

**On the diagnosis and treatment of the varieties of dyspepsia : considered in relation to the pathological origin of the different forms of indigestion / by Wilson Fox.**

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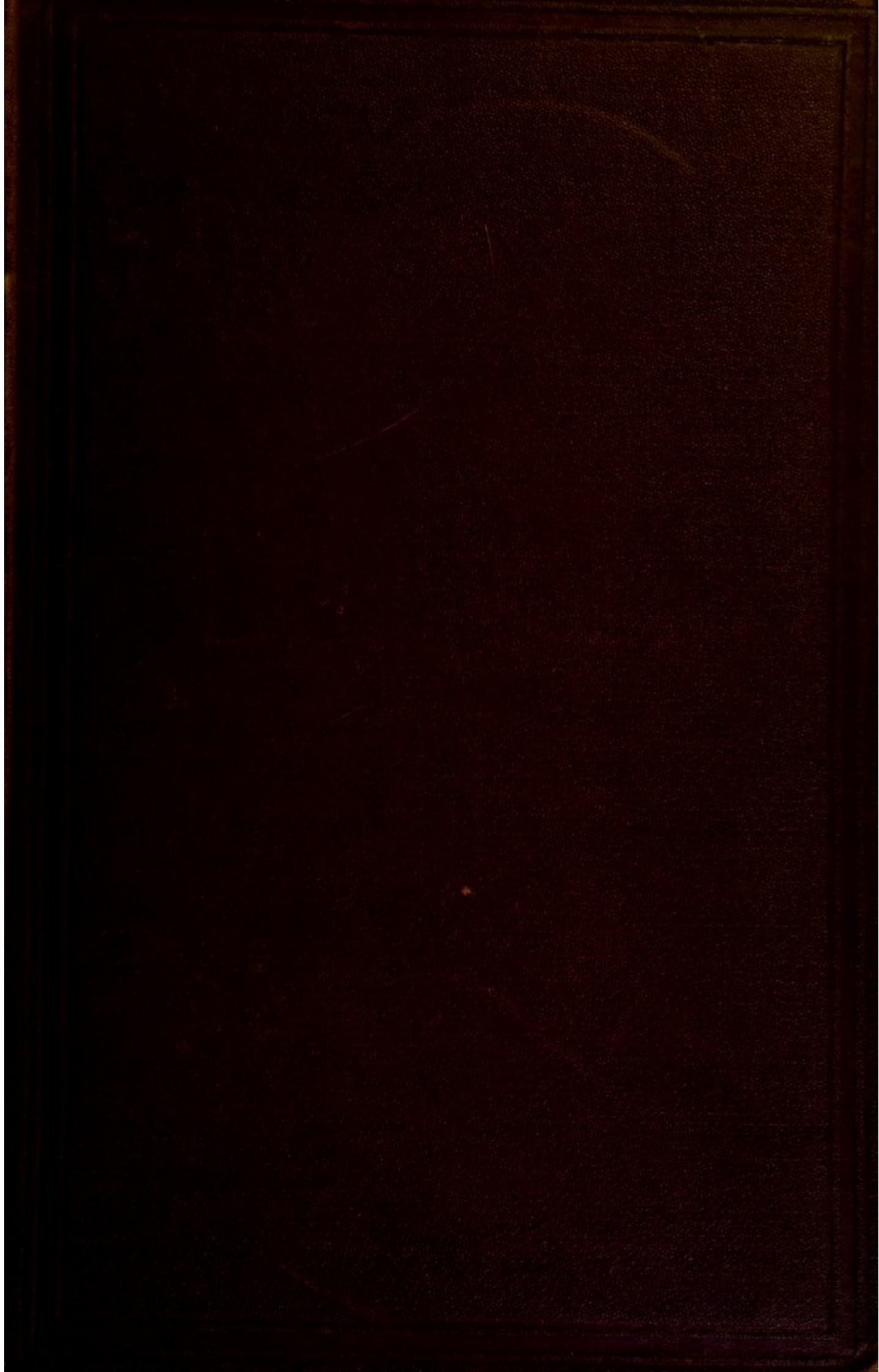
