart.

Again, the difference that is presented by the abdominal glands in early and advanced life is most marked, and is shewn in every part of the organism. The mesenteric glands in infancy constitute distinct, oval glands, highly vascular, and evidently possessing

great functional activity; in old age, it is on the contrary, often difficult to find them, and they may then only weigh a few grains. The liver in early life has proportionally a much larger volume than in old age, so also the kidneys; and although it is an opinion only based on hypothesis, we do not doubt that the gastric glands undergo similar atrophy.

To this circumstance then, we must look for one cause of the imperfect solution of food, which takes place in aged persons; but the diminished appetite and general feebleness have reference also to the state of the nervous system, and especially of the vaso-motor nerve. Still, it would be both erroneous and injurious in its tendency to regard this lessened functional activity as necessarily constituting disease, or to seek to attain the standard of early or middle life. The wants of the system do not require such a condition; and it is remarkable, that comfortable health and vigour are often maintained for months, and even for many years, upon a diet forming only a small relative part of that which is usually taken in middle life by the same person.

This feebleness of digestive power in aged persons is of great importance when disease affects other parts of the system, for then greater work is required from an organ, the functional activity of which may have been reduced almost to a minimum. Now, although we cannot restore organs already degenerated, or revive

the elasticity of youth, still much may be done to remedy this state, and there are three sources of alleviation available to us. 1. The administration of such a diet as the enfeebled stomach can digest, and the judicious use of stimulants. 2. The regulation of the general habits and condition of the patient, so that as far as possible strength may be economised, and the necessity for unusual activity of the digestive power guarded against. 3. The right use of medicines as far as they may be called for.

In reference to the first, as to the proper diet, it will often be found that the stomach may be spared very much by the use of fluid diet, by farinaceous food; and when this atonic dyspepsia is severe, by an imitation of infantile food, milk with soda water, cream with arrowroot, soups, &c. Nutrient enemata are of some service in extreme cases, but especially when acute disease supervenes upon this state of exhaustion.

When the symptoms are less severe, and solid diet can be digested, we must still give that which is easily assimilable, and free from hard and insoluble ingredients.

As to stimulants in atonic dyspepsia of advanced life, if taken in excess they increase the exhaustion, because they interfere with glandular activity and integrity; but, with wise precautions stimulants excite the stomach to more active secretion, and more powerful digestion; a small quantity of brandy may in this way be advan-

tageously added to milk, and wine judiciously administered often acts in a similar beneficial manner.

The second object of treatment is very important, namely, to spare strength by the avoidance of excessive fatigue, whether physical or mental, to take every precaution against sudden extremes of temperature, and to maintain as far as possible an equal atmospheric condition. Moderate exercise is greatly conducive to the maintenance of strength, and to the healthy performance of every function; and it affects no function in a greater degree than that of digestion.

The habit of snuff-taking and smoking produces a relaxed condition of the mucous membrane of the stomach, and impairs its digestive powers; and although, for many years the habit may have been indulged in apparently with impunity, still when the strength is diminished, this additional cause of exhaustion may prove extremely detrimental. Strong tobacco acts as a powerful sedative, but when the grains of snuff are directly applied to the stomach, as in inveterate snuff-takers they certainly are, the injury is much greater than such patients are willing to allow. In advanced life we have found this habit, although for thirty or forty years persisted in with apparent impunity, then become most pernicious in its effects.

3rdly. Medicines are not without value in these instances. We may briefly indicate some of them, and the first that we may mention is the sesquicarbonate

of ammonia ; its primary action is as a stimulant to the mucous membrane and to the vaso-motor nerve, and in this way it serves a doubly beneficial purpose. Condiments with food have a direct stimulant action on the stomach, and one can understand that the old remedy of mustard-seed was of service ; pepper, cayenne, curries, &c., act in a similar manner.

It will be found that a more beneficial stimulant effect may be induced by small doses of the preparations of iron, as the tincture of iron with chloric ether and tincture of calumba, or a dinner pill containing a small quantity of steel pill with cayenne and rhubarb, or if needful a small admixture of the aloetic pill. Dilute hydrochloric acid with vegetable bitters may be tried, and as a natural constituent of the gastric juice, the acid promotes solution of food ; but in these instances, it is in vain to expect benefit from the preparations of pepsine.

It is less, however, by any direct medicinal treatment that we can relieve the atonic dyspepsia of advanced life, than by careful attention to those rules of health and diet by which declining strength may be spared. Special symptoms and causes of disturbance will require special attention, and are amenable to right treatment ; but medicine is not the chief means at the disposal of the physician in these cases.

A second cause of atonic dyspepsia will be found in *exhaustion of the cerebro-spinal nervous system*. Mental

distress and excitement, great anxiety and physical fatigue, constitute this most frequent cause of dyspepsia.

After much anxiety of mind, close intellectual application or research, whether the result of literary pursuit or the competition of commercial enterprise, the impress of the mental state is stamped upon the whole physical organism. The lineaments of the countenance portray the operations of the mind, the sunken eye, the contracted pupil, the careworn expression, the restlessness of manner, all shew that the mind has been taxed beyond the power of the body. In a subject of this kind, there is pallor or sallowness of the countenance, sleep is very transient, easily broken, and often disturbed by dreams; there is headache or giddiness, the tongue is slightly injected in its papillæ, and has a whitish fur, sometimes large, indented, and clean; the pulse is sharp, compressible, and irritable; palpitation of the heart, throbbing sensations, and often pain in the head are produced; there is sometimes nausea, or actual vomiting; the bowels are constipated or irregular; the appetite is diminished, or entirely absent, and if food be taken, it is felt to remain as an undigested mass, producing weight and pain at the *scrobiculus cordis*; sometimes it is followed by a throbbing sensation in the abdomen, and almost over the whole body, with languor or drowsiness; at other times there is faintness after food; and when undigested portions pass into the pylorus and duodenum, violent cramp or spasmodic pain is produced.

Ingesta may be retained in the stomach for many hours, and in some cases even for days, in a crude state ; the secretion is not sufficient to dissolve what is placed in the viscus ; the irritation produced by the retained food aggravates the ailment, and fermentation or decomposition is set up, with flatulence, pain, heartburn, or severe gastralgia. This imperfect solution, however, may arise from excess of food, rather than from diminished solvent power of the gastric juice.

After any sudden mental shock, this state of comparative cessation of the digestive powers is painfully shewn, the smallest quantities of food exciting pain, headache, and distress ; the heart, already feeble in its action, is still more disturbed by attempted digestion, and actual syncope may be the result, or distressing colic and vomiting ; the bowels are in this state generally confined, but they sometimes become irritable.

It may be, that in this condition of nervous exhaustion the stomach receives an insufficient supply of blood, and that the mucous membrane is in an anæmic state ; but, there can be very little doubt, that the intimate connection of the vaso-motor or sympathetic nerve of the stomach with the cerebro-spinal centres determines this marked effect upon the digestive function. Numerous instances of this effect of the mind upon the physical organism might be adduced ; it is familiar to every one how bad news will destroy the appetite, and that the sight of disagreeable and offensive objects disturb the stomach ;

but graver and more persistent symptoms arise when the mind is overdone by the sudden removal of some beloved relative, or when it is agitated by great alarm and sudden fright, or overwhelmed by unexpected reverse of fortune. It will often be found that, whilst others may have forgotten some event which for the time produced universal sympathy, the effects are long seen by the physician, upon those immediately concerned; years may elapse, and the effect on the physical organism may still persist, and it is frequently found that a functional disturbance of the stomach thus produced, is followed by organic change; this dyspepsia at first may be only functional, but it slowly gives place to the signs of cancerous disease of the stomach or liver; thus it was with the great Napoleon at St. Helena, and thus it has been with very many who have come under our own observation.

The same connection of nerve supply explains the loss of appetite, and the inability to digest food after great physical fatigue; how often is it found that strength is so reduced that a person cannot partake of nourishment! A strong and vigorous young man may be so exhausted by the fatigue of a mountain climb as to be utterly unable for a time to take that which the system so urgently requires; and in a less degree the same state is continually observed.

The large nerve ganglia of the abdomen may, however, not only be affected secondarily by the state of

the mind, and by the centres of ordinary sensation and motion, but they may become directly involved, and this leads us to a third source of atonic dyspepsia, namely, *exhaustion of the nerve of organic life*. A certain amount of nervous energy is required for the digestive process, in order that gastric juice in sufficient quantity, and of a healthy kind, may be poured out, that the necessary muscular movements may be performed, and that the temperature best fitted for the solution of food may be maintained.

In chronic disease, as the powers of life gradually wane, there is inability to take or to assimilate the nourishment the system so much requires; and it is often in vain that we afterwards search in the stomach itself for the cause of this feebleness, although sometimes we find the mucous membrane affected with fatty degeneration, or the minute capillaries of the surface are involved in lardaceous disease.

This form of atonic dyspepsia is of very common occurrence amongst those who are in circumstances of poverty and want; hard labour and corroding care, insufficient rest and pining hunger, induce a condition that is very familiar to those who have seen much of hospital and dispensary practice, or who have seen disease amongst the poor. The spare appearance, the dejected and careworn countenance, the complexion partially bronzed, irregularly sallow, the eyes sunken, the tongue clean, or irregularly furred and injected at

the tip and edges, irritable cough, the pulse sharp and compressible, pain at the scrobiculus cordis, and flatulence after food, mark this state; very frequently the stomach becomes so sensitive that the food taken is quickly rejected, the bowels are easily disturbed, so that diarrhoea supervenes. It might be thought that in dyspepsia from exhaustion the appetite would be craving, and that a generous diet would at once be digested. This is, however, not the case: the appetite is lessened; and the solvent power of the stomach is so diminished that solids cannot be dissolved, and if swallowed they produce headache, vomiting, and pain.

In early manhood, especially if growth has been rapid, a state of general weakness is often induced, and atony is the result; inactivity of body, headache, dilated pupil, compressible pulse, and feebleness of digestion follow. There is a sense of apparent exhaustion, the mind often becomes dejected and melancholy, the more so if these symptoms be associated with any other cause of undue loss of strength. Trashy publications and advertisements tend to increase the mental depression, and the practice of the impostor is to magnify the symptoms to increase his own gain. This state is still more marked in young women, in whom the system undergoes even greater change at the period of commencing menstruation; and without great care, the stomach, at first irritable, induces painful digestion; the supplies are gradually lessened, and disease becomes

confirmed; animal food is left off, and, simply tea or dainties, are preferred; exercise in the open air is avoided if possible, from the consequent fatigue and exhaustion; this still more increases the atony, and at length marked chlorosis results; then, we have a waxen countenance, dilated pupil, severe headache, nervous depression and excitement, throbbing of the heart, pain under the breast, pain at the stomach after food, sickness, flatulence, constipation or irregular bowels, as the symptoms. In this state of exhaustion, tubercular deposit may take place in the brain, lungs, mesenteric glands, ovaries, &c., and one or other form of phthisis be induced. I have had patients under my care, who had gradually reduced their scale of diet, till one article after another had been left off, and the dietary consisted only of small quantities of bread with tea; the countenance becomes as pale as white paper, and the physical strength is gone. With right treatment and perseverance in it, such atonic dyspepsia is entirely removed. This state is closely connected with that form of sympathetic dyspepsia, especially observable in young women, to which the term of "regurgitative disease" has been applied by Sir Henry Marsh, of which the prominent symptom is excessive irritation of the stomach; but, to this further reference will be made. After child-bearing, and especially when that is followed by prolonged lactation, the whole power of the nutritive system becomes well nigh exhausted, and atonic dys-

pepsia is a common symptom. The face, and especially the forehead, often become irregularly bronzed in patches, the headache is severe, either at the vertex or at the temple; ringing noises in the ears are experienced; the eyes are intolerant of strong light, the pulse is compressible, the stomach and bowels are irritable, causing either diarrhoea or vomiting, or both; the appetite is poor, and faintness is often felt, or there is a sensation of abdominal exhaustion and emptiness. The same condition is observed in the exhaustion from other causes; from severe hæmorrhages, from excessive menstruation and leucorrhœa, and in the convalescence from acute diseases. Mercurial medicines, if continued so as to affect the system, cause general depression, exhaust the nervous energy, and relax the mucous membrane, and thus induce dyspepsia of this form. Tobacco is a powerful depressant, and although, after its moderate use, it has a soothing effect on the nervous system, and it renders the intellectual power more vigorous, we often witness that in habitual smokers, the heart is enfeebled, the mucous membrane relaxed, the appetite is lessened, and a form of atonic dyspepsia results. This is still more apparent in great snuff-takers, especially if smoking be combined. The state of the nervous supply to the mucous membrane of the stomach and its glands, is the probable cause of these symptoms. Large branches are sent from the semi-lunar ganglia upon the coronary arteries to every part of the stomach, and it is by their

influence that the gastric juice is poured out at its proper time, and in its proper quantity. The mere presence of food in the stomach will not induce further gastric secretion, if nervous energy be wanting. The enfeebled state of the nerve power is not, however, limited to the stomach, but the heart and its cardiac plexus are in a like state, and the supply of blood to the stomach is thus rendered insufficient. The attacks of faintness may be explained in the same way, namely, that a larger supply of blood being sent to the stomach, less is conveyed to the brain, causing a temporary failure of power. I have observed actual syncope, as the result of the slight disturbance to the circulation from urging exhausted patients to take solid food. In persons who are inordinately stout, we find feebleness of digestion, and this is in part due to the state of the vaso-motor nerve. The symptoms arise from the feeble condition of the heart and circulation, and are increased by an inactive state of the liver. A greater amount of food may be taken than can either be digested, or is needed for the system, and it consequently induces a sense of weight and exhaustion. Although the appetite is often small in stout persons, it is not always so, it may be both fastidious and one that has been pampered with highly-seasoned and indigestible diet; the hydrocarbons are stored up, instead of being removed in the ordinary changes of respiration, &c.; but the mischief is still further increased when the heart is irregular

from an excess of fat about it, or when the feeble circulation of the brain manifests itself in vertigo and disordered sensations. Much relief is afforded by occasional alteratives, by aloes, rhubarb, and taraxacum, or by nitro-hydrochloric acid with bitter infusions; stimulants should be cautiously given, and outdoor exercise gradually increased. To such patients horse-exercise is often most serviceable. Although in some of these cases of atonic dyspepsia superficial ulceration may take place, and from the want of power the other coats of the stomach be perforated, as we shall afterwards have to describe, it will generally be found that, with proper treatment and care, the symptoms slowly subside.

The object of the treatment is to rouse vital energy, at the same time that a diet, as sustaining as possible, is administered. The following are some of the medicinal agents at our disposal: the carbonates of ammonia induce a direct stimulant effect, and aromatics, with mild vegetable infusions, act in a similar manner. If the tongue be large and flaccid, and the food remains as a weight at the stomach, mineral acids are of great service, and assist digestion.

At a later period steel and quinine may be used, but care is required both as to the form of administration, and the mode of combination. It is well always to give ferruginous preparations directly after a meal; the medicine thus becomes incorporated and absorbed, without any excitement or pain being produced. The

milder preparations of iron should be tried, the ammonio-citrate, potash-tartrate, the phosphate, or the reduced iron.

Quinine often disagrees, and if the tongue be injected, the medicine is likely to cause sickness, headache, and increased distress; the liquor cinchonæ is a more elegant and less bulky preparation than the decoction, and it is often borne better than quinine itself.

There is a remedy, which I have found of great service, namely, nux vomica and its alkaloid strychnia; as a tonic, it proves beneficial, especially in promoting the contraction of involuntary muscular fibre, thus relieving flatulent distension and constipation; but it requires a careful administration, as it will sometimes produce a sense of most distressing faintness and exhaustion, even when given in small doses.

Pepsin is an artificial substitute for the normal solvent of the food; it was proposed by M. Corvisart, and introduced into English practice by Dr. Ballard. It has been employed dried, and mixed with starch constitutes the "Poudre Nutrimentive," and about gr. xv. have been given as a dose, alone, or mixed with hydrochlorate of morphia or with strychnia. The fluid pepsin is, however, more efficacious; still, as an agent in promoting digestion, it is very unsatisfactory in its action; and, it is better to remove the cause of the natural defect, than to supplement the deficiency in a very imperfect manner.

Stimulants are of great value in this form of dyspepsia, but should only be used with nourishment, or to enable the stomach to perform its normal function; strong alcoholic liquors taken in excess during digestion, retard the solution of food; and most injurious results may follow, if the transient stimulant of wine or ardent spirits be made to supply the place of nutriment, and be habitually resorted to, as a remedy for the sensation of weakness and exhaustion.

Ipecacuanha, perhaps, increases the secretion of the gastric juice, thus it is often given with capsicum and rhubarb, as a dinner pill, and proves of great service.

The judicious use of stimulants and tonics should only be subservient to the restoration of healthy function, and in proportion as health is restored, these should be discontinued.

CHAPTER VII.

DYSPEPSIA FROM CONGESTION.

THE mucous membrane of the stomach is extremely vascular; the minute blood vessels form a series of beautiful plexuses, which are arranged not only around the minute crysts from which the gastric juice is poured, but throughout the whole substance of the membrane. These vessels are received by the smaller coronary veins of the stomach, and then reach the vena portæ. The large venous sinus, the vena portæ, passes to the liver, and then reaches the right side of the heart; here it meets with blood from other parts of the body, before it is propelled by the force of the right ventricle to be aerated and oxygenated in the lungs. If any obstruction take place in the heart, the lungs, or the liver, the onward course of the blood is stayed, and passive distension of the extreme veins which first receive the blood takes place. If the obstruction be in the liver, then the branches of the vena portæ at once are over-filled, and passive venous engorgement is the result; but if the impediment be disease in the lungs, then the same congestion takes place by successive steps, first

the lungs, then the right side of the heart, then the liver, and, lastly, the branches of the stomach and other parts. Should valvular disease on the *left* side of the heart be the cause, it leads to the same sequence, and congestion of a similar kind follows. In each case the veins and capillaries of the stomach become filled, and at length distended, even to the rupturing of their coats and the extravasation of blood. The minute capillaries form circular plexuses around the crysts of the mucous membrane, and are found with beautiful distinctness after continued distension. It must also be remembered, that this congestion is of a passive venous kind, and very different in its appearance and in its effects from the congestion produced by active hyperæmia of irritation or inflammation. In the former it is the veins, in the latter the arteries which are filled; in the one, the redness is of a duller colour and diffused; in the other, it is of a brighter colour and in arborescent patches.

Although it is essential for the right action of the gastric glands, and for the secretion from the mucous membrane, that there should be a proper supply of blood, still, whenever the blood is delayed in its course, or congestion arises from irritation, the secretions are changed; and as a necessary result of this venous congestion, the mucus is secreted in excess, and covers over the whole membrane as a tenacious layer. The mucus is sometimes found to be alkaline in its reaction,

is with difficulty washed off by water, and consists of mucous corpuscles, nuclei, and epithelium. When in this state aliment is introduced, it is enveloped in mucus, and solution by the gastric juice is retarded. The mucus secreted in such excess readily undergoes chemical change, and gaseous formation arises and also flatulent distension.

The action of the glands or follicles which secrete gastric juice is lessened by the venous congestion, and that fluid is insufficient for the solution of large quantities of nitrogenous food.