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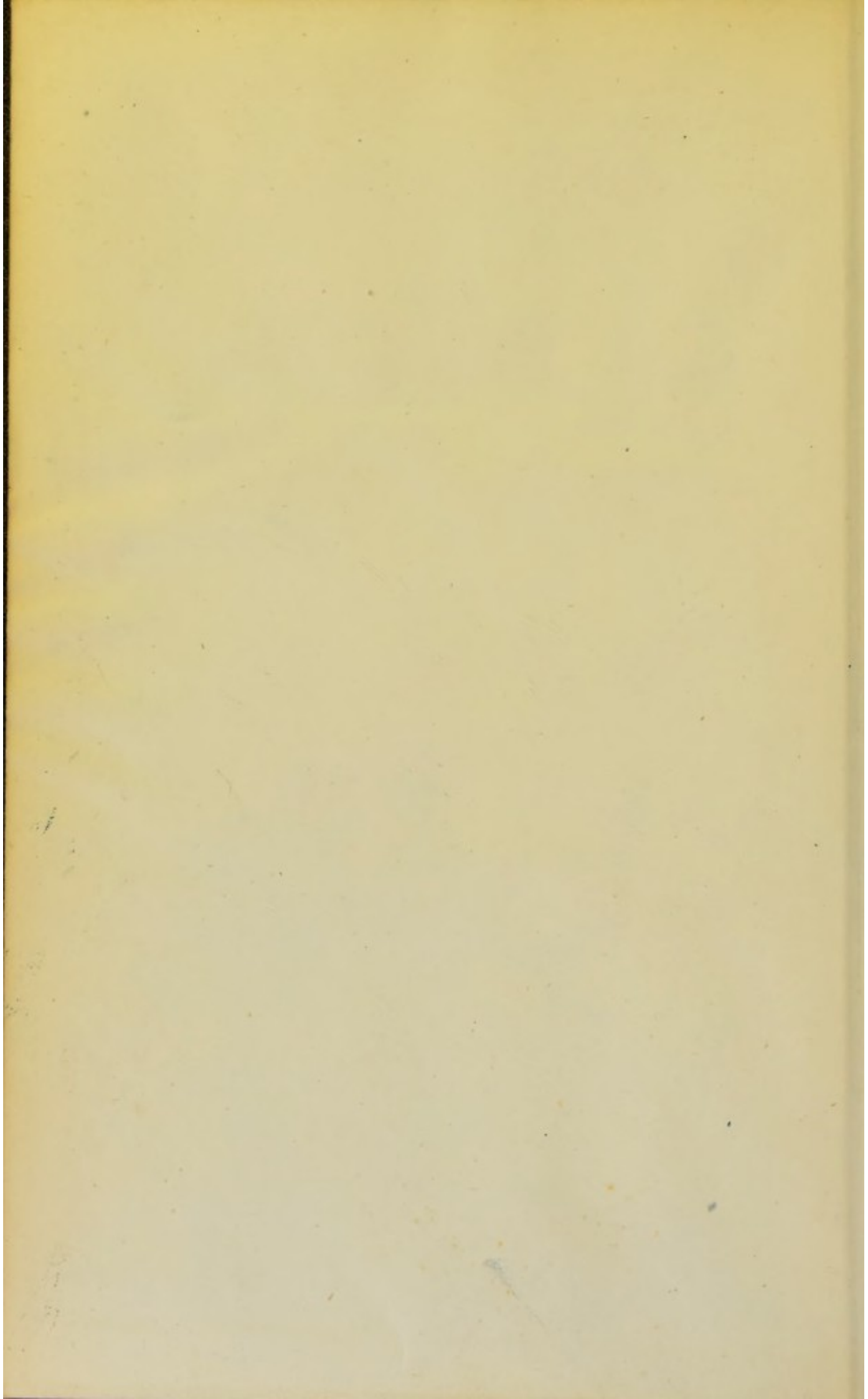
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from his sincere friend  
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ON  
THE DIAGNOSIS AND TREATMENT  
OF THE VARIETIES OF  
DYSPEPSIA.