Another result of the long-continued congestion is that serous transudation takes place into the substance of the membrane, and all the coats appear thickened and cedematous, and the surface granular; not only the mucous membrane, but the submucous and subperitoneal cellular tissue, become thus affected. This condition arises in great measure from serous transudation; but, if the capillaries give way, as is not unfrequently the case, extravasation of blood results. If the extravasation be still limited by the basement membrane, points of ecchymosis are observed; but if, on the contrary, this bounding membrane also give way, the blood is effused into the stomach, it becomes mixed with the mucus, and is passed into the intestine or rejected by vomiting. The action of the gastric juice upon this effused blood produces change in the colour, so that it would be scarcely known as blood;

when small in quantity it assumes the appearance of coffee-grounds; if the quantity be great, it is darkened and coagulated; and if it pass downwards the colour is still more deepened, and the appearance becomes that of fluid pitch.

The points of extravasation may be preceded or followed by superficial ulceration, and several of such minute ulcers may be found upon the surface of the stomach, as "*hæmorrhagic erosions*." The thickened mucous membrane becomes discoloured from the deposition of pigmental granules consequent on the long continued congestion; the follicles of the stomach are found very distinct, and filled with nuclei and cells; and this state has been well designated "*chronic catarrh*."

The symptoms produced by the state just described, and which might be designated as constituting dyspepsia from passive venous congestion, are characteristic; but they are always associated with other symptoms produced by the primary and the more important disease, whether that be of the heart, or of the lungs, or bronchi, or, lastly, chronic disease of the liver; each of these have their own symptoms, but in all, digestion is interfered with in a similar manner. The appetite is diminished, and if solid food, especially of a nitrogenous kind, be taken, pain is experienced at the scrobiculus cordis, with a sense of weight and oppression; in fact, the substance is so covered with mucus, that it is very imperfectly acted upon by the gastric

juice; vomiting is occasionally produced, and if the food pass into the duodenum and intestine, colic also follows. Flatulent distension results from the imperfect solution of the food, and from chemical changes both in it and in the mucus; this distension increases the pain, which extends to the back, and if the affection be cardiac or pulmonary, the pressure upon the diaphragm still further distresses the patient by increasing the dyspnœa. The tongue is generally furred, and, although pain in the back is present, it is much less severe than in many other forms of gastric disorder. This kind of flatulent distension becomes exceedingly distressing, so that scarcely any food can be taken with comfort, and nearly every solid form of it is discarded; an attack of hæmatemesis, or of bleeding from hæmorrhoids, &c., may remove the congestion, and afford comfort to the patient, but the symptoms are very quickly reproduced. The dyspnœa and palpitation of heart disease, the cough and gasping for breath of chronic bronchitis, engage the attention of the patient, and obscure the less urgent symptoms of disease of the alimentary canal; it is when the former have been relieved that attention is directed to the abdominal complication.

The diagnosis of this state is free from difficulty; but there are two dangers to be guarded against. 1st. That in our consideration of the primary and the more important malady, this complication be so overlooked,

that those means which would relieve much secondary distress are not used ; or, 2ndly, the primary disease may have become so quiescent that this secondary one may be regarded as the only source of disease.

As to the prognosis, it must entirely depend upon the original malady ; when that can be relieved, and the congestion diminished, the gastric symptoms are alleviated. Too often the disease is ultimately fatal ; but a great deal may be done to remove the distressing symptoms, and to prolong life for many years.

In the treatment we have three means at our disposal :—

- 1st. To attempt the relief of the congestion,
- 2nd. To remove the excessive mucus, and,
- 3rd. To regulate the diet, so that the stomach may not be unnecessarily taxed beyond its capabilities.

Some appear to consider, that because the disease cannot be cured, therefore nothing can be done ; this is both untrue and unwise, as well as unjust to the suffering patient ; much may be done, and great relief afforded.

To *relieve the congestion* the bowels should be well acted upon, and to effect this various remedies may be employed.

Purgative enema serve, not only to empty the bowels, but to relieve the portal congestion secondarily through the inferior mesenteric veins. Salt, soap, castor oil, colocynth, turpentine may thus be used ; more fre-

quently purgatives will be resorted to as less trying to the patient. Extract of colocynth with henbane, rhubarb pill with henbane, jalap and scammony, are useful aperients; but a free mercurial purge, whether of blue pill, calomel, black oxide, or grey powder, are more effective, and often afford great relief, not only by unloading the bowels and thus diminishing congestion, but by stimulating all the abdominal glands to greater activity. The Podophyllin resin also may be advantageously used with the extract of henbane. Saline purgatives diminish the portal congestion, and in this way the sulphate of magnesia is often of service. Croton oil and elaterium are rarely called for in these cases.

The second object of treatment is to remove the *excessive mucus*; and although this might be effectually done by vomiting, having previously distended the stomach by large draughts of warm water, still in cardiac disease this would not be an advisable remedy, and in severe chest complaint would greatly distress the patient. Purgatives in their action serve to clear away large quantities of mucus; but this may also be promoted by mineral acids, either the nitro-hydrochloric in combination, or alone. These acids may be combined with purgatives, as for instance, with the compound gentian mixture of the London Pharmacopeia. The saline mineral waters of Cheltenham, Leamington, Carlsbad, Vichy, &c., cautiously given, greatly mitigate

some of the symptoms to which reference has been made; and if general anæmia exist with this local congestion, the saline chalybeates may be tried, as Tunbridge Wells, some of the Harrowgate and Buxton Springs, the Brighton Spa, or Schwalbach, Franzensbad.

The third object of treatment is to *regulate the diet*. Solid nitrogenous food requires the complete action of the stomach; and in most of these instances, if the symptoms be severe, it cannot be borne. Soups, and the forms of nitrogenous diet most easy of digestion, may be tried; but generally bland farinaceous food best suits the patient. Milk cannot always be taken, for it often coagulates, and a caseous semi-digested mass produces pain and flatulence. Eggs are more easily digested. As to stimulants of an alcoholic kind, caution is required; malt liquors are generally injurious, they will increase the flatulence and distress; so also sweet and effervescent wines; the astringency of port wine contra-indicates its use also, and if any wine must be given, dry sherry, claret, or burgundy are the best. Brandy and other ardent spirits, although they give temporary relief by stimulating the stomach and relieving the flatulence, do not lessen the portal congestion, and are therefore only a partial benefit; still in some cases they are absolutely necessary.

CHAPTER VIII.

INFLAMMATORY DYSPEPSIA.

INFLAMMATION is a term that has been applied to certain associated symptoms of disease ; but the unfounded hypotheses that have been made in connexion with it have led to so much misapprehension that we would gladly renounce the word altogether ; we feel, however, that it has become so interwoven with medical phraseology, that it is almost impossible to substitute any other term.

When inflammatory action arises in any form, the whole of the structural character of the part affected is altered, as indicated by the modified circulation and character of the blood, by change in the nervous system, by the condition of the solid structure, and still more by the functions of the organ being interfered with. Thus redness and preternatural heat are excited at the part affected, the sensibility is increased, the structure of the tissues become swollen from the effusion of sero-albuminous or fibrinous products, and the functional energy is lessened. For instance, in inflammation of the stomach every part is changed ; the capillary arteries become

surcharged with blood, and if the disease be severe and acute, active hyperæmia gives place to one of comparative stagnation of blood; the mucous membrane acquires such increased sensibility, that the presence of anything in the viscus causes pain and vomiting; the membranes of the stomach are all thickened, especially when the morbid process has continued for a considerable time, and the function of the organ is more or less checked, for the stomach is unable to dissolve nitrogenous substances, and to form chymous fluid.

It is not only in severe disease that these indications of abnormal action exist; but even in acute dyspepsia the same changes are apparent, although differing in degree; and the remarkable opportunity Dr. Beaumont had of witnessing the interior of the stomach in Alexis St. Martin has elucidated facts of peculiar interest; thus he saw through an opening in the side the effects produced by ardent spirits upon the mucous membrane; erythematous inflammation was at once set up, and the surface of the stomach became preternaturally red and congested, and also drier than in health, shewing that the gastric juice was not properly secreted. These changes were transient; but when irritation is persistent, an oedematous state of the membrane from serous effusion is followed by true thickening from fibrinous product; the surface becomes mamillated, and the cellular tissue is rendered more dense and opaque.

The lining membrane of the mouth and of the œsophagus secrete an alkaline fluid, which is increased in quantity by the additions from the large salivary glands. The purposes served by the saliva are not only to facilitate mastication and deglutition, but it has also a truly digestive function, and on this account we are led to notice it more particularly. A peculiar principle is present in saliva to which the term *ptyalin* has been given, and it has the property of converting the particles of starch into dextrin and into sugar; saline ingredients are also present, soda, potash, and lime, combined with phosphoric acid, with some lactic acid, and with a variable quantity of sulpho-cyanogen. It is from these saline substances that an alkaline reaction is obtained, and the alkalinity is more apparent during active mastication; but a fact of greater importance in the consideration of indigestion is, that the saliva loses its alkaline and acquires an acid reaction during irritable states of the alimentary canal, and the organic principle ptyalin, always prone to decomposition of a putrefactive kind, is during disease more readily changed, and the breath thus acquires a faint and sickly character. Imperfect mastication, therefore, and insufficient salivary reaction, as well as a variable quantity of saline ingredients transmitted to the stomach, have each a causative relation with indigestion. Still more important are the secretions from the lining membrane of the stomach; in addition to the ordinary secretion from the mucous

membrane, minute glands pour out a fluid which is essentially digestive in its properties, and which is known by the name of the gastric juice. These secretions are changed in inflammatory dyspepsia; the inner surface of the stomach becomes drier than natural, and the power of solution of food is diminished, or altogether checked; when the stomach is inactive, and no digestion going on, the reaction by test paper may be neutral or even alkaline, but when active solution of food is in progress, the fluid formed is always acid. The gastric juice is a clear watery fluid, acid, but containing a considerable quantity of saline material. The acid consists principally of hydrochloric acid, probably derived from chloride of sodium, and lactic acid is generally also present;* but an equally essential element is pepsin, an organic principle closely allied to albumen and fibrin, and which is soluble in water, but insoluble in alcohol. The solvent power consists in the combined action of the pepsin and acid; and an artificial digestion may be effected, if proper heat be maintained (98 to 100°), so as to dissolve albuminous substance. It is this gradual solution of nitrogenous food that goes on in ordinary digestion; it is really more of a chemical than of a vital process, but it is the living action of the stomach that separates the reagents necessary to execute the required

* According to Gmelin and Tiedemann acetic acid is present, and M. Blondlot attributes the acid reaction to superphosphate of lime. —*Simon's Chemistry, Sydenham Soc.*

changes. The solution thus formed differs in its properties from those previously possessed by the fluid albumen, for it does not coagulate by heat. Anything that interferes with the proper formation of the gastric juice, and the due proportion of its components is therefore a cause of indigestion.

The proportions of these ingredients is thus given by Schmidt:

Water	..	..	..	..	..	..	..	..	954.13
Pepsin	..	..	..	..	..	..	..	..	0.78
Sugar, Albuminates, Lactic Acid, Butyric Acid, and Ammonia	..	..	..	..	..	..	..	..	38.43
Chloride of Potassium	..	..	..	..	..	..	..	..	0.70
Chloride of Sodium	..	..	..	..	..	..	..	..	4.26
Potash	..	..	..	..	..	..	..	..	0.17
Phosphate of Lime	..	..	..	..	..	..	..	..	1.03
Phosphate of Magnesia	..	..	..	..	..	..	..	..	0.47
Phosphate of Iron	..	..	..	..	..	..	..	..	0.01

Hydrochloric acid was also found when the stomach was excited to full action, but it exists in variable proportions; and of the saline substances also, a considerable quantity is poured into the stomach in the saliva. The saliva readily undergoes putrefactive change, but the reverse is the case with the gastric juice, which may be kept at a temperature of 100° for several days.

In numerous microscopical examinations of the mucus upon the gastric membrane, we have found great diversity in the size and development of the epithelial and mucus cells; in some instances they are large with distinct nuclei, and in fact these cells if

isolated, might be depicted as typical specimens of cancer cells, although no such disease existed; in other cases, they are smaller, of a simple and rounded form, and evidently of more rapid growth; these varieties in form were not accidental circumstances, but were indications of a previous modification of vital process. Again, the facility with which the secreting cells from the gastric follicles are evolved, although generally the result of post-mortem œdema from the lining membrane of the follicle, it may really evince an exudative change. In my larger work on diseases of the abdomen, I have dwelt on other changes in the mucous membrane, the result of inflammatory or of degenerative action, in the former instance leading to effusion of fibrin and contraction, in the latter causing the production of highly refracting fatty particles instead of healthy cells.

In the consideration of this form of disease, we do not refer to acute inflammation of the stomach arising from the accidental or voluntary introduction of corrosive fluids and other powerful chemical reagents; neither do we at present refer to the conditions of superficial or aphthous ulceration, nor to the perforating and chronic ulcer. As to diphtheritic ulceration and suppuration, they are exceedingly rare sequences of inflammatory mischief in the stomach. Inflammatory dyspepsia is associated with ulcerative changes, but it frequently exists independently of any destruction of tissue whatever; in a short time superficial ulceration may supervene, but

the irritability of the stomach may also continue for a considerable period without such effect being produced. It is very common to find aphthous ulceration of the mucous membrane of the mouth; such minute abrasions entirely disappear without leaving any trace, and we believe that a similar state is often present in the stomach, associated with symptoms of irritability, but of a transient character.

Although the characteristic symptoms of inflammatory dyspepsia are sometimes obscured by attendant circumstances, still they are sufficiently diagnostic when considered in their general aspect. Three indications are usually present, whilst others are less constant and of secondary importance. The three signs referred to are, 1, tenderness at the scrobiculus cordis; 2, irritability of the stomach; and 3, a desire for cold drinks.

1. Tenderness at the scrobiculus cordis differs greatly in its intensity, sometimes it is only manifest on pressure or on percussion, at other times it amounts to severe pain passing through to the back between the shoulder-blades; in any case, however, pressure at the pit of the stomach is distressing to the patient. In many other diseases, the pain is more severe and persistent, as for instance in ulceration and in cancerous growth, whilst in the one under consideration, it is only described as "soreness."

2. The irritability of the stomach is often *disproportionate* to the severity of the pain; and the blandest

form of diet is retained with difficulty. An affection of the mucous membrane alone is not productive of the intense suffering so frequently observed in chronic ulcer of the stomach, and in other organic diseases. It is only when the deeper tissues are involved by the extension of disease to the muscular coat, or when distension of the viscus occurs, that pain in its severity is experienced. An exceptional instance must, however, be adduced when the mucous membrane in the immediate neighbourhood of the pyloric valve is especially affected, but whether this unusual sensibility is due to spasmodic contraction of the valve is doubtful: many of these patients describe the pain as being worst at the close of the digestive process, and characterise it as the passing of food "over a raw surface" at the site of the valve. The vomiting in ulceration of the stomach is *preceded* by pain, the patient often stating that the pain persists till the food is either rejected or has passed onwards; not so, however, in inflammatory dyspepsia, the stomach rejects its contents almost at once, but unless the vomiting be very persistent, little complaint is made.

3. The desire for cold drinks is usually present in the dyspepsia under our consideration; and ice, or cold water, are exceedingly refreshing to the patient, and easily tolerated by the stomach.

As to other symptoms, the tongue is generally injected at its tip and edges; it is covered with an abundant yellowish-white fur, and the papillæ appear

as distinct red points on its surface; it does not present the large and indented appearance noticed in atonic states of the *primæ viæ*.

Headache, mental depression, lassitude, disturbance of vision and ringing noise in the ears, are often complained of. The countenance is expressive of anxiety, the eyes are sunken, the skin is slightly sallow, dry, and often parched, there is occasional febrile disturbance, with a burning sensation at the palms of the hands and soles of the feet. A short dry cough is a frequent symptom, the pulse is irritable and compressible, and the bowels are generally confined, although when the erythematous condition of the stomach passes downwards into the intestine, constituting gastro-enterite, diarrhœa is set up. The urine is high coloured, and urea is generally in excess; it deposits lithates freely, or with nitric acid it assumes a deep colour. It is very important to distinguish this form of dyspepsia from those previously noticed: the first atonic, from an atheromatous condition of the vessels, from an exhausted cerebro-spinal system of nerves, or from a like state of the vaso-motor; the second from passive venous congestion occurring as a sequence of disease of the liver, lungs, or heart; but this is of a more acute kind, and is generally produced by indiscretion in diet or excess, or by the immoderate use of wine or ardent spirits.

There are three forms of inflammatory dyspepsia deserving of separate description and notice; the first

is that which we find in children after sudden changes of food, or after an unsuitable diet; the symptoms are characteristic and sometimes alarming, not only in their primary, but in their secondary effects. The disturbance produced during weaning might be adduced as exemplifying this condition, and so also that set up by hard and indigestible diet or by stimulants; a state of peevish excitement is induced, especially at night, with headache, and often with more or less delirium, the child becomes fretful, its natural appetite is gone, and it craves for improper substances or for cold water; the skin is hot with remissions, so that the state has sometimes been termed gastric remittent fever, the tongue is white and injected at the tip and edges, or with distinct papillæ. The bowels are loose, and the abdomen is enlarged. In many cases the irritability of the stomach is excessive, and the blandest nourishment is rejected, and if associated with diarrhœa, rapid prostration of strength ensues, a haggard wasted appearance is presented, and the little countenance has the painful expression of old age in miniature. In some cases improper diet induces severe colic with prostration and collapse; thus the coagulation of milk in the stomach and intestines has led to exhaustion so speedily, that the effects have been attributed to poison.

Minute points of ulceration have sometimes been detected on the post-mortem examination of the stomach

of children thus affected with acute gastric symptoms; these ulcers have been called "*follicular*;" they vary in size from one-sixteenth to one-fourth of an inch, and sometimes stud the whole surface, being not limited to the lesser curvature alone; they do not extend beneath the mucous membrane. They are not confined to children, but have been found where no indication of disease of the stomach had existed, excepting perhaps the vomiting of coffee-ground substance. This form of ulcer is, however, distinct from the superficial or by aphthous ulceration to which reference has been made.

The second form is that in which the stomach is disordered by some accidental indiscretion in diet or by intemperance. There is headache, with vertigo and disturbed vision, sleep is broken, the appetite is taken away, the sight of food is intolerable, but cool drinks are grateful; the tongue is furred, the stomach irritable, and if the vomiting be violent, green bilious fluid is rejected; tenderness at the *scrobiculus cordis* is also associated with pain at the back, the bowels are irregular, and flatulence distresses the patient. It must not, however, be supposed that every attack of this kind must necessarily be referred to known indiscretion in diet, for the cause may lie in the air we have breathed or the water we have drunk; impurities in the one or the other may induce this inflammatory dyspepsia; a malarious atmosphere, or one charged with impurities from imperfect drainage, have often induced

this condition, and not less frequently, organic impurities in water.

A third form of inflammatory dyspepsia is the result of long-continued excess in food or in stimulants. The countenance assumes a peculiar restlessness, the pupil of the eye is contracted and the conjunctiva suffused; the sleep is disturbed by dreams or entirely taken away, or it is short and broken and without refreshment; the cheeks are irregularly flushed, and their capillaries often peculiarly distinct; the tongue is furred, or unnaturally red, sometimes like raw beef, or it has red patches upon it as if deprived of epithelium, and the patient complains of offensive taste in the mouth; the appetite also is depraved or destroyed, and highly seasoned dishes are longed for; the bowels are variable, and sometimes hæmorrhoids distress the patient; the urine is scanty and high coloured, and deposits an abundance of lithates or of uric acid, and in some cases it becomes highly albuminous; there is also flatulence, spasmodic pain or "cramp" in the abdomen; to these symptoms is added a sense of weakness and exhaustion, which the patient seeks to remedy by fresh potions of stimulants, until the stomach becomes so irritable, that everything is rejected; tenderness also comes on at the scrobiculus cordis, with pain across the chest or in the back; these patients are generally hypochondriacal, and often believe themselves to be the subjects of serious disease of the liver. With other disturbances of

the nervous system already mentioned, we find perverted special sensibility, as indicated by double vision, *muscæ volitantes*, noises in the ears; and the nerves of general sense are also affected, as manifested by numbness, formication, &c.

In strumous subjects, there is a special tendency in the mucous membrane of the stomach to become very irritable. The gums become spongy, the mouth and pharynx aphthous and painful; vomiting is occasionally a troublesome symptom, and also diarrhœa. The pain at the stomach is increased by every kind of food. This form of disease is of a very obstinate character, and may persist month after month; and although we have no evidence of actual ulceration and destruction of the mucous membrane, still there is probably chronic inflammatory change. It must be distinguished from the sympathetic irritation of the stomach produced in the early stage of disease of the lung and of the brain; but it closely resembles that condition of exhaustion with irritability, which we find towards the close of phthisis, of cirrhosis, of strumous peritonitis, &c. The latter state is associated with hectic symptoms, and generally with peculiar fretfulness and irritability of temper.

The symptoms of inflammatory dyspepsia from excess may pass into delirium tremens, or may lead to chronic disease of the liver; and in reference to the stomach itself, the subsequent effects will be scarcely less dis-

astrous. It may be that the state of chronic engorgement of the vessels is suddenly relieved by the rupturing of its capillaries; hæmorrhage takes place into the stomach, and the blood is either vomited in a dark clotted state, or passed downwards in a semi-digested condition, constituting black alvine discharges. We have seen cases where this natural relief has mitigated the former symptoms, although it may have completely blanched the patient, and for a time placed his life in apparent jeopardy; or superficial ulceration may supervene, followed by hæmorrhage of a more severe and dangerous character; or chronic ulcer may be set up, with all its attendant misery, and with symptoms only to be subdued by the most careful treatment, and by attention to strict hygienic rules.

In reference to the prognosis, this form of dyspepsia will generally be relieved, and patients may entirely recover, if they will be controlled in their diet and adopt other suitable measures.

The principles of treatment consist in diminishing the irritation and in relieving the congestion; and these objects are effected by removing anything from the stomach which perpetuates disturbance, by allowing rest as far as possible to the viscus, and by medicines, if any be given, which directly soothe the inflamed surface.

If undigested substances remain in the stomach, an emetic of ipecacuanha or of sulphate of zinc is the most effectual remedy.

The most bland forms of diet are desirable, and those articles which tax all the energies of the stomach to dissolve them should be avoided, as solid animal food; animal soups, and even beef-tea, are often injurious, whilst farinaceous substances are well borne.

Stimulants, especially ardent spirits, malt liquors, and generally wine also, should be abandoned; whilst cold drinks and ice are often extremely grateful to the patient, as well as curative in their effects.

As remedies, those which act upon the bowels, as saline purgatives, especially magnesia and the salts of soda, are of service. These not only unload the congestion of the gastric capillaries, but they act upon the whole portal system. Mercurial purgatives and alteratives act in a similar manner, and afford speedy relief to many of the distressing symptoms. Unfortunately this has led to their too general adoption.

Mucilaginous drinks sheathe the irritable membrane; lime water is often of great service as an alkali in diminishing the extreme sensibility of the stomach; but we have still greater confidence in bismuth when combined with salines and mucilage; the dose of it may, however, be much larger than that usually given. I generally begin with doses of 10 grains, but I have known $\mathfrak{z}i.$ doses of pure nitrate given three times a day, with relief to the symptoms, and without any injurious consequences. Schacht's solution of bismuth I have often used with advantage, and a very elegant

and useful preparation is the effervescing citrate of bismuth, prepared by Savory and Moore. Carbonic and hydrocyanic acids act as sedatives to the disturbed parts.

In *acute* forms of inflammatory dyspepsia of adults, leeches to the scrobiculus cordis and counter-irritants have often afforded great relief; and in them, but especially in infants, the bicarbonate of potash alone, or combined with the chlorate, tends to mitigate the distressing sensibility of the stomach by diminishing the acidity of the secretions. I have found few remedies of greater value when oftentimes repeated, and given in some bland mucilaginous fluid. In the gastro-enterite of children, the thing of greatest importance is to adapt the diet to the condition of the mucous membrane, and to the requirements of the system. It is often necessary, in children thus affected, to avoid milk altogether, and to give cream with water, or only rice water, and to some, ass's milk; and by adults, milk may sometimes be agreeably taken with soda water.

In chronic inflammatory dyspepsia, the same principles of treatment must, if possible, be carried out—namely, to prevent fresh sources of irritation from improper diet, to unload the congested structures, to clear away effete materials from the system, and to restore healthy action.

Saline aperients, with vegetable tonics, assist in effecting the latter objects. Mercurial alteratives, when

cautiously administered, stimulate the lacking energies of the glandular system, and small doses of ipecacuanha tend to promote healthy secretion from the mucous membrane, whilst they diminish capillary stasis. The beneficial effects of the saline mineral waters are often in these cases very evident, especially those which contain sulphates of soda and of magnesia. In our own country we may especially mention Cheltenham, Leamington, Purton Spa, Epsom, Scarborough, Harrowgate; and on the Continent, Carlsbad, Franzensbad, Seidlitz, Marienbad; but the attendant circumstances, the change of scene, the rest, both physical and mental, the attention to hygienic rules, the rigid exaction of abstinence in diet, with regularity, conduce most effectively to restore health and vigour.

CHAPTER IX.

HEPATIC DYSPEPSIA.

THE liver is frequently blamed for disturbance with which it has no connection ; but, there can be no doubt, that in some forms of dyspepsia the liver shares in the disorder of the stomach, and that this unhealthy state perpetuates the gastric symptoms.

The veins of the stomach pass into the vena portæ, and thus directly to the liver ; and any irritating ingredient or stimulant, after exciting the mucous membrane of the stomach, in an equally direct manner creates similar abnormal action in the liver. Thus ardent spirits exert their action at once upon the liver ; and although the erythematous inflammation of the stomach thus produced very quickly subsides, less readily does that of the liver, for the secretion of the bile is changed, it is diminished in quantity, or of an unusually irritating character ; the elements of bile are thereby retained in the blood, and thus the balance of the whole economy is upset. If the offending cause is only temporary, then the irritation it has excited soon diminishes, and the attack is what is so often

called a "bilious attack;" but if, on the contrary, the irritation is renewed day by day, then the congestion of the stomach becomes persistent, its secretions are disordered, its mucous membrane thickened, its submucous coats infiltrated, and the liver still more seriously suffers. There is inflammatory effusion into Glisson's capsule, leading to enlargement and afterwards to contraction of the gland; the serous surface becomes thickened and inflamed, the secreting cells atrophied, and the bile ducts changed in their character. The depuration of the blood is hindered, effete materials are retained, engorgement of the portal system is consequent, and the disease thus leads to organic change in the liver and to dropsy. Hepatic dyspepsia is the first step in this most serious downward course of disease; and what are its symptoms? Many of them are referred directly to the stomach, others to the liver. The former is irritated and irritable, and vomiting is a common symptom, sometimes only sufficient to empty the viscus, but more generally severe and leading to regurgitation of bile into the stomach. This also is rejected, and the patient regards it as proof of excess of biliary secretion. Still more severe is vomiting in some instances; and the stomach remains so irritable that for many days it will not bear the presence of any food, however bland its character. This irritability of the stomach is preceded by foul and furred tongue, by bitter or unpleasant taste in the mouth, and is often

accompanied with severe headache, with vertigo and disturbed vision, and it may be, with noises in the ears. The headache is often very severe in acute temporary disturbance of the stomach of this kind, and is experienced across the eye-brows, at the forehead, or at the back of the head; sometimes the whole head is felt to throb with each pulsation of the heart. The countenance is sallow and the mind depressed; sleep is greatly disturbed, and everything is seen mentally through a distorted medium; the physical strength is apparently lessened, and the patient complains of exhaustion, a weakness the result of impeded action, rather than of actual loss of power. The kidneys act imperfectly, and the urine is scanty and loaded with lithates; the bowels are often confined, but sometimes irregularly purged, with accompanying pain; the motions are mottled and clay-coloured, or of very dark and offensive character, and as an additional discomfort, hæmorrhoids distress the patient.

Another class of cases are those in which, without any gastric irritant whatever, bilious vomiting comes on, and is connected with extreme irritability of the stomach. Languor and headache often precede the attack, and tenderness at the scrobiculus cordis follows.

These symptoms closely resemble those of inflammatory dyspepsia.

The condition thus described is an easily remediable one, but the first and essential means of relief is to

avoid perpetuating the disturbance by fresh excitement, by indigestible or rich viands, by fermented liquors or ardent spirits. The most manifest treatment is to allow the stomach to *rest*, having first removed irritating matters from it, if need be, by an emetic; and at the same time, it is well to unload the bowels and the portal system by a free purgative; thus the congestion of the liver is lessened, and the first step towards relief obtained. After a time, saline drinks, soda water, or more correctly carbonic acid water, with or without milk, may be taken. Soda water is very often resorted to, and its benefit is partly due to the sedative action of the carbonic acid, and to the diluent action of the water; in fact, free potions of cold water are a very serviceable remedy in this condition, it cleanses away offending excreta by acting on the bowels, on the kidneys, and in fact, on all the abdominal glands.

A free mercurial purge is often productive of great benefit; as four or five grains of calomel, blue pill or grey powder, followed by a saline purge.

If the stomach continue irritable, bismuth may be given, with magnesia or its carbonate.

Still the most bland nourishment only should be allowed: as arrowroot made with water, mutton broth, thin gruel, &c.

If the dyspepsia be of a *chronic* kind, and the secretions have been already acted upon, we have found great benefit from the use of the nitro-muriatic acid with

taraxacum; and as a purgative, small doses of the resin of podophyllum with rhubarb, capsicum, and henbane. If the secretion from the stomach be defective in quantity, ipecacuanha is an excellent addition. Another form of treatment is the combination of dried rhubarb with dried carbonate of soda, the bowels are thereby gently acted upon, and the tonic effect of the rhubarb strengthens, whilst the alkali diminishes the irritability of the membrane; these medicines in a fluid state, although less palatable, can be given in more effective doses.

Still, too often some fresh indiscretion renews the complaint, or the patient cannot be persuaded to discontinue ardent spirits, or wine in excess, or large draughts of malt liquors, and the physician is expected to remove the effect, whilst the cause is allowed to remain. The vigorous diet, and strict regime of the hydropathic establishments often prove of signal service in these cases; for it is found to be easier to go from one extreme to another, than to observe rules of hygiene commensurate with the wants of the system and the healthy activity of its functions.

When the stomach has become weakened by attacks of this kind, extreme regularity as to the time of meals should be observed; sufficient time should be allowed for thorough mastication, and the articles of diet, although of a proper character, should not be unwisely mixed together.

CHAPTER X.

RHEUMATIC AND GOUTY DYSPEPSIA.

It is not our intention to enter into a description of the symptoms of rheumatism and gout; these diseases have some symptoms in common, but they are not identical in their character; and it is a subject of grave doubt amongst many physicians whether they are ever combined, that is to say, whether there be any such condition as rheumatic gout. Their origin has been referred to defective secondary assimilation, a term comprehensive in its character, but one that is often used to veil our ignorance of the phenomena of the healthy organism; after absorption has taken place into the blood, and the pabulum which is to supply the wants of the system has been brought into intimate relation with its several structures, growth is the result. This growth and manifestation of function involves chemical change and rearrangement of elementary composition; the glands grow, whilst they receive elements from the blood, and pour forth their normal excretions, whether it be the liver, the kidney, the pancreas, or the mammary gland. Similar changes ensue in relation to the muscular system,

and to the substance of the brain itself. During functional activity there is the entrance of fresh material, and the discharge of effete product; these changes constitute the life of the part, and in their aggregate they are the life of the whole. The phenomena themselves present new manifestations of force, whether in the development of heat, the production of motion, the putting forth of nervous energy. The result of these changes is variously shewn; the presence of urea and of uric acid prove a readjustment of nitrogenous compounds, and may to some extent be taken as an estimate of the amount of that internal change which is going on in the system. If the eliminative processes of these substances be checked, the products may be retained in the blood, and induce other changes in the system; and as the result of one form of defective secondary assimilation and of elimination, gout takes place. Dr. Garrod has demonstrated that there is excess of uric acid in the blood in gout; this excess, however, does not constitute gout; *that* is essentially caused by some antecedent defect of which this excess of uric acid in the blood is only a sign. The primary changes which induce gout affect the whole system, and hence the production of other symptoms beside the paroxysm of gout. So also with reference to rheumatism, it has been referred on insufficient data to an excess of lactic acid in the system; but this, if correct, is an insufficient explanation of the disease; we should next have to enquire why such

acid is generated in the system, and again we are referred back to defective secondary assimilation, or to deranged chemical transformation in the nutritive changes of the tissues.

In both gout and rheumatism we frequently find peculiar functional disturbance of the stomach; and we may correctly speak of "gouty dyspepsia;" we do not mean that the disease of the stomach is an essential part of gout, but that the state of the system, which issues in a paroxysm of gout, also induces characteristic dyspepsia. And, although the secondary changes which follow the absorption of food into the blood, have more especially to do with the proximate cause of gout, still the primary solution of food has also a causative relation.

In patients so affected the stomach is often taxed by overwork, and over stimulated at the same time; but frequently this is not the case, and the gouty patient may be abstemious in all his habits.

The symptoms of dyspepsia are sometimes well marked, and are in part referred to an abnormal state of the gastric juice; it is preternaturally acid, and is the cause of the heartburn so often complained of. Acid eructations are also present, "sourness at the stomach;" there is pain at the *scrobiculus cordis*, the tongue is often furred, and the pulse is irritable. The hepatic secretion is often disordered, and sallowness of the countenance, with irregular action of the bowels, and very dark or clay-coloured motions, are induced; the

urine also is high coloured, and there is abundant deposit of lithates. The urine, however, more frequently presents a large quantity of uric acid deposit, red dust, or gravel, as it is sometimes called, and under the microscope the crystalline character of the deposit is well shewn, rhomboidal crystals, or clusters of acicular ones.

These gastric and other symptoms may be accompanied with some pain in the joints, as in the great toe; or with deposit of lithate of soda in the fibrous tissues about the joints, or in the ears; but the external signs may be undeveloped, and the only indication of gout is an hereditary tendency in the parents or grandparents, the brother, or some other member of the family.

In numerous instances the symptoms of indigestion are vague and ill-defined; there may be sense of oppression at the region of the stomach, with mental inertia, and incapacity for exertion, and sense of weakness. Sometimes severe pain in the head or neck is induced with disturbance of the sight and hearing, and even with vertigo and partial loss of consciousness; or, again, aching pain in the loins and in the limbs occurs, as neuralgia or sciatica; or, there is irritability of the bladder, and in persons advanced in life, the symptoms of stricture. We have witnessed the gastric affection so severe as to simulate the dyspepsia of organic disease, and these symptoms have entirely disappeared with the lessened tendency to gouty attack.

There are, however, two symptoms of gouty dyspepsia which deserve especial attention, namely, irregular action of the heart, and severe paroxysmal pain, known as "gout in the stomach," or if in the bowels, constituting a severe form of colic. The close sympathy of the cardiac plexus of nerves with the large nerve centres of the abdomen is frequently shewn in this dyspepsia; the pulse becomes small, irregular, and intermittent, and the patient is distressed by palpitation, and by breathlessness on exertion; he is disturbed at night by broken sleep, and may even be unable to lie down. The embarrassment of the heart's action is sometimes less defined, and is manifested by dyspnœa on taking any exertion, even on stooping to the ground or kneeling. The sensation is one of distress rather than of pain, and sometimes it compels absolute rest, the patient, feeling as if the heart would cease to beat altogether unless quietness were maintained; the character of the symptom is that of "breast pang,"—angina pectoris. It may be that a cardiac bruit is produced from atheromatous thickening of the valves; but this abnormal sound is often entirely absent, and the heart disease is purely of a functional character. These and other symptoms often entirely disappear when the gouty dyspepsia is removed, and they sometimes cease after a paroxysm of gout itself.

Again, whilst these gastric and general symptoms

may persist with very little pain, *sometimes* pain is a prominent symptom, especially after food, and it may trouble the patient for months, as if there were organic disease; or, intense pain at the region of the stomach comes on, without vomiting, but soon followed by extreme prostration, compressible pulse, a haggard countenance, and in rare instances a fatal issue soon follows. Although some of these cases may really be explained by the presence of undigested substance in the stomach, and in others by gall stone, or renal calculus, or lead colic, still there are patients affected with gout who, without any such exciting cause, suffer from intense pain at the stomach of a most alarming character. We lately witnessed a case of most severe colic, which, after lasting about forty-eight hours, gave place suddenly to severe gout in the foot, as well as in the small joints of the hands; after a few days the gout subsided, without any return of abdominal pain.

It is when these anomalous dyspeptic symptoms exist without any gouty deposit in the neighbourhood of the joints, or in the fibrous tissues, and without previous paroxysms of gout, that the diagnosis is accompanied with difficulty; but when gout has become manifested by these outward signs the organs of primary assimilation are found to be very easily disturbed.

In chronic gout, degeneration and contraction of the kidney often occur; albuminuria is found to exist without dropsical effusion, and the gastric symptoms

are greatly aggravated. Some of these patients who have consulted me, merely complained of drowsiness; and on investigation the urine was found albuminous, and the kidney organically affected. With great care a fatal issue may be warded off; but too often cerebral disease and apoplexy ensue from degeneration of the minute capillaries of the brain.

In rheumatism, both of an acute and of a chronic kind, the gastric functions are disordered; in the acute form the tongue presents a white and creamy fur, and there is loss of appetite, with more or less constipation; and in chronic rheumatism, we often find that there is troublesome gastric affection.

The most effectual relief for this gouty dyspepsia is to promote the separation of the excreta retained in the blood; saline purges with colchicum, and the cautious employment of neutral salines or carbonated alkalies with vegetable infusions should be used, and if there be much depression these remedies should be given with aromatic spirit of ammonia. The saline waters of Karlsbad, Vichy, Bath, Cheltenham, &c., are often very serviceable. A few doses of mercurial medicine serve to stimulate the abdominal glands to more vigorous action.

If the gastric pain be severe, bismuth and the carbonated alkalies of potash, soda, or magnesia, with hydrocyanic acid and chloric ether, may be used; and when the pain is intense, opium or chloroform should

be administered, or a minute quantity of morphia should be used hypodermically.

But the most powerful remedial agent in the treatment of gouty dyspepsia is the maintenance of a healthy state of the skin with a well regulated diet; there should be the spare use of nitrogenous food, and only of the more easily digestible forms, and a free allowance of vegetable diet, and of ripe fruit—of the former, greens and similar productions; of the latter, strawberries, grapes, oranges, &c.