ON  
THE DIAGNOSIS AND TREATMENT  
*OF THE VARIETIES OF*  
DYSPEPSIA,

CONSIDERED IN RELATION TO THE  
PATHOLOGICAL ORIGIN OF THE DIFFERENT  
FORMS OF INDIGESTION.

BY  
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TO

WILLIAM JENNER, M.D. F.R.S.

PHYSICIAN IN ORDINARY TO HER MAJESTY THE QUEEN, AND TO  
HIS ROYAL HIGHNESS THE PRINCE OF WALES,  
PROFESSOR OF THE PRINCIPLES AND PRACTICE OF MEDICINE  
AT UNIVERSITY COLLEGE, LONDON,

*This Work is Dedicated*

IN ADMIRATION FOR AN EXAMPLE

OF UNWEARIED AND SUCCESSFUL DEVOTION TO THE

ADVANCEMENT OF MEDICAL SCIENCE,

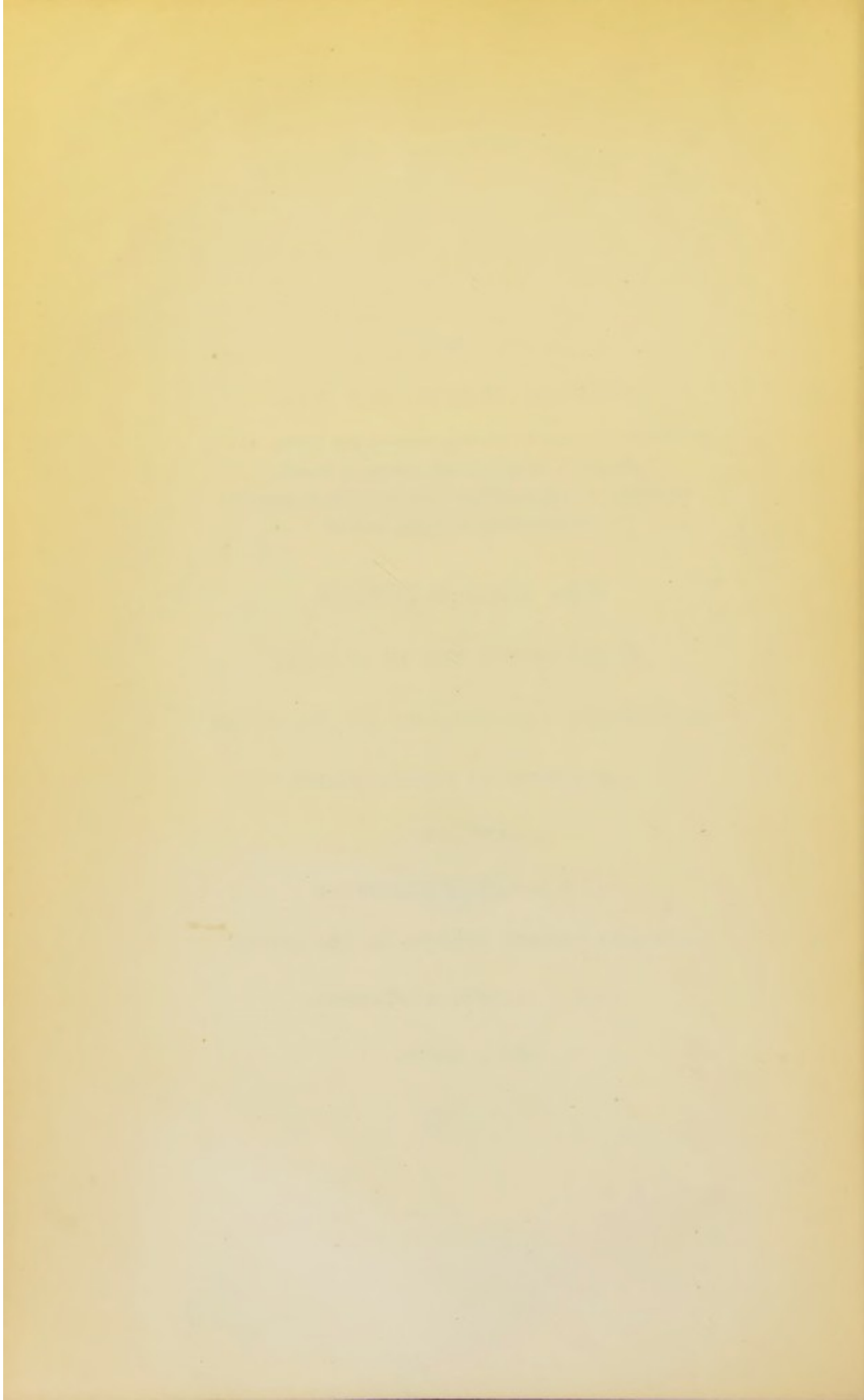
AND ALSO

AS A TOKEN OF GRATITUDE

FOR MANY BENEFITS RECEIVED BY THE AUTHOR

FROM A TEACHER, A COLLEAGUE,

AND A FRIEND.