Wine should only consist of the lighter kinds, and of these claret is perhaps the best; but ardent spirits as a rule should be entirely avoided.

Another essential part of right treatment in these cases is outdoor exercise, either as horse or carriage exercise, walking, yachting, &c.; the free inhalation of pure oxygen tends not only to invigorate and strengthen, but to remove effête material.

I have tried the salts of lithia in these cases, but without the benefit expected from the laudatory terms of its introducer. Dr. Garrod, from the fact of the greater solubility of the compounds of uric acid with lithia, considered that this alkali would effect more readily the separation of redundant uric acid. The dose of these salts, as the carbonate or citrate of lithia, is five to ten grains with aerated waters or with vegetable infusions. Equal, if not greater, benefit arises from the use of the iodide of potassium with the

bicarbonate, or the potash tartrate with bitter infusions ; and if the heart be enfeebled, the ammonia citrate or potash tartrate of iron may be advantageously conjoined.

CHAPTER XI.

RENAL DYSPEPSIA.

THE connection of disorder of the stomach with diseased conditions of the kidney, is scarcely less intimate than that which exists between the liver and the stomach, but this connection is of two kinds: 1st, it has its origin in the intimate union of the nerves supplying the two organs; and, 2nd, the imperfect depuration of the blood in disease of the kidneys produces gastric disorder.

The first form of malady is seen in the acute vomiting and extreme irritability of stomach produced by calculus in the kidney or ureter; intense pain comes on in the region of the kidney, in the course of the ureter and of the genito-crural nerve, and at the same time vomiting of a most severe kind ensues. The sudden onset of the paroxysm of agonizing pain is caused by the impaction of a calculus in the ureter; and, as the pain radiates across the abdomen, it is frequently mistaken for colic, or from the sympathetic affection of the stomach, it is regarded as primary gastric disorder. If the structure of the kidney be unaffected, the gastric

symptoms disappear when the pain ceases ; and the patient rightly states, that as soon as the pain has subsided, a hearty meal can be taken, and well digested without any renewal of pain.

This condition then is due to the relation of nervous structures ; the renal plexus of nerves is intimately connected with the semi-lunar ganglion, and branches of the pneumogastric nerve also pass directly to the kidney ; the stomach also receives its nerve supply from both these sources, the pneumogastric nerve and the semi-lunar ganglion ; these instances are not really dyspepsia at all, nor even disease of the stomach in any sense, although not a few instances have been brought under my notice as such.

The second form of gastro-renal disease is from organic disease of the kidney ; the blood is imperfectly purified, urea is retained in it, and as a symptom of this uræmia, gastric disturbance is produced. From this blood-contamination all the secretions become changed, and the gastric juice itself is altered from the presence of urea in it.

The symptoms of this disorder are loss of appetite, nausea coming on without any assignable cause, and vomiting of clear watery mucus ; anything placed in the stomach is at once expelled, even the blandest diet is with difficulty digested ; distension and pain are excited, and when the viscus has become composed, any indiscretion is sufficient to bring on a recurrence of the

irritability. These symptoms are often less severe, and we may find the urine highly albuminous, without any disorder of the stomach.

This dyspepsia is accompanied by other characteristic symptoms of renal disease, such as anæmia and anasarca, but in numerous instances this is not the case; the anæmia may not be remarkable, and the only evidence of anasarca may be an œdematous condition of the conjunctiva and of the eyelids. Pain in the head, and at the back of the neck, or an unusual disposition to sleep, may, however, be the indication of an uræmic state.

These instances of disease are of a most serious kind, and great care is required lest the already diseased kidney almost cease in its action, and the case terminate fatally. In sudden suppression of urine, vomiting is sometimes as marked a symptom as in intestinal obstruction, as shewn many years ago by Dr. Barlow.

When vomiting is persistent in albuminuria, and especially when it is accompanied with purging, we regard it as a very unfavourable symptom. The whole mucous membrane of the alimentary canal becomes œdematous, and the serous discharge produces irritation, disturbs the ordinary functions, and exhausts the patient. With renal dyspepsia other cerebral symptoms are often conjoined, as occasional momentary loss of consciousness or epileptiform attacks; the senses are also affected, and amaurotic symptoms come on from degenerative change

of the retina; the hearing is perverted, and ringing or other noises are excited as subjective phenomena; these perverted sensations are followed by general diminished power of the sensory organ affected. It is a wise precaution in all cases where vomiting is a prominent symptom, carefully to examine the urine.

These varieties of disease are excited by the causes of acute or chronic renal affection; we have seen numerous instances in connection with the intemperate use of ardent spirits, in which a single glass will at once produce a return of the albuminuria; with other patients gouty diathesis is associated, and a very severe form of sympathetic disturbance of the stomach is observed when diabetes is co-existent with albuminuria. I have witnessed this complication in young children producing epileptiform convulsion and speedy death; and on the contrary in others, it had apparently lasted for many years.

In the treatment of renal dyspepsia, if the bowels are confined, they should be acted upon freely; the skin should be excited to increased action by diaphoretics, as by the acetate of ammonia, by hot air, or Turkish bath, and a cupping-glass should be applied to the loins. In chronic disease of the kidney a blister to the loins often proves of great service.

Sedatives, as effervescing medicines, hydrocyanic acid, bismuth, have very little effect in quieting the stomach; they may, however, be tried, and in some cases partial relief follows. It is of greater service to act upon the

kidney, and thus remove the cause of the gastric disturbance. Salines of potash and soda, the acetate of ammonia, and free doses of the compound jalap powder, effect greater benefit than remedies directly influencing the stomach itself. The compound jalap powder is often very efficacious at first, but afterwards it entirely fails. Elaterium should then be tried in doses of one-sixth to one-fourth of a grain, administered with the bitartrate of potash; but when thus given, it often acts as powerfully upon the mucous membrane of the stomach as upon that of the intestine, and violent vomiting takes place. This effect is partially obviated by giving the drug, in the form of a pill, with the extract of henbane; and very small doses of elaterium, as one-twentieth of a grain, repeated every two to four hours, are also, in some instances, found to distress the patient less, and to act very efficiently. The resin of podophyllum, I have found in some cases of chronic albuminuria, prove more serviceable, than either jalap powder or the elaterium, especially when the renal is associated with hepatic disease. The resin of jalap sometimes produces more certain result than the powder.

Again, I have had several cases of this kind under my care, in which erysipelas of the lower extremities and abdomen has been followed by marked relief to the renal and gastric symptoms. It is scarcely necessary to mention that ardent spirits should be avoided, and, if possible, every form of alcoholic stimulant.

CHAPTER XII.

MECHANICAL DYSPEPSIA.

It is not sufficient for the completion of the digestive process that the mucous membrane alone should possess its functional activity and integrity; the muscular coat is essential, in order to execute the churning movements performed in the process, and then to propel the fluid mass onwards through the pyloric valve. Anything that interferes with these normal movements may become a cause of dyspepsia; and we may arrange these mechanical impediments into three groups:

1. Displacements of the stomach,
2. Pressure upon the stomach in its normal site.
3. Changes in the muscular fibre itself, fibroid disease of the pylorus, causing contraction, and atrophic distension.

It is more especially to the simple displacements that we refer, in speaking of the functional maladies of the stomach. The common causes of these displacements are external pressure, from stays or belts, or the pressure from leaning over a table or desk, or against instruments used in mechanical occupations; but a frequent

source of displacement is internal, and consists in abnormal intestinal adhesions. The stomach is naturally placed almost horizontally, the pyloric being only a small distance below the cardiac extremity; and from its greater curvature, the omentum extends to the transverse colon and spreads over the small intestine.

When the lower ribs are firmly compressed, especially during active growth and development, the stomach assumes an almost vertical position; the pylorus is then pressed downwards to the umbilicus, and the natural churning movements of the stomach, as well as the passage of the food along the lesser curvature, and backwards towards the cardia by the greater curvature, are interfered with; the semi-formed chyme gravitates unnaturally towards the pyloric valve, and portions pass into the duodenum before they have undergone complete solution. In this semi-dissolved state of the ingesta irritation of the intestine is set up, and pain produced. Borborygmi and flatulent eructations distress the patient, and a fertile source of hysterical complaint arises. When direct pressure is made upon the *scrobiculus cordis*, the movements of the stomach are differently modified; the firm pressure whilst digestion goes on, not only interferes with free movement, but excites irritation.

Again, cases are far from unfrequent where the omentum, attached as we have just said to the greater curvature of the stomach, becomes adherent at the lower part of the abdomen, or is fixed by hernial attachment.

The free distension that accompanies normal digestion is prevented, for the stomach is tied down; we find that pain in the side is produced of a fixed character, and this distress is increased by anything that distends the viscus, therefore especially by digestion; and the pain recurs after nearly every meal. Another form of dyspepsia of a mechanical kind is that arising from pressure upon the stomach by dropsical and other effusions. As the effusion accumulates in the peritoneal cavity, an uniform pressure is exerted upon the stomach, and no inconvenience may be felt as long as the stomach is not distended; but directly it is required to perform its normal work, and necessary movements, with which are also generally associated some increase in the volume of the stomach, either from food or gaseous evolution, pain is produced, and is frequently followed by the rejection of the contents of the stomach. And although the primary disease—the cause of the dropsy, whether it be chronic disease of the liver, of the kidney, or of any structure—may itself produce dyspepsia as one of its symptoms, still this mechanical pressure greatly aggravates the gastric disturbance. The patient becomes physically unable to take food; pain, eructation, and a sense of almost insufferable distension are produced. When the fluid or the pressure is lessened, the symptoms subside; and we have very frequently noticed that the stomach has suddenly regained its power after paracentesis abdominis had been

performed. Abdominal tumours, whether carcinomatous, hydatid, or of any other kind, sometimes exert pressure upon the stomach, and thus mechanically interfere with its healthy action.

3. As regards the changes in the coats of the stomach, they belong so exclusively to organic diseases that we shall not enter upon the consideration of them here ; but it may be mentioned, that in fibroid disease of the pylorus, the stomach sometimes attains enormous proportions, so that with the pyloric valve close to the pubes, the viscus fills nearly the whole of the abdomen ; and that *without* such valvular obstruction, the muscular coat becomes sometimes atrophied, and the cavity enormously distended, so that it is unable to contract upon its contents. In this latter case, the principal symptom is the tympanitic distension of the abdomen, with feebleness of digestion. We shall have again to refer to distension of the stomach in speaking of fermentative changes.

CHAPTER XIII.

SYMPATHETIC DYSPEPSIA.

THE extensive connection of the stomach with other parts of the system, by means of its supply of nerve filaments, leads to frequent disturbance of its function from disorder in other parts; and an intimate acquaintance with these sympathetic maladies is of the utmost importance; for without this knowledge, not only is the true source of disturbance overlooked, but, as a necessary sequence, the treatment is ineffective, because applied in a wrong direction.

It is not our intention to describe the nerves that supply the stomach, but only to state that this supply is from two sources, 1st, from the large branches of the vaso-motor nerve of the semi-lunar ganglia of the abdomen, by which it is connected, not only with the adjoining viscera in the abdomen, but with nearly every part of the body; this connection gives rise to disturbances of sight and hearing, and of the intellectual and sensory centres generally; the 2nd source is from the pneumogastric nerve, which also supplies the lungs and the heart.

Perhaps the most important form of sympathetic disturbance of the stomach is that connected with disease of the brain ; and the consideration of this is the more necessary, because in such cases the true nature of the malady is often overlooked. There are some peculiarities, however, which serve to distinguish this form of malady ; in one class the subjects are young, of an active mind, intelligent, and precocious. There may be some headache, and temporary disturbance of vision, grinding of the teeth, disturbed nights, and restless activity of mind during the day ; they are generally precocious children, of bright and joyous disposition ; and, without any very apparent cause, vomiting is set up, and the illness is regarded as a " bilious attack." This may soon be followed by more marked symptoms of cerebral disturbance, by severe headache, convulsion, and gradually increasing coma, in fact, by all the symptoms of acute hydrocephalus ; or there may be a succession of such attacks, each slight in itself, but, as the mind is allowed to rest, and the irritation of the brain is diminished, the diseased state gradually subsides. This repeated disturbance of the brain favours the deposition of tubercular deposit in the membranes, and at length acute hydrocephalus is developed to the inexpressible anguish of the relatives of the child. Sometimes the symptoms of cerebral affection are preceded by those of gastric remittent fever, and then it is difficult without careful inves-

tigation to decide, whether the disease is really wholly abdominal in its character, and whether the brain disease is not secondary rather than primary.

In another class of cases, the patient is more advanced in life, it may be in early manhood, when severe pain in the head, and vomiting without any real gastric disturbance, usher in most serious and fatal disease.

The same sympathetic connection is witnessed after concussion of the brain; as the patient begins to rally from the first effects of the blow, vomiting is a frequent result; and, if local inflammation of the membranes of the brain takes place, the irritability of the stomach is sometimes excessive, especially if the disease extend to the origin of the pneumogastric nerves.

These cases are often set down as "bilious attacks," which is the most serious mistake that could be made, for the sole attention is then directed to the stomach and the liver; the nature of the malady is overlooked, and the treatment misdirected. In the diagnosis of these cases, where irritation of the brain is the cause, the head is hot, the pupils generally small, the tongue clean, the abdomen contracted, and the bowels confined.

Another cause of sympathetic disturbance of the stomach is disease of the spinal cord; but although irritability of the stomach is sometimes to be traced to this source, more frequently the pain at the scrobiculus cordis, and flatulent distension of the stomach and

abdomen, are really signs, the one of irritation at the peripheral extremity of the spinal nerves, the other of paralysis, which prevents the muscles forming the abdominal parietes, and the involuntary muscular fibre of the intestine from contracting in their normal manner.

In disease of the lungs, especially of a tubercular kind, the implication of peripheral branches of the pneumogastric nerves in the morbid action sets up reflex disturbance of the stomach; we find delicate strumous subjects thus affected with such extreme sensibility of the stomach, that food of almost every kind is at once rejected; no cough may be present, but on examining carefully the apices of the lungs, some difference in the resonance on percussion will be found, and the respiratory murmur will be heard more feeble than natural, or irregular, or the expiratory murmur coarse and prolonged, even if more advanced indications of organic change do not exist. This state of sympathetic gastric disturbance sometimes subsides as the phthisical condition becomes fully developed, or it may continue to harass the patient throughout the whole course of the complaint.

It may be argued by some, that the gastric altogether precedes the pulmonary mischief, and that in the weakness from the impaired power of digestion we have the cause of the low organised deposit in the cell structure of the lungs. If such were the case, the gastric disease would continue at least *pari passu* with

that in the lung, and be detected after death; whereas, we never find tubercular deposit or strumous ulceration in the stomach, and the utmost that can be noticed is the fatty degeneration or atrophy occasionally found in phthisical patients, although not exclusively in them. Too often have we found that most important time has been lost during early phthisis by this error of supposing that the disease is "all stomach."

In this state of functional disturbance of the stomach, preceding or accompanying phthisis, there is unusual irritability of the mucous membrane. As Dr. Theophilus Thompson has shewn, the state of the gums is peculiar, a red injected line of congested mucous membrane being observable along the margins of the teeth; nausea, loss of appetite, disrelish for fatty substances, pain at the scrobiculus cordis may also co-exist; severe vomiting may be followed by cough, and after a time by hæmoptysis, and the general signs of tubercular disease of the lung.

It is during this early stage of phthisical disease that remedial measures are of inestimable value. Far better is it at this period to seek to invigorate and strengthen the system by change of climate and generous diet, than to wait until disease has become firmly established; for too often patients are removed from the comforts of home when the strength is entirely exhausted, and they are sent away to die among strangers, and in foreign lands.

We more frequently have sympathetic disturbance of the heart from functional disease of the stomach than the converse, namely, stomach irritability from heart affection, except that consequent on passive venous congestion.

In the disease of the supra renal capsules, which received so much attention from Dr. Addison, and which is generally associated with discoloration of the skin, irritability of the stomach is one of the characteristic symptoms; and although in some of these instances, we have found superficial ulceration of the stomach, and a condition of the mucous membrane indicative of more than mere functional change, namely, arborescent vascularity; still, we are led to regard the very intimate connection of the stomach by means of large nervous filaments with the semi-lunar ganglion, and the same ganglion with the supra renal capsules by still larger branches, as an important fact in explaining the irritability of the stomach in the observed cases of disease of the supra renal capsules.

In the sympathetic disturbance of the stomach from disease of the kidney, we do not refer to instances of Bright's disease and albuminuria, in which the changed character of the gastric secretion leads to vomiting and other signs of stomach disturbance; but we would notice cases of calculus in the kidney, in which vomiting is a constant and characteristic symptom, though evidently not connected with simple disorder of the

stomach, for patients often state, that when the pain has subsided, they can digest a hearty meal, as we have before said, and we have had cases brought before us of this kind mistaken for ordinary abdominal colic.

That diseases of the uterus and of the urino-genital organs set up vomiting, is a fact familiarly known. Many persons, during the whole period of utero-gestation, suffer severely by this sympathetic disturbance, and a greater number are affected during the earlier months.

Any abnormal congestion and inflammation about the ovaries, may lead to similar gastric distress; and in men, disease of the bladder, prostate and testicles, induce almost corresponding symptoms.

In the treatment of these forms of sympathetic disease, correct diagnosis is of the utmost importance, for it is worse than useless to direct the whole attention to the stomach, when it is only secondarily involved. Our chief concern then must be with the cause of the complaint; thus, in disease of the brain, if we can diminish the cerebral mischief, the gastric will soon subside. Still, although the stomach is not primarily implicated, and its structure is not changed, it is in an unfit state to digest an ordinary meal, and great care should be used to lessen the quantity of the diet, and to tax the energy of the organ, only by bland and un-irritating diet.

Medicine may also assist in quieting even this secondary irritation, and in enabling the stomach to tolerate

the presence of food. Effervescent medicines, carbonic acid, &c., appear to act directly upon the nerve filaments of the stomach, and to diminish sensibility. Hydrocyanic acid, with alkalies, acts also as a sedative, and lessens irritability, so also bismuth.

In renal calculus, alkalies with rest are the most likely measures to afford relief, after having quieted the pain by chloroform, ether, or opium. Sometimes the inhalation of chloroform may be advantageously used, especially if the improved method be employed, namely, of mixing the chloroform with atmospheric vapour, in definite proportions, before the inhalation; the object to be sought for is, by so diluting the chloroform as to allow of its very gradual absorption, and in this way pain may be removed without narcotising the patient; or a free dose of Battley's sedative solution of opium may be combined with tincture of henbane and chloric ether. Belladonna may also be tried. The hypodermic method of employing morphia is a valuable means of quickly subduing the intense pain. In utero-gestation, on the contrary, mineral acids, with chloric ether, are perhaps the most effectual means of relieving vomiting, although too often ineffective whilst the cause remains.

In these instances of gastric irritation from uterine activity, the bowels should be gently acted upon, and the effervescing citrate of magnesia constitutes both a grateful and effective remedy. Much may be done, however, by careful regulation of the diet, the dis-

turbance is sometimes quieted by the repeated administration of small quantities of food; and in all cases large meals should be withheld, and all external pressure upon the stomach itself taken away.

In young persons, especially those affected with hysterical susceptibility, with dysmenorrhœa or leucorrhœa, a state of extreme irritability of the stomach is sometimes induced. The contact of any substance with the mucous membrane is followed by its instant rejection, and this may take place without previous nausea or pain; and what is still more remarkable, there may be very little emaciation, although this condition have existed for many weeks or months. Sometimes pain at the scrobiculus cordis exists, but more frequently the pain is of a neuralgic kind, and is situated beneath the left breast; the pulse is irritable, the tongue has generally more or less injection of its papillæ, and the bowels are confined. It is to this state that Sir Henry Marsh has applied the term of "regurgitative disease;" because the food is rather regurgitated than vomited. These cases require careful watching and treatment; they nearly all after a time completely recover. These cases may, however, be associated with gastric ulcer, when the pain and more persistent symptoms of that state will be also present.

The first question is as to the food, which must be of a bland and easily digestible kind, as soup, mutton-broth, soda water with milk, farinaceous food. If these

be rejected, then the quantity must be diminished, and only a very small portion given, as a few tea-spoonfuls of milk, with soda water or with lime water every quarter or half hour, and if the pulse be failing a small quantity of brandy may be added. If the regurgitation still continue, then it is well to allow the stomach to rest entirely, and to administer by enemata, nutrient fluids three or four times a day, as a cup-full of strong meat soup, thickened with flour, and with the addition of five to ten drops of laudanum, and a table-spoonful of brandy. We have known many obstinate cases entirely cured in this way. In one patient the injections were continued for a fortnight, and only a few tea-spoonfuls of cold water were given to relieve the thirst. The bowels should be gently acted upon by aloetic pill, alone or with steel, with henbane, or with the extract of *nux vomica*.

I have often found the nitrate of bismuth, with carbonate of soda and chloric ether in mucilage mixture, very useful; so also the black oxide of manganese in dose of gr. x. to xx., as recommended by Dr. Leared. The salts of cerium are praised by some, but I have found other remedies more efficacious.

When the extreme irritability has lessened, there must be a gradual return to more strengthening diet, and the milder preparations of iron are very serviceable, as the ammonio-citrate of iron with carbonate of ammonia, the phosphate and hypophosphite of iron with dilute phosphoric or hydrochloric acids; sometimes

also the sulphate of iron, in half-grain doses, with sulphate of quinine and extract of henbane is useful.

Other remedies, with uncertain effect, are tried, as hydrocyanic acid, alkalies, magnesia or its carbonate creasote, chloroform and chloric ether, opium. Opium does not act so well in these cases, as in ulcer of the stomach. If the pain be severe, a small quantity of morphia may be used hypodermically. Belladonna is better than opium. Small blisters applied to the scrobiculus cordis, or to the spine sometimes alleviate the symptoms.

Calomel has been used as a sedative to the mucous membrane of the stomach in some of these cases of extreme sympathetic irritability. This condition is, however, so frequently associated with an anæmic, chlorotic, or hysterical state, that the administration of mercurials, except as occasional aperients, is better avoided. Still we have witnessed instances, where one grain of calomel, given several times during the day, has been followed by cessation of the symptoms.

There are several other conditions of dyspepsia which are atonic in their character, but appear at the same time to be sympathetic, and connected with the state of the cerebro-spinal system. In some men we observe a state closely resembling hysteria, as shewn by flatulence, loss of appetite, sensibility of the surface of the abdomen, sensations almost amounting to globus hystericus, disturbed cerebral function, depression,

anæsthesia, incapacity for exertion, &c. In this condition, which is often combined with distended colon, I have found marked benefit result from the use of aloes combined with steel; fresh air and vigorous exercise are important remedial agents, when they can be obtained.

In other cases, the head is badly formed, and the forehead narrow, shewing that the brain is likely to be easily disturbed, or there is hereditary tendency to mental disease, mania, and melancholia. The body is well nourished, but the patient complains of pain at the scrobiculus cordis and in the back, or in various parts of the body; the mind is depressed, and the appetite irregular. Although muscular, a man may be quite incapacitated for exertion; the tongue may be clean, the bowels regular, the evacuations normal or pale, the pulse tolerably full or depressed and irregular. It would seem that dyspepsia has arisen from ordinary causes, but the sympathetic nerve reacts upon the cerebro-spinal centres, and these being easily disturbed from their healthy balance, again react upon the sympathetic nerve, perpetuating and aggravating the original and slighter malady.

In young children the susceptibility of the nervous system during first dentition is universally acknowledged, although frequently too much is attributed to this cause; and every disturbance of the brain or of the digestive system is attributed to this circumstance;

but the same susceptibility, though less energetic, is manifested at a later period. We have often found young persons, between the ages of eighteen and twenty-five, affected with vague nervous and dyspeptic symptoms during the passage of the wisdom teeth through the gums; the mind is oppressed, so that there is an incapacity for directing fixed attention to any subject, and slight disorder of the gastric function is associated, irregular appetite, occasional nausea, &c.; and in some instances we have known severe epileptiform attacks come on.

These states of sympathetic dyspepsia, with nervous irritation, require attention. The bowels should be freely acted upon, so as to unload the colon; and the diet should be sustaining without being of a stimulant character. If there be any direct pressure upon the gum, free incision should be made; but what is of still greater importance is the general treatment of the patient: the mind must have rest from close application; exercise in the open air is desirable, especially horse exercise; hot rooms and exciting pleasures should be avoided; and when it can be attained, several months of travel and change of scene is greatly conducive to complete restoration of health.

Less severe, but more distressing, is the dyspepsia in hypochondriasis. We might have spoken of it in connection with atonic dyspepsia, for there is great feebleness in the vaso-motor nerve, leading, it may be, to a

deficient secretion of gastric juice ; or we might have described a very similar state as being produced by gouty dyspepsia ; or, lastly, as arising from an over-worked mind and body. In these instances the whole attention is occupied with the diet ; the mind is depressed and its energies enfeebled ; one change after another is tried, but pain and discomfort equally follow ; the stomach is sometimes exceedingly irritable, the bowels are over-anxiously watched, the sleep is unrefreshing, and life rendered miserable. To tell the patient nothing is the matter, would be to drive him to some one who would give an opinion more in unison with his feelings.

By carefully regulating the diet and the bowels, by cold sponging, by taking frequent exercise, either walking or on horseback, or a pedestrian tour when it is possible ; by keeping the mind free from anxiety, and by cheerful society and occupation, all the symptoms may be greatly relieved. Such patients often take too spare a diet, leaving off one thing after another as unsuitable ; and considerable improvement follows a more generous diet, especially when the mind is encouraged and cheered by the prospect of restored health.

CHAPTER XIV.

FERMENTATIVE DYSPEPSIA.

THE chemistry of digestion is a subject full of interest, and one that has received considerable elucidation from the researches of later years. The food begins to undergo change as soon as it is brought into contact with the secretion from the salivary glands, and passes through the process of mastication, although this is especially the case with starchy and farinaceous substances, which are converted into sugar. The saliva is naturally alkaline in its reaction, and contains a substance to which the name of ptyalin has been applied; this chemical substance resembles diastase. It induces a rearrangement of the elements of the starch, so that saccharine principle is produced; the saliva also contains sulphocyanides and a large quantity of saline material. Thus, thorough mastication serves a double purpose, not only to break down the solid portions of food, so that they may more readily undergo solution by the gastric juice, but to incorporate the salivary fluid, so that it also may be brought into contact and exert its energy upon the starchy elements. This metamorphosis

is extremely rapid, and it continues throughout the whole of the masticatory movements, during deglutition, and till the food reaches the stomach; and even then, it is not checked, although more important reactions take place by means of the gastric juice. In the duodenum and small intestine the same action persists as was commenced in the mouth, but with less energy. It is of great importance, therefore, that mastication should be thoroughly and efficiently executed, and the defect in this process is the first step towards the abnormal fermentative changes in the form of dyspepsia, which we have now before us.

In the stomach a different set of glands, peculiar to itself, secretes an acid fluid, known familiarly as the gastric juice; this secretion contains a nitrogenous substance, pepsin, and an acid, variously regarded by chemists as hydrochloric or as lactic acid, besides saline materials and water. The pepsin acts upon fibrinous substances, causing their solution, without itself entering into combination or becoming decomposed; the fluid that is formed, although fibrinous or albuminous, possesses different properties from a mere solution of a protein compound, for it is not coagulable by heat; the term peptone has been applied to it, and the whole solution has been designated chyme.

The chemical solution of the nitrogenous portions of food by the pepsin is limited, but it is greatly increased by the presence of the acid of the gastric juice, and by

the heat of the stomach and churning movements of the muscular walls. The food rotates along the lesser, and then from right to left backwards by the greater curvature; as the chymous fluid is formed, it passes by the pyloric valve into the duodenum, when it is mixed with the bile, and with the pancreatic secretion before it reaches the small intestine, and is absorbed into the system by the capillary veins and the lacteal processes.

This process of solution or digestion requires, according to the nature of the food, from two to four or five hours; and many substances that are taken cannot be dissolved at all, but pass in their crude state into the intestine; and although the solvent powers exerted by the gastric juice are especially upon the protein compounds,—the nitrogenous elements,—still the changes upon the starchy portions commenced in the mouth are not entirely checked; the oleaginous elements are more thoroughly divided, and the saline and aqueous constituents are diffused completely through the semi-fluid aliment. In a normal state the solution should be completed after a certain time, and as one part after another passes into the duodenum or becomes absorbed, the stomach is left in a quiescent state. But, far different are the conditions found in dyspepsia of the kind we are considering; when, either from improper food, or from insufficient secretion of gastric juice, or because the fluid when formed is unable to pass from the stomach, fermentative changes take place.

The gaseous exhalations into the stomach consist of nitrogen and carburetted hydrogens, or fermentation takes place accompanied with the evolution of carbonic acid, or butyric acid is formed, or lastly, putrefactive changes arise, and sulphuretted hydrogen is produced; these several forms of fermentation arise from different causes, as we have before mentioned in speaking of distension of the stomach as a sign of gastric disease; they produce diverse symptoms, and are amenable to various forms of treatment.

We have already enumerated several sources of gaseous distension of the stomach, and shall not again enter upon their full consideration. We have stated, 1st, that gas may be swallowed; or, 2ndly, produced by the decomposition of food in the stomach; 3rdly, that it may be evolved from changes in the mucous secretions themselves; 4thly, transuded from the blood; 5thly, regurgitated from the duodenum, or from a fistulous communication with the colon, or from some adjoining abscess; 6thly, gas of an offensive kind is produced by the decomposition of a growth in the stomach, as cancerous tumour.

The first form of gaseous distension that we have to notice, is quite independent of food, or rather is frequently produced by the want of it. The gas consists of nitrogen mixed with carburetted hydrogens and some carbonic acid; it is often suddenly evolved, and is especially connected with an exhausted state of the

nervous system ; it is often peculiarly marked in hysterical patients, and in others it may be induced by mental excitement or depression, and abstinence from food is a very common cause of it.

This form of dyspepsia is of an atonic character ; the want of power being due either to general loss of strength, or to deficient supply of nourishment. It is marked by a sense of sinking at the stomach, distension, and pain as that distension increases ; the pain often commences in the back, and seems to pass round the body or through it to the scrobiculus cordis ; headache is often present, and sometimes faintness ; if the pain become severe, the pulse assumes a compressive character, the tongue is not necessarily changed ; eructation takes place, and with that relief, the pain subsides ; or the gas passes downwards, and the pain then moves from the stomach, and entirely ceases as the gas is evacuated. This form of dyspepsia sometimes produces extreme prostration and collapse, and the severity is so great, that perforation of intestine is simulated. At the commencement of this state, if a small quantity of nourishment can be taken, the symptoms may be checked ; stimulants may be given, as wine and brandy with nourishment ; but if the distension have become severe, then antispasmodics are necessary, chloric ether, ether, camphor, ammonia, and when pain has supervened, opium should be given. We have known severe collapse quickly relieved by opiates freely administered ;

but, it is always very important, so to strengthen the system and regulate the diet, as to guard against these attacks.

A second form of gaseous distension arises from fermentation of the food itself, whether from its improper character, from defective gastric secretion, or from obstruction; a short time after a meal has been taken distension and pain arise, and three or four hours later, or it may be at the close of the day, several hours after food, a large quantity of fermenting substance is ejected, sour and acid in its reaction, and with a frothy surface. It might be compared to the fermentation produced by yeast in alcoholic or vinous fermentation, and carbonic acid is also evolved. It is not unfrequent, especially when associated with gastric ulcer, or with pyloric disease, to have the *sarcina ventriculi* of Goodsir present. These minute confervoid growths, in their bale-like quadrangles, appear to indicate some peculiarity in the fermentative process, and although often associated with organic disease, are not pathognomonic of it.

In this form of fermentative dyspepsia, pain at the stomach and in the back, flatulent distension, colic, eructation, furred tongue, are the common symptoms; the pain is often very severe, and the distress considerable.

It would, however, be an erroneous supposition to think that the fermentation to which we have referred

is the primary disease, for it is only a symptom ; and it is the consequence of previous abnormal action. The gastric juice checks fermentation, but if it be insufficient for this purpose, or if the dissolved aliment be unable to escape, either from constriction or spasmodic contraction at the pylorus, secondary changes rapidly follow.

Some forms of diet are more prone than others to produce this effect. Saccharine and starchy substances, cruciferous vegetables, and hard and indigestible products generally favour similar action.

To relieve this distressing symptom of gaseous distension from chemical change, our first object is to remove the cause, and then so to regulate the diet, as to give those articles least likely to induce this reaction ; but if necessary directly to check distension, then we find the value of those reagents, which in the laboratory of the chemist stop alcoholic fermentation ; the sulphites and hyposulphites powerfully absorb oxygen, and may be given with great advantage ; and a still more energetic substance is creasote, and in many instances we have witnessed its efficacy. The cases, however, must be carefully selected, for in irritable conditions of the mucous membrane creasote cannot be borne, and bismuth with alkalies will be found to be more efficacious.

Charcoal may also be used, and it is certainly very valuable, in some instances, in directly absorbing

gaseous substances in the intestinal canal. Carefully prepared wood charcoal, finely triturated, may be given with simple mucilage mixture ; and some patients prefer this to the charcoal biscuits. Dr. Leared strongly advocates the use of charcoal in capsules. We have many years ago seen it extremely serviceable as an enema in relieving secondary fermentative changes in the colon ; and given by the mouth, we have found it of greater value in intestinal than in gastric distension, for the latter we could obviate by more agreeable treatment.

Another form of fermentative dyspepsia results in the production of butyric acid. This organic acid is closely allied to lactic acid, and it is that which gives the peculiar sourness to the vomited matters in dyspepsia. Fatty matters, milk, cheese, especially when these are partaken of in disordered conditions of the digestive apparatus, lead to this chemical change, and butyric acid is formed.

The symptoms are severe heartburn, regurgitation of food into the throat, pain at the scrobiculus cordis and in the back, foul tongue, disordered state of the liver, the urine often high coloured, and the bowels irregular. This state may arise in occasional attacks from indiscretion in diet, or it may become persistent and most trying to the patient ; almost everything that is taken becoming, as the sufferer says, "sour" on the stomach.

The most powerful means of relieving this condition

are thoroughly to unload the portal system, to exclude as much as possible substances capable of butyric acid fermentation, and to strengthen the mucous membrane of the stomach by vegetable tonics.

During the severity of an acute attack, salines of potash, soda and magnesia most effectually relieve the pain and heartburn.

The last condition of fermentative change to which we have to allude is that in which sulphuretted hydrogen is formed; a putrefactive action, in which the patient complains of the offensive character of the eructation or of the unpleasant odour of the breath, or of the taste in the mouth. It would seem that some varieties of food containing sulphur, more readily than others, thus become decomposed. With some the sulphur present in egg is at once the cause of this offensive gaseous formation.

The sources of fallacy upon which we have previously dwelt must be borne in mind, that the gaseous taint may exist in the mouth, in the tonsil, the nares, and the throat, or be produced in the respiratory passages. And again, regurgitation may take place from the duodenum, or from a fistulous communication with the colon, but here we have a fœcal odour conjoined. Sloughing in the stomach itself, as of a cancerous or other tumour, decomposing blood, and the communication with an adjoining abscess, are other sources of fetid gaseous formations in the stomach.

When it is truly gastric in its character and arising from dyspepsia, beside the more prominent and distressing symptom of the taste of rotten eggs, the secretions are vitiated, and we find other symptoms are conjoined: sallowness of the complexion, headache, sense of weakness, a furred tongue, and an irregular condition of the bowels, the evacuations are dark and offensive, and often loose in character; a sense of malaise or of general inability for exertion is also present. We do not find the same amount of pain as in the last-mentioned form of dyspepsia, but an atonic state exists, the bolus of food is not properly dissolved, it soon putrefies, or if dissolved, before it passes from the stomach decomposition commences. The gastric juice itself checks putrefaction, so also does the admixture of bile; but in these cases the action of the first is insufficient. It is probable that to some extent symptoms resembling those produced by the inhalation of sulphuretted hydrogen accompany this form of dyspepsia, and that the blood becomes contaminated by the absorption of this gas from the stomach; we refer especially to the sense of exhaustion that is induced, and the irregular action of the bowels.

The diet must be carefully regulated; and when no obstruction exists, it is well to administer warm saline aperients, as the sulphate of soda or tartrate of potash, with the aromatic spirit of ammonia and the bitter vegetable infusions of orange peel, calumba, cascarilla or

gentian. The old formula of Guy's rhubarb, soda and calumba may be advantageously tried; but creasote, whilst it checks the decomposition, is not so effective in these, as in the cases previously described.

CHAPTER XV.

DUODENAL DYSPEPSIA.

THE duodenum, as the commencement of the small intestine, may be divided into three parts: its 1st and horizontal portion, its 2nd and vertical, and its 3rd again horizontal, as it joins the jejunum. The 1st part is intimately connected with the stomach, in its physiological as well as in its pathological relations; the 2nd with the liver and the pancreas; and the 3rd with the intestines.

The pyloric valve separates the stomach from the duodenum; this valve receives nervous supply from the pneumogastric, and so also does the first part of the duodenum, and consequently diseases affecting the mucous membrane of this part of the intestine, immediately beyond the valve, closely simulate the same disease of the stomach; thus, we find congestive conditions, altered enervation, superficial and chronic ulceration, sudden perforation, and cancerous diseases, which are with difficulty diagnosed from disease on the gastric side of the valve. But it will be generally found that the position of the pain and tenderness, and

the duration of time after the food has been taken before the attack comes on, will enable us to form a correct opinion as to the nature of the disease. Three or four hours after food, that is, at the close of the digestive process, the pain commences. But there are instances, in which the rapid passage of fluids from the stomach induces pain in the region of the duodenum almost at once.

The pancreatic duct opens into the duodenum close to, and frequently in common with, the bile duct; and, as the bile is known to regurgitate into the stomach, it is probable that the pancreatic secretion may in a similar manner pass backwards and be vomited. In irritable conditions of the stomach large quantities of mucus are often brought up in conjunction with bile; and it may be that the pancreatic fluid alone is rejected through the stomach. The symptom to which the term *pyrosis* has been applied has been variously explained: it consists in the regurgitation of a watery fluid, sometimes saline in its taste, sometimes tasteless; it is accompanied with some pain at the *scrobiculus cordis*, and with burning pain at the back of the mouth, or in the gullet, usually designated heartburn. The fluid is ejected at irregular intervals; the mouth may be filled with this fluid almost without warning, or it may be expelled soon after a meal, or even in the middle of the night. Other symptoms of gastric disorder may be present, but it is often unaccompanied by any of these

symptoms. Some have regarded the œsophagus as the source of this pyrotic fluid; it is generally referred to the stomach, and the question naturally arises, can the pancreas be the origin of it? However it may be produced, pyrosis or water brash is a distressing symptom to the patient, and is often associated with a state of general dyspepsia. We have previously referred to it as a symptom of gastric disease.