## PREFACE.

IN spite of the numerous works which have of late appeared on the diseases of the Stomach, I have constantly found, while engaged in the practical instruction of students, that they experience greater difficulties in the diagnosis of the different forms of Dyspepsia, and in the application of the appropriate remedies for these disorders, than in the treatment of almost any other class of diseases.

The reason for much of the uncertainty which has attended this branch of medical practice, has appeared to me to lie in the fact that the various derangements of the digestion are so universally regarded as being of a purely functional nature; and although many recent authors have recognised the error of this view, it is one which nevertheless still largely prevails, and can only be overcome by a persevering study of the pathological changes undergone by the stomach, which underlie these disturbances in its functions.

Having, during the earlier periods of my own professional career, felt the difficulties attendant on this branch of practice, I was induced many years ago to enter upon the path of observation of the morbid states of the stomach, which had shortly before been opened out afresh by the researches of Dr. Handfield Jones. With this view I availed myself of the large opportunities offered for an investigation of this nature by the number of post-mortem examinations made at the Patholo-

gical Institute of the Charité Hospital at Berlin ; and through the extreme kindness and liberality of Professor Virchow I was enabled to prosecute some researches upon this subject, the results of which I laid before the Medico-Chirurgical Society of London in 1858. I have ventured to hope that these observations, by assisting to widen the knowledge of the morbid alterations of the stomach, may tend to give greater stability to the diagnosis of the various derangements of its function which are met with during life ; and since their publication I have lost no opportunity for making the leading features of these disorders an object of study, correcting my observations during life by a sedulous examination of the stomachs of persons dying of different classes of diseases.

In many of the forms of Dyspepsia, our diagnosis must indeed be frequently only inductive, since the disorder, when uncomplicated, seldom proves fatal ; but I believe, nevertheless, that the data for diagnosis are, generally speaking, sufficiently numerous to enable us to arrive at tolerably correct conclusions, without the humiliating avowal that the results of treatment are *necessary* adjuvants in the diagnosis of these affections.

This work, indeed, can only be regarded as an attempt to extend the knowledge of the profession in a direction in which all modern scientific research has of late pointed. The bases of classification, for the purposes of diagnosis which I have followed, have been already more or less fully adopted by most of the writers to whose labours I have alluded in the Introduction, and my aim has been principally devoted to the definition and extension of these. There are, indeed, no symptoms of stomach disorders which have not been recorded almost from the earliest periods of medical literature, but the recognition of their true import has been only the result of the labours of many gene-

rations of observers, and can by no means be said to be as yet complete. Nor can I claim to have introduced any new remedies to the notice of the profession; for I believe that we have already even more than enough for the ordinary cases which come before us, if they are rightly directed and applied; and my object in treating of therapeutic measures has been to define more strictly the objects for which individual drugs are serviceable, and to assist in discriminating the conditions in which they may be advantageously used.

The work has extended somewhat beyond the limits which I had originally intended; for finding that, in imparting instruction on these diseases, it is almost invariably necessary to explain the import of different symptoms, I have thought it desirable to devote the first part to the explanation of the grounds for diagnosis which they afford; and as the symptoms of stomach disturbance are for the most part departures from the normal order of its physiological functions, some allusion to these has become almost absolutely necessary. Moreover, I have considered it desirable to preface the description of particular states by a general account of the causes of Dyspepsia, a knowledge of which is often imperatively necessary for the removal of their effects; and though this plan has involved a certain amount of repetition, I trust that this will be pardoned, if aiding, as I believe it will do, in the more perfect comprehension of the proteiform characters of these disorders. The same charge of repetition can, I am aware, be made with regard to the enumeration of the symptoms of some of the forms of the disorder; but, as I have constantly found that it is in the recognition of these that the greatest difficulties exist, I have thought it better to incur this risk, rather than to pass too briefly over states of disease which are so constantly presenting themselves to the notice of the practitioner.