There are *two* forms of duodenal dyspepsia that require especial consideration; the one arising from excessive irritability of the mucous membrane, the second from inflammatory congestion.

Great credit is justly due to M. Corvisart for the investigation he has carried out in reference to the function of the pancreas, and its connection with duodenal dyspepsia; and doubtless this large gland, situated at the commencement of the small intestine, has important relation to the functional activity of the ileum and jejunum. Without entering upon the consideration as to the agency of the secretion in promoting the solution of nitrogenous products, there can be no doubt that its function is as important and probably analogous to that of the salivary glands; and that with the function of the pancreas the minute duodenal glands, Brunner's glands, are closely connected.

The first condition to which we have referred, abnormal irritability, is probably of a functional rather

than of an organic kind; but, in some instances, the symptoms are so severe, that we have feared superficial ulceration. Such patients are generally in a weak and enfeebled state, the mind is restless, and the countenance anxious. There is tenderness to the right of the scrobiculus cordis, and the statement generally made is, that all goes on very well for about two to three hours after a meal; then, that soreness is felt, and a trying sense of pain with faintness is induced, the pain is sometimes described as a feeling of "tightness," "grasping;" at other times as if there was "a raw surface," which was disturbed when the food was made to pass over it. Other portions of the mucous membrane may be irritable, and vomiting is not very unfrequent. The tongue is irregularly congested or patchy, the bowels may be in a normal or irritable condition, the pulse is compressible, but the most distressing symptom is the general feeling of malaise and exhaustion. It may be, that these symptoms are due to an unusual sensibility of the pyloric valve; and we believe that this state does sometimes exist. It is, however, difficult precisely to localize these symptoms, for both stomach and duodenum are supplied with branches from the pneumogastric nerve, and the first part of the duodenum is closely allied in function with the stomach.

That this state may precede one of organic change, and be followed by ulceration of a serious kind, is doubtless the case; but with care, we have known the

symptoms entirely subside. After years of freedom, they may return, but again yield to judicious treatment.

The condition we have just described is one in which the strictest attention to hygienic rules and to a restricted dietary is essential to restoration.

The diet should be of a bland unirritating character. Sufficient time should elapse between the meals, and stimulants should be avoided if possible, especially ardent spirit and malt liquors. Physical rest, in a recumbent position, is also important; for exertion of a violent kind, even horse exercise, tends greatly to increase the pain and susceptibility.

If these means can be used thoroughly and continuously, medicine may be almost or entirely disregarded; if the bowels be confined, mild saline aperients should be used, as Karlsbad salts, Rochelle salts, or the carbonate of magnesia with hydrocyanic acid.

The nitrate of bismuth with carbonate of soda, in ten or fifteen grain doses, and if the pain be severe, with small doses of morphia, are extremely useful in some instances; or minute doses of opium may be given; but the great disadvantage of opium is soon felt, that it confines the bowels, and interferes with free secretion.

Acute inflammation of the duodenum is sometimes found after the administration of poisons; and after severe burns, the mucous membrane of this part of the alimentary tract becomes in some cases greatly congested; and, as first remarked by Mr. Curling, ulceration may

supervene. He describes diarrhœa, and the discharge of blood, as having arisen from this condition of the duodenum, and sometimes severe hæmatemesis and prostration. In some instances of severe burns, death has taken place as the consequence of perforation of the duodenum causing peritonitis. And after such severe injury to the skin, which, as we have before remarked, always evinces the closest sympathy with the mucous membranes of the stomach and intestines, it is not surprising to find, in connection with the general disturbance of the circulation, that congestion of this part occurs. In some instances, the free use of stimulants may have conduced to this inflammatory disease of the duodenum.

Grey discoloration of the mucous membrane of the duodenum is produced by long-continued congestion. It is of a uniform or punctate character, and it arises from the deposition of pigmental grains in the substance of the mucous membrane, or in the coats of the capillaries.

This chronic hyperæmia is observed in connection with pulmonary and hepatic congestion, in fact in any disease which leads to distension of the vena portæ; and we also find a less general condition of vascular repletion of the first part of the duodenum in disease of the pylorus, whether it be simple fibroid degeneration and hypertrophy, or true cancerous disease. The mucous membrane becomes thickened, its vessels con-

gested, and its glands enlarged; sometimes, indeed, so much so, that the glands might easily be mistaken for minute cancerous tubercles; the continued irritation having led to hypertrophy of the glands of the mucous membrane, as we find in other similar structures.

This state of chronic engorgement is best relieved by diminishing portal and hepatic congestion, and by stimulating the abdominal excretory organs to increased action, as we have described in speaking of congestive dyspepsia.

There is, however, a state of acute hyperæmia of an interesting kind described by Sir H. Marsh and by Dr. Stokes. It is induced by exposure to cold, by great mental anxiety, and sometimes by irregularity in diet and by stimulants. There is sallowness of the complexion, often followed by jaundice, with febrile excitement and headache. Vomiting is a very troublesome and distressing symptom, and induces a sense of great exhaustion, with faintness and pallor of the countenance. After intemperance there is the same violent bilious vomiting, but with a furred state of the tongue; loss of appetite and loathing of food, diarrhœa, tenderness of the right hypochondriac region, being followed by jaundice.

The inflammatory hyperæmia probably commences in the duodenum, and extends into the biliary ducts, and along the course of Glisson's capsule; the ducts become obstructed by the changed secretion, and

jaundice is the consequence. These instances occur independently of the excitement from stimulants, and sometimes are very alarming in their character. The febrile condition is accompanied with cerebral oppression, with a semi-comatose state, or with violent delirium. This brain complication may perhaps be due to the glandular structure of the liver becoming involved, and the depuration of the blood being consequently interfered with.

The pain in these cases is much less than in gall-stone; and they differ from ordinary inflammatory jaundice in the mode of commencement, the symptoms being at first those of intestinal or gastric irritation.

The prognosis is generally a favourable one, unless the cerebral symptoms become inordinately severe. In some instances general hepatic disease has been induced.

The treatment must be directed to quiet the irritation of the stomach, and to relieve the hyperæmia of the affected parts. As to the former, scarcely anything must be administered by the mouth. Soda water and milk, arrow-root, broth, and similar forms of diet, are alone admissible. Alkalies, as lime water, effervescing citrate of magnesia, carbonate of soda with hydrocyanic acid, also serve in some degree to soothe the stomach. A free mercurial purgative is very desirable in these cases, as five grains of calomel or grey powder, followed by a saline aperient; and hot fomentations may be applied externally.

CHAPTER XVI.

DEGENERATION OF THE STOMACH.

THE stomach is not independent of the general law, that when one part of the body is affected with disease, other parts also become implicated either in a primary or secondary manner. Purely local disease is of very rare occurrence, and this is still more manifest when we regard degenerative changes; thus, degeneration of the stomach is not unfrequently observed, but, it is only a part of other more general morbid conditions.

We find the stomach affected with—

1. Atrophic degeneration or wasting.
2. With fatty degeneration.
3. With lardaceous disease.
4. With fibroid disease, implicating especially the pylorus.

1. *Atrophy*.—The mucous membrane and the other coats of the stomach are sometimes found in chronic disease to be exceedingly thin and pale, as if, with the gradual decline of the general nutritive power, the organ of primary assimilative function had also proportionately wasted; the glandular follicles are less distended with

cells, the muscular coat is indistinct, and the coats are semi-transparent.

2. *Fatty wasting*.—Sometimes the cells of the follicles, instead of presenting a simple nucleus, contain a great number of highly refracting particles, and almost resemble an inflammatory granule cell, while the appearance of the stomach itself indicates an otherwise healthy condition. At other times, the stomach is found to be pale, and studded with white points, somewhat resembling solitary glands, but not at all elevated above the surface. A section of the membrane at this part shows that around the crypts are collected highly refracting granules and fatty particles, giving to the vertical section the appearance of a dark border. This form of degeneration has been observed in phthisis, in struma, in exhausting suppuration, and is often associated with a fatty condition of the liver. A more advanced condition of atrophy shews the follicles to be entirely destitute of secreting cells, only containing granules of fat.

3.—*Lardaceous disease*.—In ordinary cases this form of albuminous degeneration is found to affect the liver, the spleen, the kidneys, &c., but the mucous membrane of the stomach is also similarly affected. With the iodine test, the mucous membrane becomes deeply coloured, and under the microscope, the section shews that the minute capillaries have undergone remarkable change; their walls are greatly thickened, they appear

of a homogeneous consistency, and the free circulation of the blood is greatly impeded.

Beyond loss of appetite, exhaustion, prostration, and the inability to take food, or if taken by constraint to digest it, we are not acquainted with any symptom which indicates these states of degenerative change. They are part of a general state of exhaustion, and are indications, that *pari passu* with disease in other structures, the stomach takes part.

4. *Fibroid degeneration*.—After chronic inflammation of the mucous membrane, the structure appears thickened, dense, and the mere rudiments of gastric follicles remain. This appearance arises from fibroid degeneration which gradually extends so as to induce follicular atrophy; and it is from the contraction of this fibroid deposit, that true “mammillation” of the surface of the membrane is produced. We would call this true mammillation in contradistinction to that which is observed in a healthy stomach, from the contraction of the muscular layer.

Beside this general condition of fibroid degeneration, there is one perhaps of greater importance, although of a local character, we refer to *fibroid disease of the pylorus*. This state has by some pathologists been considered as a form of cancerous disease; if, however, the diseased structure be carefully examined, no evidence of cancer will be found in it, or in the adjoining parts. The disease apparently commences in the submucous cellular

tissue, which undergoes fibrous thickening, while the mucous coat is in many cases unacted upon. This deposit leads to obstruction of the valve; the muscular coat then becomes hypertrophied, and the amount of that hypertrophy is an indication of the degree of obstruction.

The growth beneath the mucous membrane is whitish in colour; it is firm, sometimes almost cartilaginous in hardness, but without any "juice" as cancer; it consists of elongated or wavy fibres, resembling a fibroid tumour, and with acetic acid it presents numerous elongated nuclei; bands of similar tissue pass between portions of involuntary muscular fibre, and externally the omentum may be contracted, and adhesions may have been formed with adjoining structures. The mucous membrane of the stomach may present a grey and thickened appearance, and simple chronic ulcer or the cicatrix of one, are occasionally present. At the pylorus the mucous membrane may be quite healthy, having distinct or even hypertrophied gastric follicles; but the irritation may have excited secondary disease and ulceration. The glands near the pancreas are not usually affected.

The symptoms closely resemble those of cancerous obstruction, and they consist in chronic dyspepsia, followed by emaciation; vomiting occurs several hours after food, preceded by pain; distension of the stomach, eructation, fermentation, and the development of *sarcina ventriculi* are also symptomatic; the bowels are gene-

rally constipated; exhaustion gradually comes on, till at last the patient sinks from inanition. The abdominal walls are wasted and collapsed, and a tumour is often felt at the epigastric region, consisting of the thickened tissues at the pylorus. If, however, the stomach be free from adhesions, the thickened pylorus is often pushed downwards so as to be felt near the umbilicus, or even near to the pubes. Pain is not generally a marked symptom of this form of pyloric disease; but tenderness on pressure is sometimes experienced, arising probably from peritoneal adhesions.

We are not acquainted with the predisposing nor with the exciting *causes* of this fibroid disease; but it is probable, that long-continued irritation, as indicated by dyspepsia, generally precedes it. The intemperate do not appear to be more liable, and one sex is as prone to it as the other; although it is more common in advanced age, still it does occur in early and middle life.

The diagnosis is sometimes obscure, and the presence of other more acute disease may entirely mask the complaint; the duration of life is greater in this fibroid degeneration of the pylorus than in the ordinary forms of cancer, especially the medullary and epithelial varieties, nor do we find in the former disease the peculiar cachexia of malignant diathesis.

As to *treatment*, although we cannot remove the obstruction, we can afford great relief to the symptoms and greatly prolong life. The change from solid and

irritating food to that of a fluid and bland kind is often followed by marked relief. In this way spasmodic contraction at the pylorus is lessened, and the fluid slowly passes onwards. If, however, the stomach be very irritable, the best way of affording relief is to allow it to rest entirely, and to sustain life by nutrient enemata for several days. Towards the close of the disease, we are driven to this means to prolong life.

The secondary fermentation in the stomach may be greatly diminished by other remedies, by creasote, the sulphite and hyposulphite of soda, by charcoal; whilst the irritability is lessened by alkalies, by bismuth, by hydrocyanic acid, by opium, or morphia, &c.

It is remarkable that with these several forms of degenerative change we do not find the stomach subject to strumous disease of a tubercular or ulcerative kind; and although tubercles are often found upon the serous membrane, the mucous membrane is always free. The term "gastric phthisis" is, we think, very apt to be misunderstood on that account, and likely to prove very injurious in drawing attention away from the true source of disease, namely, the lungs.

CHAPTER XVII.

ULCERATION OF THE STOMACH.

DYSPEPSIA is *par excellence* the symptom of ulceration of the stomach, for the process of digestion is then especially difficult and painful.

The destruction of the surface of the mucous membrane and of the coats of the stomach by ulcerative process occurs in several forms and conditions; and we have already referred to some of these in describing the varieties of dyspepsia, with some of which they may be associated.

1. Ulceration may be the sequence of acute inflammation, and may be connected with abscess, or with sloughing of the surface; these are, however, instances of an unusual kind, and are caused by local mischief, or by poisons or irritating substances.

2. Although diphtheritic inflammation does occur in the stomach, it is of rare occurrence. Dr. Fenwick believes that it is frequent with scarlet fever. We have never witnessed diphtheritic ulceration.

3. Ulceration of a superficial kind, or of the character of aphthous ulceration, is not uncommon; it is the

result of sub-acute inflammatory change, and is present in inflammatory dyspepsia, and in that connected with hepatic engorgement. After the irritability of stomach present in Addison's disease of the supra-renal capsules, this form of ulceration has also been observed. It is not necessary again to describe the symptoms connected with these states, having already done so in a former chapter. In this form of ulcer the mucous membrane only is destroyed in small irregular patches, generally about the lesser curvature or towards the pyloric extremity. Other portions of the mucous membrane show arborescent injection consequent upon a hyperæmic state of the part.

4. Ulceration sometimes occurs as numerous minute points, and it has been designated *follicular* ulceration; the parts destroyed are very small, about one-sixteenth of an inch in diameter, and are thickly spread over the surface of the membrane. This condition has been observed in connection with the gastro-enterite of children; and after the symptoms have subsided it is probable that the surface of the stomach entirely regains its normal appearance.

5. Another ulcerative state has been designated *hæmorrhagic erosion*, and is especially observed in chronic catarrh of the stomach, and is caused by the long-continued congestion of obstructive disease, whether in the heart, lungs or liver. The intensely congested capillaries having given way, blood is effused in small

points or in larger patches; if the former, mere specks of ecchymosis are the result; if the latter, the surface of the membrane gives way, and a small ulcer is produced, having an irregular margin, and it is generally covered by a clot of blood almost resembling a slough.

6. Beside these conditions, which it is not necessary to describe again more fully, we have that state which is especially meant when we speak of *ulcer* of the stomach. It has been variously designated as simple ulcer, chronic ulcer, perforating ulcer; and in its consideration the description of the symptoms is facilitated by dividing into two classes:—

1. Ulceration perforating *without* adhesion, and
2. Ulceration perforating *when adhesions* have taken place.

When the coats of the stomach are destroyed by ulceration, and *no* adhesion has taken place, acute peritonitis is suddenly induced from the extravasation of the gaseous or fluid contents of the stomach into the peritoneal serous membrane; intense inflammation is thus set up, and the life of the patient is at once placed in imminent jeopardy—in fact these are terrible instances of disease, and from apparently good health, without any warning, a few hours of intense suffering is followed by a fatal issue. The ulceration which leads to this untoward result may be small in size, from a quarter to half an inch in diameter, and it has on its internal aspect a peculiar appearance: the mucous

membrane is ulcerated to a greater extent than the muscular, and the muscular than the peritoneal, so that it has a bevelled aspect towards the mucous membrane, and the opening through the peritoneum is small and round like the hole of a punch.

This form of disease is most frequent in young women between the ages of fifteen and thirty, and appears to be connected with an enfeebled state of general nutritive power.

The *second* form is that in which adhesions take place. Here the action is of a slower kind, the mucous membrane and the muscular coat are destroyed in a similar manner; but when the peritoneal surface is approached, the irritation suffices to set up change in the adjoining serous membrane; fibrin is effused, this becomes organised, and firm adhesions surround the opening, and thereby extravasation is prevented. The edges of the ulcer are rounded and elevated; and in consequence of long-continued irritation effusion takes place at the edges; this product becomes firm, it is fibrous in its character, and as it increases it encloses fibrillæ of the pneumogastric nerve, thereby producing severe pain. The ulceration slowly increases in size, so that the ulcer may vary from the size of a fourpenny-piece to that of a crown-piece. Dr. Law mentions one six inches in length. The peritoneal surface, the lowermost in the stomach, also becomes increasingly destroyed, and the floor of the ulcer is then formed by the tissues,

the adjoining viscera, to which adhesions have taken place. It may be that the floor consists of one structure, more frequently, however, of several parts, covered by a thin stratum of fibrin. If the disease be at the posterior aspect, the pancreas forms the greater portion of the base; if towards the anterior, then the abdominal parietes and the liver bound it. Sometimes it is the right, sometimes the left lobe of the liver, or the diaphragm, or several of these parts combined. With all this protective adhesion, perforation sometimes happens in a secondary manner. The adhesions are only partial, and after some unusual distension, rupture takes place into the peritoneal cavity, and inflammation which is fatal in a few hours, is the result. This opening is sometimes just on the edge of an ulcer with dense edges, or it may be in the centre of one with but feeble adhesions. It is not always that the perforation extends into the serous membrane, for it may be into the cellular tissue, and an abscess is then formed. An abscess of this kind may reach towards the spine, or extend upwards to the diaphragm; it may perforate that muscle, and communicate with the pleura, setting up intense inflammation there. We have known the earlier symptoms so insidious, that the pleurisy was almost the first indication of any abnormal change. In such instances, empyema ensues in a very short space of time. In an instance I have recorded elsewhere, a sinuous opening extended through the diaphragm

into a sloughing vomica in the lung. A secondary cavity filled with air from the opening in the stomach sometimes exists below the diaphragm, and simulates pneumothorax.

The ulcer sometimes extends into the sac of the lesser omentum, and forms an abscess bounded by the spleen, diaphragm, pancreas and liver; or it communicates with the colon or even with the parietes. A communication sometimes exists with the colon, but this appears generally to extend from the intestine to the stomach, and the opening is at the greater curvature. In one instance of this kind two other openings existed at the greater curvature into the sac of the lesser omentum, and a large fœcal abscess, which extended into the lung, had formed. Dr. H. Davies records a case of simple chronic ulcer extending into the colon. There had been dyspepsia and fœcal vomiting whenever the bowels were confined. The patient gradually sank.