The appearance of this work has been delayed by the desire which I felt to re-investigate some points connected with the manner in which the lymphatic structures of the stomach participate in its diseased processes ; and the successful prosecution of this inquiry involves processes of microscopic research which require much time for their full carrying out. I have found however that these changes affect, in many instances to a considerable extent, the pathological appearances as seen by the naked eye, and particularly in certain of its inflammatory conditions, and I shall therefore not regret the delay if my observations are found in any degree further to elucidate these appearances.

22B, CAVENDISH SQUARE,  
*March, 1867.*

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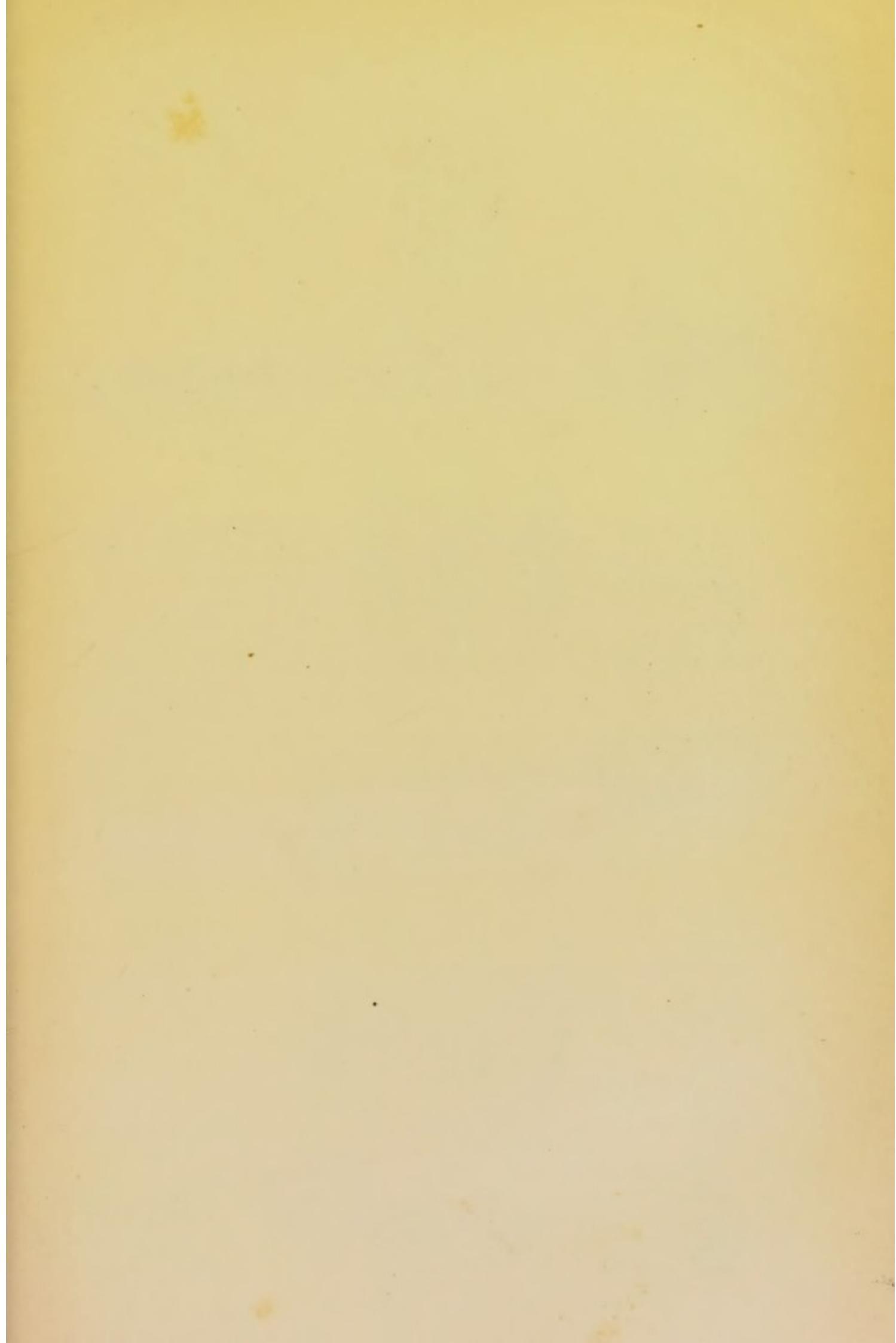
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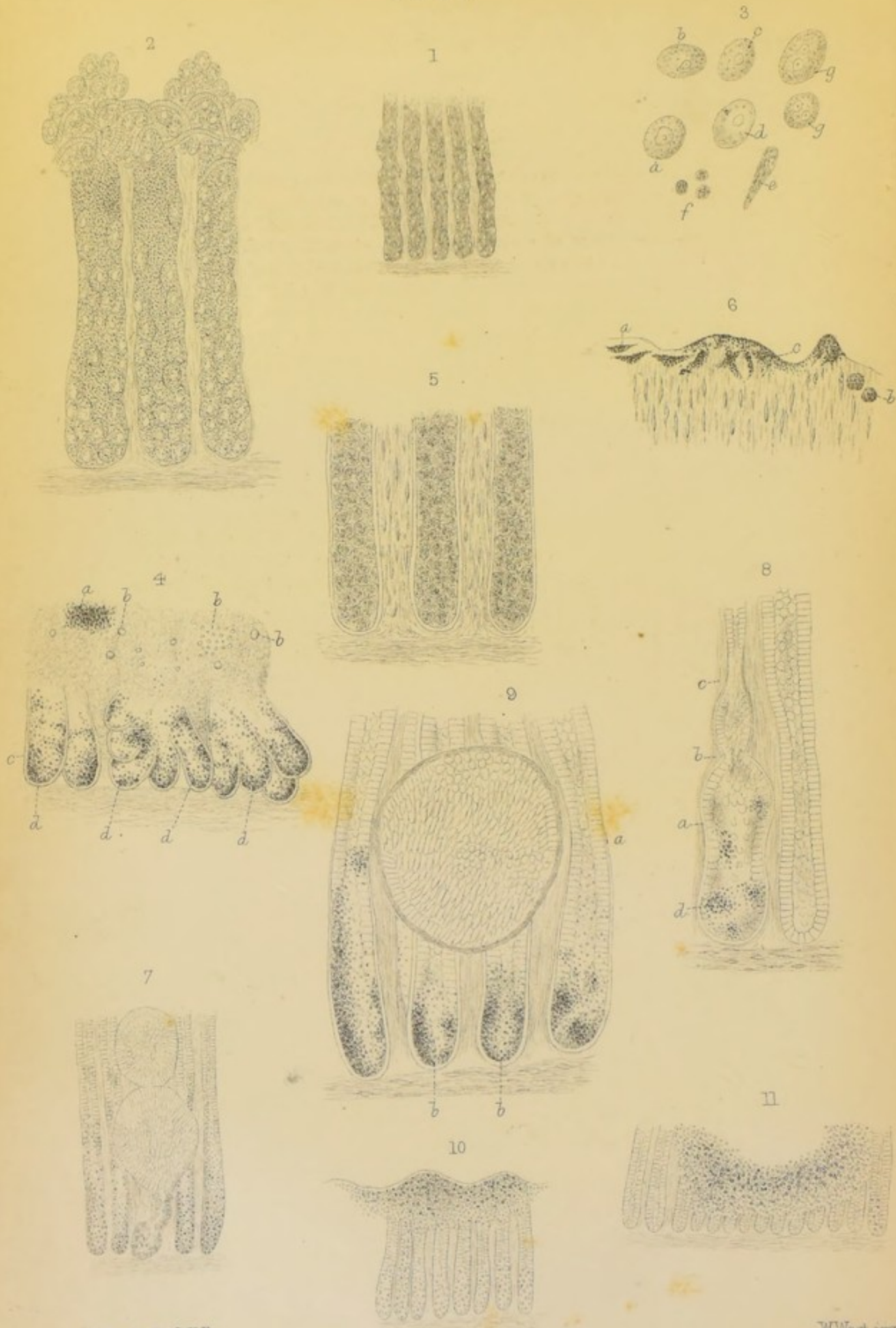
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## DESCRIPTION OF THE PLATES.

### PLATE I.

*Fig. 1.* Vertical Section of Stomach Tubes in a case of Acute Catarrh,  $\times 90$  diam., showing the irregular outline and granular appearance of the Glands.

*Fig. 2.* The same  $\times 400$  diam. (reduced). The Tubes are filled with swollen epithelial cells and with granular débris, arising from the breaking down of these. Enlarged capillaries are seen at the surface.