The base of the ulcer, or the cicatrix as it might be termed, when a healing process has taken place, is smooth, of a whitish colour, and consists of fibro-elastic tissue, or it has a minutely granular appearance. The edges become exceedingly firm, and are composed of dense fibro-elastic tissue. Minute fibrillæ of the pneumogastric become involved in this tissue, and thus cause severe pain; sometimes the nerves pass along the floor of the ulcer, and when sloughing follows, pain

suddenly ceases from the destruction of these sensitive and exposed nerves.

Glandular mucous membrane is not re-formed in these cicatrices, and when the liver or pancreas form part of the boundary of the ulcer, their tissue is hardened. The adjoining liver structure assumes a white and dense appearance.

Both forms of ulcer thus described, may be accompanied with hæmorrhage, from the ulceration having extended into the vessels. Bleeding is, however, especially present in the latter, or if in the former it immediately precedes the fatal perforation. Thus a small ulcer—it may be, not larger than a sixteenth of an inch in diameter—may extend into a vessel, causing profuse hæmorrhage, so that even the first sudden hæmorrhage is fatal; and such an ulcer, if it had rapidly increased, would have perforated into the peritoneum without adhesion. More frequently severe hæmorrhage takes place from the slower form of ulcer; the vessel has gradually become perforated, and as its walls are prevented from retraction by the effused tissue, the loss of blood is very great; and indeed, if it extend into one of the larger vessels—the splenic, coronary, or pancreatic—it is often fatal. *Several* attacks of bleeding may take place, and where an ulcer is extending, the destruction of the minute capillaries at the margin of the ulcer may be the source of it. This may be so slight, and the blood so incorporated with the secretions,

as only to be detected by careful, or even microscopical examination.

In one instance, in the museum at Guy's Hospital, *both* the splenic and pancreatic arteries were opened. The hæmorrhage often takes place in primary ulceration; but frequently after cicatrization secondary destruction ensues, followed by renewed hæmorrhage. The perforated vessel is often closed by a small clot, or a drop of blood may be pressed from it, and in large ulcers the vessel may be seen as a small papillary eminence.

The form of the stomach is often greatly changed, either by adhesions external to the viscus, or by contraction of the walls of the ulcer. When the ulcer is situated in the centre, the cavity may appear double, like an hour-glass, from puckering at the seat of the diseased part, and from irregular contraction.

Two or three ulcers sometimes exist in the stomach. A large chronic ulcer may have been the source of much suffering, but a second and smaller one may be more serious by inducing sudden hæmorrhage or fatal perforation. The form of these ulcers is generally circular, but when two become united an irregular reniform margin is produced; and sometimes the pyloric orifice is thus nearly surrounded, especially if cancerous disease supervene upon the simple ulcer.

As to the *site* of the disease, the ulcer is generally at the lesser curvature, towards the anterior or posterior

aspect. If in the former part, it has a greater tendency to produce perforation; if in the latter, hæmorrhage. The ulcers are situated nearer to the pyloric, than to the œsophageal orifice. Dr. Brinton gives the following table, which must be regarded as relating to cases in which perforation takes place without antecedent adhesion. In every 100 such cases, the ulcer is situated

On the posterior surface in	..	..	..	..	2
At the pyloric sac in	..	..	..	..	10
At the middle sac in	..	..	..	..	13
At the lesser curvature in	..	..	..	..	18
At the anterior and posterior surface at once in					28
At the cardiac extremity in	..	..	..	..	40
At the anterior extremity in	..	..	..	..	85

Whereas in ulcers of the stomach generally, he almost reverses the order; that in 43 per cent. the ulcer was at the posterior surface, in 27 at the lesser curvature, in 16 at the pyloric extremity, in 6 at both the anterior and posterior surfaces, often at opposite places, in 5 at the anterior surface, in 2 at the greater curvature, and in 2 at the cardiac pouch.

Ulceration of the stomach is more frequent in women, than in men. Dr. Brinton found, out of 654 cases, that 440 were female and 214 male; and that in one out of every five cases more than one ulcer was present; whilst in one out of every seven or eight cases perforation took place.

As to the *age* of those who are the subjects of this affection, the cases of cancer which have come under

my own immediate notice have been more advanced in life, than those who were the subjects of ulceration of the stomach. Dr. Brinton has collected statistics from a large number of cases, and he shows that the ulcer generally "affects the periods of middle and advancing life, with a frequency which gradually increases up to the extreme age allotted to man." But the cases of ulcer in which perforation happens, "seem not only to select another period of life, but to exhibit a marked contrast of age in the different sexes, the period of life in which it is most liable to occur being quite a different epoch in the male and in the female," in the female being between the ages of 14 and 30, in the male from 50 to 60, the diminished risk of the female at the latter periods of life rendering the total risk in the same number of cases nearly equal. Dr. Lees mentions that he has seen perforation of the stomach from ulcer "in a girl of eight, and a boy of nine years of age."

The *symptoms* of ulceration of the stomach may be considered first in reference to those instances in which sudden perforation takes place without any adhesion. Such cases have much general, as well as pathological interest, on account of their usually disastrous termination. They often occur in young women affected with chlorosis and amenorrhœa, or with painful menstruation. The previous gastric symptoms are very slight or altogether unnoticed, although there is generally impaired health, with leucorrhœa or chlorosis, neuralgic

pain in the side, and symptoms of hysteria. The onset of the fatal attack is unexpected, and is generally after slight muscular exertion, or after a full meal. Intense pain comes on, followed by rapid prostration and collapse. The skin becomes cold and clammy, the pulse fails, the pain in the abdomen becomes general; tympanitis follows, and occasionally vomiting supervenes. Death ensues in from five to twenty-four hours, although life is sometimes prolonged for several days, and in rare cases the patient recovers.

Various suggestions or hypotheses have been made in reference to these cases of perforation. The enfeebled nutrition, and inability of the coats of the stomach to resist the chemical action of the gastric juice, is considered by some to be the cause of this terrible result; others refer it to the state of the nervous system; and we have ample proof of the close connection of the gastric sympathetic nerve with the ovarian and uterine ganglia. The pain below the mamma in leucorrhœa arises probably from the connection of the splanchnic with the dorsal nerves.

The cause is equally obscure as to the part of the stomach usually affected with ulceration. Why the lesser curvature, either at its anterior or posterior portion, should be so generally involved, is not known. This is the part least free in its movements—in fact it is almost stationary, the stomach in its general expansion and consequent movement turning upon its lesser

curvature. This also is the region along which the branches of the pneumogastric nerve pass.

The symptoms of *chronic* ulceration are at first those of ordinary dyspepsia, and are often very obscure, and imperfectly marked. Thus slight uneasiness after food and constipation may be the only evidence of disease. Afterwards, the pain, with tenderness in the region of the stomach, especially at the scrobiculus cordis, attracts more attention from the patient. It is sometimes slight; at other times intense, and of a peculiar gnawing character. The pain is generally increased by food, and relieved by the rejection of it; vomiting is, therefore, generally present, and sometimes pyrosis or water brash. The other symptoms are, pain between the shoulders, more or less of abdominal uneasiness, constipation, emaciation, and a peculiar pallor and cachexia. Hæmatemesis, the rejection of food by vomiting, or melæna, the discharge of blood from the bowels as black pitchy stools, are present in most cases at one or other stage of the disease.

The *pain* is not always of the same character, but may be regarded as a symptom present in almost every instance. It may be almost constant, but generally undergoes degrees of exacerbation, being increased by food. The patient often states, that pain comes on as soon as the aliment reaches the stomach, and continues as long as it is retained. Sometimes it is so intense, that the patient is completely exhausted, as I have several

times found when branches of the pneumogastric nerve have been involved in the dense edges of a chronic ulcer. In a case under my care, in which other signs of ulcer were present, the patient stated that the pain was sometimes relieved by firm pressure against the back of a chair. Position has, in not a few instances, a marked effect as to the severity of the pain; and I have several times been able to confirm the statement of Dr. Osborne, that the position of the pain serves as a guide to the seat of the ulcer, according as the contents of the stomach gravitate towards or away from the injured part. Thus in an ulcer at the posterior part of the lesser curvature the patient has been most easy when leaning forwards and towards the left side. On the contrary, I have seen the pain continue, whatever position might be assumed. In young women suffering from well-marked ulceration of the stomach, with chlorosis, neuralgic pain in the side may be present at the same time that tenderness and pain are experienced at the scrobiculus cordis from ulcer; and in these patients, we find increase of pain, during or prior to the menstrual periods.

Pain in the back is rarely absent in chronic ulcer of the stomach; it is generally less severe, and comes on later, than the gastric pain, but is sometimes complained of more urgently than that at the stomach itself, the patient often stating that the pain goes through to the back. In speaking of the diagnostic value of pain,

Dr. Lees states, "The occurrence of pain will often be of great assistance in the diagnosis between simple ulcer and cancer; for it is an important fact, that there is seldom pain in cancer of the stomach, unless great obstruction of the pyloric orifice prevents the passage of food out of this viscus." And again, "The mere fact of severe pain constantly occurring after food, should lead you to diagnose simple ulcer of the stomach rather than cancer. The pain, moreover, in simple ulcer, is often of a gnawing character, causing a sense of sickening depression; it is variable and remittent, sometimes being very severe and then ceasing for days or even for weeks; but in malignant disease, the pain, although not often severe or lancinating, yet is almost always constant after it has once commenced." All observers will bear testimony to the general variability and the gnawing character of the pain in ulcer of the stomach; still in some cases, as we have before said, the pain in ulceration is terribly constant and severe. Again, we have known cancerous disease of the pylorus, where no pain was acknowledged on repeated questioning of the patient as to present symptoms and previous history; and in other instances of cancer, when the suffering is extreme, the relief is often very great on the avoidance of solid and indigestible food, and during the use of anodyne remedies. Other causes of pain must be borne in mind; these we have explained in speaking of pain as a general symptom.

The *period at which vomiting* takes place in ulceration of the stomach, is equally varied; sometimes the food is at once rejected, in other instances it is retained for many hours or even days. In an instance where the thickened edge contained a large branch of the pneumogastric nerve, the stomach almost instantaneously rejected food, and the patient died exhausted. Fermentation, with the development of the *sarcina ventriculi* of Goodsir (*merismopodia ventriculi*.—Robin) takes place in some cases of chronic ulcer, as well as in cancer and diseased pylorus. The *sarcina* can scarcely be considered as a proof of obstruction, for its development occurs without any impediment. Vomiting, however, as a sign of gastric ulcer, must be regarded with great care, since in so many instances it is purely sympathetic in its origin. Pyrosis also is often present in disease of a less serious character, and is amongst the signs of functional disturbance.

Chronic disease of the abdominal viscera is marked by an anxious and dejected countenance, with emaciation; in gastric ulcer this appearance is present, and is associated with pallor arising from the condition of general nutrition. In cancerous disease, a careworn expression is found, with cachectic *sallowness*; and, in the *anæmia* of chlorosis and *amenorrhœa*, there is in extreme cases a waxen appearance, which is very peculiar; so also in the *anæmia* after considerable loss of blood. Again, in many instances of *struma* and of glan-

dular disease, pallor is present; but, in ulcer of the stomach, the anxious countenance of abdominal disease, conjoined with the emaciation and pallor of imperfect nutrition, afford a very characteristic morbid expression, and as a symptom is rarely absent.

Hæmorrhage takes place in most cases of gastric ulcer; vomiting of several pints, or even quarts of blood, may be amongst the earliest symptoms of disease; in other instances the bleeding is slight, or entirely absent. The first hæmorrhage from the stomach is occasionally fatal; in ordinary cases the discharge of blood is preceded by a sense of weight and coldness, followed by faintness or actual syncope, and then rejection of dark-coloured blood takes place. The action of the gastric juice confers this deepened colour; but, if the effusion be very rapid, the colour is more bright; a portion of blood passes onwards into the duodenum and intestines; and if life is prolonged, so that it may be discharged per rectum, a black tarry evacuation is the result. Sometimes, however, the whole of the blood is thus discharged, and there is melœna without hæmatemesis; these two symptoms are generally combined. Instances have been recorded where sudden hæmorrhage into the stomach was followed by fatal syncope, without the discharge of blood either by vomiting or by purging, more frequently the hæmorrhage is oftentimes repeated.

Unless hæmorrhage, however, takes place, we cannot with any certainty diagnose ulceration of the stomach;

cachexia, emaciation, pallor, pain, and vomiting, all arise without ulceration, in cases of gastrodynia and irritability of the stomach, sympathetic or otherwise. But hæmorrhage is not in itself pathognomonic of ulceration; it often arises from over-distended capillaries in an engorged state of the portal circulation, and in cancerous disease; and although less frequent in cancer than in simple ulceration, it does occasionally arise. Disease of the œsophagus and aneurism sometimes produce the same symptom.

Abercrombie distinguishes three modes of fatal termination of ulcer of the stomach. 1. Gradual exhaustion; 2. Hæmorrhage; and 3. Perforation into the peritoneal cavity. Another might also be mentioned: the production of inflammation by extension to adjoining viscera, as in a case in which the disease extended through the diaphragm into the lung, and produced acute pleurisy. The disease, however, sometimes remains in a passive condition, and the patient dies of some other complaint. It is not very rare to find cicatrices in the stomach; and in those cases where there has been extensive destruction of surface, and of the muscular and peritoneal tissue, the adjoining viscera are found covered with a smooth fibrous investment.

The *duration* of life after the development of symptoms of ulcer of the stomach, as compared with cancer, is generally very different. Setting aside those cases in which perforation into the peritoneal sac takes place,

the ulcer is more curable and its duration is much greater. A long period may elapse, and some have mentioned cases of gastric ulcer which have continued for twenty years. I have several times observed patients in whom there were marked and severe gastric symptoms—men of middle life, with sallow complexion, with pain at the scrobiculus cordis, vomiting of food, occasional hæmatemesis, loss of flesh, &c.—who have lost their symptoms under proper treatment and care; they have regained flesh and comfortable health, and have had no return of symptoms for many years. In cancer, after the disease is fairly developed, we rarely find that a year passes, and frequently only three or four months before a fatal termination takes place; and it is probable that many cases of supposed cancer of the stomach, in which the patient survived for many years, were really chronic ulceration. It has yet to be fully shown whether the cicatrix of a chronic ulcer ever becomes the seat of cancerous deposition; but several instances warrant such a supposition.

There is much obscurity as to the *cause* of ulceration of the stomach. Some cases are produced by a state of chronic inflammation of the whole mucous membrane, produced by intemperance or irregularity in diet. In others, it appears probable that the general state of nutrition and of the nervous system act as predisposing causes. Mental depression or anxiety, scanty food, late hours at night, and insufficient exercise, pressure upon

the scrobiculus cordis, either by direct girding of the abdomen, or by constant and constrained position, as in milliners and shoemakers, or the striking of the epigastrium by the shuttle of the weaver, are also causes of gastric ulcer. The causes of the sudden perforating ulcer are still more doubtful, as we have previously intimated.

There are several objects to be sought for in the *treatment* of ulceration of the stomach.

1. The promotion of reparative action by sustaining and increasing general nutritive power.

2. The relief of distressing symptoms, pain, vomiting, hæmorrhage, pyrosis, constipation, &c.

3. The prevention of the extension of the disease.

4. The removal of its complications.

1. The promotion of reparative action is in many instances most effectively secured by allowing the affected organ to rest; and much more can be done in this way than is usually supposed. If absolute rest could be afforded, the ulceration would in many cases rapidly heal; but, since this is almost impossible, it must be our object to give such forms of nutriment as will spare the stomach; and in seeking to accomplish this purpose it must be borne in mind, that the especial office of the stomach, for which its peculiar secretion is adapted, is the solution of nitrogenous compounds. These elements are found in the flesh of animals, in beef and mutton, &c. Hence we generally find that solid food produces

pain and vomiting in cases of gastric ulcer, and must therefore be avoided.

If, however, these elements of food be given, they must be in an unirritating form, as the less oleaginous kinds of fish, the sole, whiting, cod, &c., or poultry; or in a fluid state, as veal and mutton broth, clear soups, &c.; beef tea often creates nausea and vomiting. Still more must hard and indigestible meats, preserved meats, and cheese, be avoided. Oysters, sweetbread can often be taken, when more irritating diet would be rejected.

Starchy food is converted into sugar by the saliva and by the secretions in the intestine, and in that state is readily absorbed. So also oleaginous substances are converted into an emulsion by the alkalies in the secretions of the mouth and intestine, and in the bile; so that these forms of diet, whilst they are demulcent and soothing to the diseased gastric surface, do not require the action of the stomach in order to place them in a state ready for absorption. Good stale bread, biscuits, milk, starchy substances, as arrowroot, tapioca, maize or Indian corn flour, rice, &c., may thus be given to the patient. Eggs often disagree, but may be taken in the form of light puddings; milk, also, when refused in its simple character, may be better tolerated by combination with isinglass, as in blanc-mange, or with soda water or lime water, and even cream and bacon are occasionally well borne.

Rich soups, highly seasoned dishes, pepper, mustard,

&c., are better abstained from ; so also pastries, and food containing much insoluble material, as salads, unripe raw fruit, green vegetables, &c. It is, however, undesirable altogether to abstain from vegetables, for we may thus defeat our object by inducing cachexia. Oranges, lemons, &c., may be often taken with benefit.

Again, it is most important that food should be slowly and thoroughly masticated ; and it is better to take small quantities at a time, and to repeat the allowance more frequently, than to distend the stomach by a large and bulky meal. About three to four hours should intervene in ordinary cases ; but where there is great exhaustion, with irritability of the stomach, food may be required more frequently, and in very small quantities. Exertion, both mental and physical, should be avoided directly after meals ; in fact, everything should be done to facilitate the process of digestion. It is well to abstain from alcoholic liquors, if possible ; they tend to aggravate the disease, and should not, I think, be given, unless the circulation be failing, and there be tendency to syncope ; but when required, brandy in small quantity, and well diluted, or the forms of sherry which contain the least sugar, are best. New wines, port, and imperfectly fermented malt liquors generally disturb and distress the patient.

It is desirable to use every means in our power to improve the health, as by exercise in the open air, but over fatigue or constrained positions should be avoided.

Moderate horse exercise, and bracing air, will sometimes afford more relief than medicinal agents, even when long continued; but violent shaking is injurious. When a chlorotic or anæmic state has been produced, the preparations of steel, by restoring a more healthy condition of the blood, greatly facilitate reparative changes. We prefer the milder preparations, as the ammonio-tartrate or citrate. The compound steel pill, with aloes and myrrh, or quinine with iron, as the sulphates or citrates conjoined, may also be beneficially prescribed.

It is obviously most desirable to administer that form of aliment which will nourish the body, so that healing may be favoured, but without irritating and disturbing the process which is going on towards recovery. The difficulty is still more increased by the occasional irritability of the stomach itself. And this leads us to the consideration of the means we possess for the *mitigation of distressing symptoms*, pain, vomiting, hæmorrhage, pyrosis, constipation.