*Fig. 3.* Cells extruded from the Glands in a state of Acute Catarrh. (*a, b, c*) Enlarged and Granular Spheroidal Epithelium. (*d*) The same, treated with acetic acid. (*e*) Swollen Columnar Epithelium. (*f*) Free Nuclei. (*g*) Enlarged Cells containing double Nuclei.

*Fig. 4.* Stomach Tubes (vertical section) in case of Chronic Catarrh  $\times 290$  diam. (*a*) A mass of Pigment in upper layers of Membrane. (*b b b*) Free Fat Drops. (*c*) Thickened Membrana Limitans. (*d d d*) Entire fatty degeneration of the Epithelium.

*Fig. 5.* Chronic Catarrh. Section treated with acetic acid. Shows the increase of Connective Tissue between the Glands, and thickening of the Membrana Limitans of the Glands. The cloudy appearance of the Epithelium is due to the action of the acid.

*Fig. 6.* Pigmentary deposits in the villi of the Pyloric region, in a case of Chronic Catarrh. The pigment is seen at (*a*) within the cells of the Connective Tissue; at (*b*) in the Nuclei of the Glandular Epithelium; at (*c*) it is free among the elements of the Tissue.  $\times 340$ . Treated with acetic acid.

*Fig. 7.* Cystic degeneration of a Gland in the Pyloric portion. The Gland Tube is seen continuous with the lower portion of the Cyst. The Glands around have their Epithelium in a state of fatty degeneration.  $\times 100$ .

*Fig. 8.* A Gland Tube which has undergone a double constriction in its course, probably an earlier stage of the foregoing.  $\times 340$  diam. (*a*) Thickening of the Membrana Limitans. (*b c*) Points of constriction where the Connective Tissue is greatly thickened. (*d*) Fatty degeneration of the Epithelium.

*Fig. 9.* A Cyst from the Pyloric portion of the Stomach, showing the contents to be Cylindrical Epithelium: at (*a*) is seen a capsule of Fibrous Tissue surrounding it; (*b b*) Glands in a state of Chronic Catarrh.  $\times 340$  diam.

*Figs. 10, 11.* Fatty changes in upper layers of Mucous Membrane, leading to erosion of the surface.  $\times 100$ .

## PLATE II.

*Fig. 12.* A change somewhat similar to the above, in which the cells (*a a a*) of the Connective Tissue are seen in a state of fatty degeneration. (*b*) Fatty degeneration of the Cells of the Submucous Tissue.

*Figs. 13 and 14* illustrate different positions in which enlargement of the Solitary Glands and increase of the lymphatic elements are seen in Catarrh of the Stomach. At *fig. 13* one of these structures is seen pushing the Tubes aside. In *fig. 14* there is seen at (*b*) a second growth, extending close to a larger one. At (*c*) the same process of multiplication is seen in the Submucous Tissue,  $\times 100$  diam. *Fig. 13* is from a case of Acute Gastric Catarrh in a child; *fig. 14* from a case of Gastric Catarrh associated with General Tuberculosis.