For the relief of *pain*, opium or its alkaloid morphia is often the best remedy, in doses of a quarter to one grain of the former two or three times a day, or a few minims of the solution of the latter. Chloric ether, in doses of 10, 15 to 20 m, will be found very efficacious, especially when combined with nitrate of bismuth and carbonate of soda in 10 to 20 grain doses. Chlorodyne is spoken of as being a valuable substitute, but I have no experience in its use. Dilute hydrocyanic acid, in doses

of 3 to 5 m, is also a useful adjunct in some cases, especially when given with alkalies. Both potash, soda, lime and magnesia have been used; they neutralise acid secretion, and oftentimes increase the anodyne power of remedies previously mentioned, opium, morphia, chloric ether, &c. If, however, there be constipation, dryness of the tongue, and opium is not well borne, conium, henbane, belladonna, &c., may be used as substitutes. The nitrate and oxide of silver, in doses of a quarter to one grain, in some instances diminish the pain and irritability of the stomach, especially when the gastric symptoms are associated with pyrosis. Creasote in 1 m doses, we have found very effectual in relieving pain, when accompanied with irritability of the stomach, vomiting, and fermentative changes in the food. Again, carbonic acid, as in ordinary soda-water, is effective in relieving pain, as well as vomiting. So also the use of cold water and ice, which are often very grateful to the patient. The black oxide of manganese in similar doses to bismuth is also an effective remedy, although not equal to the latter preparation.

Vomiting is a very distressing symptom in many cases of ulcer of the stomach. It is best combated by only partaking of fluid diet, and of that in moderate quantities. The remedies, we have already mentioned, are of service, but especially bismuth, hydrocyanic acid, creasote, ice and alkalies. Dr. Jenner has pointed out the value of the sulphite of soda in checking the fer-

mentative action, and the development of sarcinæ in obstruction from chronic ulcer, as well as in cancerous or pyloric disease. It may be given in ʒi doses alone or combined with other agents; the hyposulphite is also given in similar cases. Charcoal directly absorbs gaseous evolution, and checks fermentative action, and in these instances of gastric ulcer it may be given *for a short time* with great advantage. Counter irritants are often of great service for the relief of pain and vomiting: a small blister should be applied to the scrobiculus cordis, or the croton oil be rubbed in so as to produce pustular eruption; some even use a seton; but I think that milder remedies may attain the same beneficial result with less suffering and distress to the patient.

If there be *excessive secretion* or *hæmorrhage*, astringents may be given; thus mineral acids, as the sulphuric alone, or with Epsom salts; acetate of lead, tannin, and alum are also available; and when there is hæmorrhage without great irritability, small doses of turpentine with mucilage or yelk of egg are sometimes prescribed; but this is a remedy in which I have little experience. I have sometimes seen it aggravate the symptoms, beside being very offensive to the patient. When hæmorrhage has recently taken place, it is well to avoid the use of anything likely to distend or mechanically disturb the stomach, as carbonic acid. Ice, which tends to produce contraction of bleeding vessels, should be

allowed to the patient; and if there be much throbbing of the vessels it may be applied externally.

Pyrosis may be checked by the astringents just mentioned; but we have found the greatest benefit from nitrate or oxide of silver with opium, from creasote, from the compound kino powder; and, when other symptoms would bear it, from the astringent preparations of iron. The bowels should be acted upon, either by agents, which are not retained in the stomach, or irritating to it, as the aloes or colocynth pill with henbane, the effervescing citrate, the carbonate or Dinneford's fluid magnesia; in other instances enemata are useful, consisting of simple water or castor oil, or of turpentine; and occasionally a mercurial purgative will be found beneficial in thoroughly emptying the canal without increasing gastric irritability, as a few grains of grey powder, one or two of calomel, or of blue pill, with henbane, &c.; but to continue this form of medicine is, we think, injurious and prejudicial to the patient. In many cases of constipation with gastric disease minute doses of strychnia, or of the extract of nuxvomica with aloes, act very beneficially.

In order to carry out the *third* indication of treatment, namely, in preventing the extension of the disease, sudden and violent exertion should be guarded against; and also the distension of the stomach by large meals, or by the formation of gaseous products, as the result of fermentative changes.

4th. In the treatment of the complications of gastric ulcer, arising from its extension to neighbouring parts, as when perforation has taken place, and the symptoms of peritonitis have been suddenly produced, there is still a slight chance that life may be prolonged; the patient should not be moved, nor anything introduced into the stomach, except a tea-spoonful of water or milk to assuage thirst. Opium must be given freely, as recommended by Dr. Stokes and Dr. Graves, so that the patient may be entirely under its influence, a grain every two or three hours; by this means peristaltic action is checked, the nervous shock diminished, extravasation prevented, adhesions promoted, and life may be thus preserved. For many days aperient remedies should be avoided, and food only taken in the most cautious manner.

If local suppuration have taken place, opium is still the best remedy, in order to diminish irritative fever, to relieve pain, and to place the patient in the most favourable condition for reparative action. If the disease have extended into the chest the prospects of recovery are still less, for sudden acute pleurisy and empyema, or asthenic pneumonia are almost certain to follow. Life may be prolonged by sustaining the patient, and the severity of the symptoms of acute disease of the chest may be partially relieved by ammonia and opium.

CHAPTER XVIII.

CANCEROUS DISEASE OF THE STOMACH.

THE stomach is one of the organs most frequently affected with cancer; and in this frequency a remarkable contrast is presented when compared with the rarity of strumous disease of the same organ. Every form of cancer is found to occur in the stomach, but instances of medullary and scirrhus cancer are the most numerous, whilst the epithelial, colloid, villous, and melanoid varieties are less constantly observed. It is seen, however, that these varieties pass the one into the other; and thus while one part has almost the firmness and structure of scirrhus, another has the characteristics of medullary growth; and again, the surface also of a medullary cancer may have the appearance of a villous structure. The disease originates in the mucous membrane of the stomach, or its submucous tissue, or it is propagated to the stomach by the affection of the glands in the neighbourhood of the pancreas; and the pylorus, lesser curvature, and cardiac extremity are the parts generally affected.

We are not acquainted with the determining cause

of the forms of cancer, or whether the opinion which is maintained by some pathologists can be established, that scirrhus is connected in its origin with the fibrous tissues of the part—medullary with the mucous surface or gland structure, and colloid especially with the latter—or, whether they are rather indications of the intensity of the morbid action. The part affected has a modifying influence on the character of the disease; the epithelial cancer of a surface covered by squamous epithelium is different from the same disease, where the epithelium is columnar, an instance of differentiation as applied to morbid changes. It would seem that scirrhus disease is less removed from normal nutritive change than medullary cancer; in the one there is a greater disposition to form fibroid tissue, in the other the growth is cellular, or nuclear.

During the *earlier* stages of cancerous disease of the stomach, especially before any growth can be detected on manipulative examination, the *symptoms* are often exceedingly obscure. It may be convenient to arrange the symptoms into three divisions, according to the respective stages of the disease. The first is the stage of organic dyspepsia before the development of any tumour; the second is that of abnormal growth; and the third, the disintegration of that growth by ulceration or sloughing.

The first symptoms are often deceptive and obscure; they are those of dyspepsia, and with it there is a

peculiarly sallow and anxious expression of countenance; pain at the stomach may be entirely absent, or there may be severe gastrodynia; pyrosis is frequently present. There is emaciation and general feebleness; but the tongue may be clean, and the bowels quite regular in action.

In the *second* stage, a tumour is felt in the region of the stomach, and the symptoms become more distinctive; vomiting is generally a marked sign, especially when the disease is situated at the pylorus or cardia; and the rejection of food takes place according to the seat of obstruction or irritation of the gastric surface, either a short time or several hours after a meal. In some instances the vomiting so quickly follows deglutition as to lead to the supposition of œsophageal disease. The pain also becomes more severe, and is generally of a more lancinating character than that experienced in chronic ulcer of the stomach. The vomited matters are often frothy and fermenting, and present us with abundant *sarcina ventriculi*. *Hæmatemesis* is occasionally present. Flatulence distresses the patient, and eructations are frequent; the bowels become constipated; emaciation steadily advances, and the countenance becomes more haggard and cachectic. On careful examination a tumour may generally be felt at the region of the stomach, or of the pylorus; it often increases rapidly, and on account of the wasted condition of the parietes becomes very apparent. The

growth is often pulsatile in its character, either from contact with the large abdominal vessels, or from its own excessive vascularity.

In the *third* stage of the disease, that of disintegration, the symptoms are more severe, and the emaciation is extreme; and the vomiting of coffee-ground substance often precedes a fatal termination. The vomiting sometimes ceases on account of the sloughing of the growth, the obstruction thereby being removed; or the branches of the pneumogastric nerve being destroyed there may be cessation of consequent irritation; the pain also diminishes from similar causes, and as the exhaustion becomes typhoid in its character, it may entirely cease; but throughout the course of the disease there may be immunity from suffering. Again, it has been shewn by Dr. Kennedy that the size of the tumour may actually lessen from the sloughing process.

The immediate cause of death in gastric cancer differs greatly; the fatal exhaustion may depend, 1st, on the interference with the absorption of nutriment, and with the completion of the digestive process; 2nd, on the sloughing of the growth, and subsequent septic changes in the blood; the patient in such a case becomes rapidly prostrate with typhoid symptoms, the breath is offensive, he is seized with hiccough, and pneumonia of an asthenic kind is induced. 3rd. The fatal termination may ensue from hæmorrhage; when the ulceration produces only slight oozing of blood the

hæmatine becomes blackened by the gastric juice, and we find that the vomited matters have the appearance of coffee-grounds; but if a larger vessel have become divided the effusion of blood is more abundant, sudden pallor is produced, and blood may be rejected by the mouth, or pass as a black semi-fluid dejection from the bowels, or, again, without discharge of any kind fatal syncope may at once take place. 4th. The extension of disease to adjoining parts may greatly modify the later symptoms of disease; if the liver become involved, or the bile ducts pressed upon, jaundice is the result; if the peritoneum be invaded acute changes may be induced in the serous membrane, or ascites may follow. When sloughing extends to the surrounding parts the colon, the skin, or the diaphragm may be perforated; of these parts the transverse colon is most frequently invaded, it becomes adherent to the stomach, and a valvular and sloughy communication is established; if the opening be small, gas only is extruded, and fœcal eructation results; but if the passage be more free, fœces pass from the colon into the stomach. Dr. Gairdner states, that fœcal vomiting is more likely to take place when the pylorus is free; but Dr. Murchison, on the contrary, and we think correctly, remarks, that fœcal vomiting is regulated by the size of the communication between the stomach and colon. The adhesions and sloughing occasionally reach the external parietes; and, if a communication

also exist with the colon an artificial anus is the result. We have, however, more frequently found this perforation of the skin, in instances of cancerous disease, affecting primarily the transverse colon.

The cancerous disease is generally found to have involved the glands in the small omentum at the lesser curvature. Next in frequency we find the liver also invaded, sometimes to a great extent, so that it is difficult to state in which structure the disease commenced. Next in order of frequency, the glands in the anterior or posterior mediastinum are implicated, and tubercles are found on the pleura or in the lungs; and, lastly, other abdominal viscera, the peritoneum, kidneys, and spleen, contain cancerous growths. In cancerous disease also, we observe that the coats of the stomach become infiltrated, and in this respect contrast with the condition which we find in fibroid degeneration of the pylorus. In any form of obstructive disease at the pylorus, the muscular walls of the stomach become hypertrophied; but, if there have been ulceration at the pylorus, and the obstruction has subsequently been removed, the hypertrophy may be exceedingly slight; so also when the central portions of the stomach or the cardia are affected.

The symptoms of gastric cancer are modified by several circumstances. 1st, by the position of the disease; 2nd, by its character; 3rd, whether it affects the stomach as the primary disease, or is merely

secondary, extending to the stomach from adjoining parts; and 4th, according to its vascularity.

1. The *position*. If the disease be located at the central part of the organ, and the orifices be free, the symptoms may be exceedingly slight, and unrecognised for a longer period, than if the orifices are affected. Vomiting is absent or only occasional; and the prominent symptom may be, continued and profound cachexia, with progressive emaciation. If the cardia is diseased, the vomiting occurs immediately after food, so that the symptoms resemble cancerous disease, or obstruction of the œsophagus.

2. The character of the disease also modifies the symptoms as well as the duration. Scirrhus more generally involves the pylorus, whilst soft medullary cancer invades any part, and increases with unusual rapidity.

3. In secondary disease of the stomach the symptoms may also be very obscure, and the diagnosis doubtful. It sometimes happens that cancerous disease of the liver is followed by infiltration of glands at the head of the pancreas, which become united to the pylorus; and without having infiltrated the mucous membrane, these glands lead to obstruction at this part, causing hypertrophy of the muscular coat; and, by this obstruction they simulate primary cancer of the stomach itself. In some instances the pneumogastric may be traced through the medullary tumours of the

stomach ; and either the nerve-fibres may be found to present their ordinary microscopical appearance, or be entirely destroyed. It is this destruction of nerve fibres which sometimes leads to a cessation of pain, and of the extreme irritability of the stomach.

4. The symptoms are modified by the vascularity of the growth. When the pancreas is diseased, or the glands at the lesser curvature are infiltrated, or the posterior part of the left lobe of the liver affected so as to press upon the aorta or other large vessels, pulsation may be communicated, and the disease simulate aneurism ; but when the growth in the stomach is very vascular, pulsation may be felt in it from this cause alone. This pulsation is less affected by position than the instances just referred to of glands pressing upon the aorta. If both sides of the stomach be affected by a vascular growth, the intervention of fluid by varying the position of the patient, modifies the pulsation to some extent.

In the *diagnosis* of cancer of the stomach, there are several conditions so closely resembling this malady, that we are in danger of forming an erroneous opinion as to the nature of the disease. 1, ulceration ; 2, aneurism ; 3, disease of the glands of the lesser curvature ; 4, disease of the liver ; 5, abscess at the pancreas ; 6, cancerous disease of the pancreas ; 7, similar disease of the omentum ; 8, affections of the transverse colon ; 9, local peritonitis ; 10, fibroid disease of the pylorus.

The symptoms of cancer closely resemble those of

chronic ulcer of the stomach. Both are preceded by a period of dyspeptic suffering, during which the diagnosis is exceedingly obscure. The expression of countenance in both is indicative of distress, but in chronic ulcer there is pallor; in cancer, cachectic sallowness. Vomiting of blood is more frequently observed in ulceration than in cancer, but in the closing stages of cancerous disease, the rejection of coffee-ground substance is of frequent occurrence. The pain of chronic ulceration is often very intense, even more so than in cancer; but it is of a gnawing character in the former, more acute and lancinating in the latter. Again, the vomiting is often more severe in ulceration, than in cancer. The tumour of cancer is generally much larger and more perceptible than the thickening around an ulcer. The emaciation in both may be gradual, progressive, and extreme; but the termination in ulcer is more frequently by hæmorrhage or perforation, whilst in cancer, it generally arises from the typhoid exhaustion consequent on the degeneration or sloughing of the growth, the absorption of decomposing material into the blood, or the extension of disease to adjoining structures. Both diseases may occur at the same age, but it is more common to find chronic ulceration at an *earlier* period than cancer. In my own experience of cases, the average age of cases of ulceration of the stomach is 37, of cancer 52. From 40 to 60 years is the age at which we are most likely to have cancerous disease of other organs,

and the law holds good with the stomach. The age will in some measure assist us in the diagnosis even at the later stages, but still more in the earlier; for the varied forms of dyspepsia, gastrodynia, pyrosis, &c., are very frequent at a period long antecedent to the age at which cancer generally manifests itself; dyspepsia being exceedingly common among young females, whilst cancer is almost unknown.

In *aneurismal* disease in the gastric region, the stomach itself often suffers remarkably little. Digestion may be sound, the food being taken and absorbed in a healthy manner. The pain of aneurism is of a different kind, and is uninfluenced by the diet. It is generally a dull constant pain in the back, but with severe and even intense paroxysms at night. The pulsation is uniform, not changed by position. A bruit, if audible at all, may be systolic, or almost diastolic.

In *diseased glands* at the *lesser* curvature of the stomach, the tumour may be marked, but the pain and vomiting are less distinctive, than in disease of the stomach itself; the latter often becomes involved, however, before the close.

In *disease of the liver* also the position is some guide to us, so also the absence of severe gastric symptoms; but when the left lobe of the liver is diseased, and pressure exerted upon the stomach, the correct diagnosis is very difficult, jaundice being often absent in hepatic cancer.

In *inflammation and abscess at the pancreas*, a tumour may form at the epigastric region, with severe pain, vomiting from pressure, a haggard countenance, and compressible pulse. The symptoms are more sudden than in ordinary gastric cancer, but this will not always save us from mistake, for we remember an instance of cancer in a sailor, who was said to be quite well; in whom sudden pain came on at the scrobiculus cordis of so severe a character that he fell down on deck, and soon afterwards a large tumour of a cancerous kind was found.

Cancerous diseases of the pancreas, although behind the stomach, and accompanied with cachexia, leave the stomach free to perform its function. Fatty evacuations have been recorded by some, but such a sign is certainly not always present.

Diseases of the omentum would only produce any doubt, when adhesion to the stomach has taken place, and when there is pressure from the size of the growth.

Cancerous disease of the transverse colon is sometimes a source of obscurity in diagnosis; for adhesions with the greater curvature of the stomach having formed, the disease often extends into the stomach so as to cause extravasation of gas or fœces; and the pain in cancer of the colon comes on at a much later period after food; discharge of blood from the bowels is also occasionally present.

Local peritonitis induces peritoneal adhesion and external hardness; and when local extravasation has fol-

lowed so as to form a fœcal abscess, the emaciation is progressive, the hectic is severe, pain is sometimes excessive ; and in the certainty of fatal issue, the disease approaches the character of the worst forms of cancer ; but we do not find the malignant cachexia. The pain is more superficial, and digestion is less directly disturbed than in gastric disease.

Fibroid disease of the pylorus is regarded by some as of a cancerous nature ; still it has neither the pathological character nor the physical history of that disease. As with cancer, there is progressive emaciation, with cachexia, and too often a steady downward course ; but the duration is longer, the tumour less distinct, hæmorrhage is less frequently, if ever observed, and the disease is more amenable to treatment. The constant ejection of food at the close of the digestive process, from the obstructive disease of the pylorus, and the presence of sarcinæ of Goodsir, have led many to form a more unfavourable diagnosis, than the case has warranted.

The statistical tables of Dr. Brinton in reference to the age of the patient affected with gastric cancer, and the *position* of the disease, are of great interest. The pyloric extremity is the part most frequently affected, and the disease extends upon the posterior or upon the anterior surface. Next in frequency is the lesser curvature ; then the œsophageal extremity and the cardia ; and lastly the middle of the stomach. When the greater curvature alone is affected, the mischief has

nearly always extended from the transverse colon or omentum.

As to the *duration* of chronic ulcer compared with cancer, the former disease extends over a longer period. In cancer the duration may be from three to six or twelve months, or even two years; but in ulceration the disease will be found continuing three, four, or even seven years, with varied accessions of severe symptoms. Ulceration may heal, and a cicatrix be formed, and instances have occurred in which twenty years have intervened between the commencement of the symptoms and their fatal termination. The one is a curable disease; the other tends to increase with more or less rapid downward course till it terminates in death.

In the *treatment* of cancer of the stomach, the same remedies which have been mentioned in chronic ulceration may afford great comfort to the patient, although they are ineffectual for cure; but it will often be found, that life is prolonged and ease obtained by the administration of nutrient enemata. The distressing flatulence and fermentation and vomiting of food are thus avoided, and the sufferer is nourished by this imperfect means more than by ineffectual attempts to induce normal digestion.

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