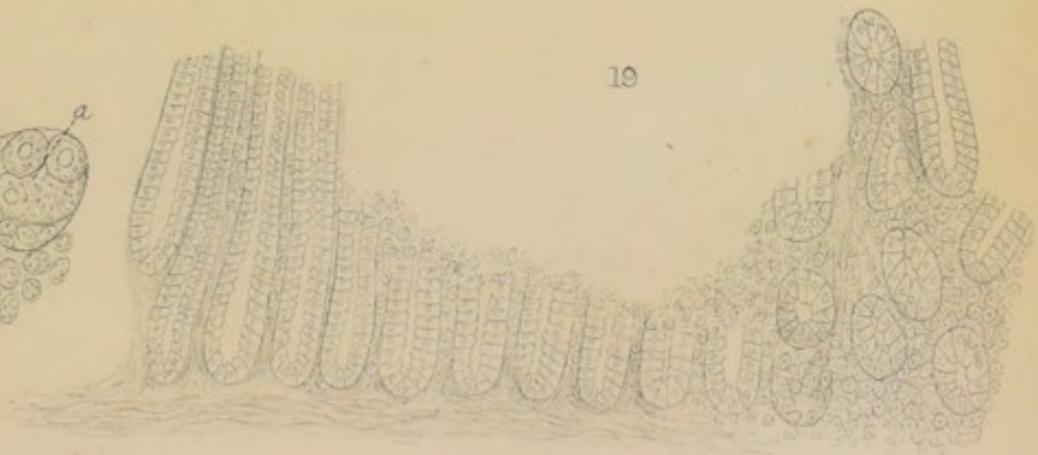
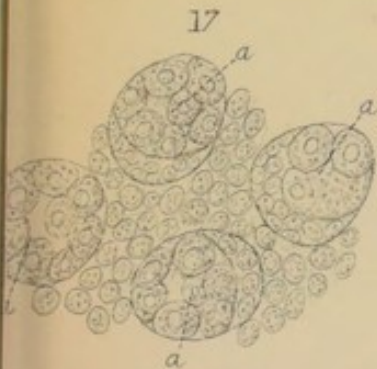
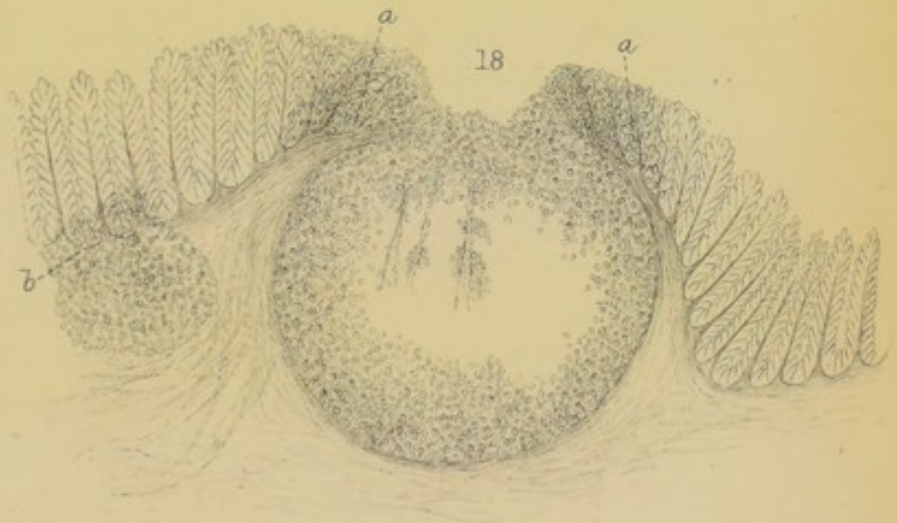
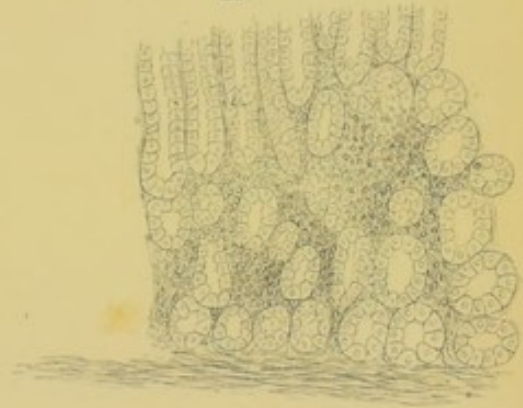
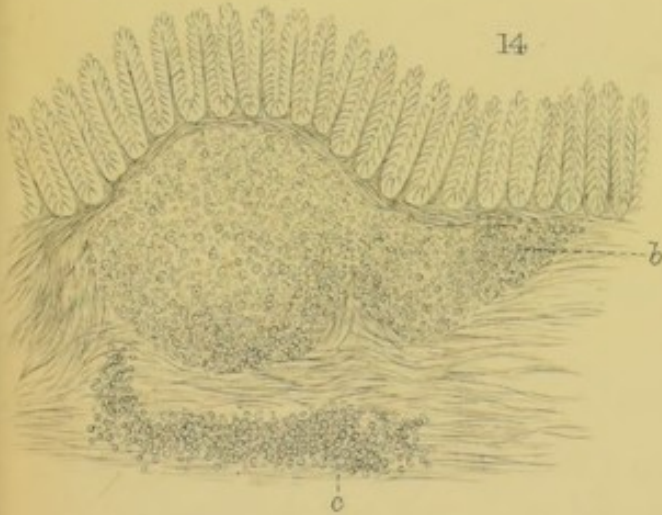
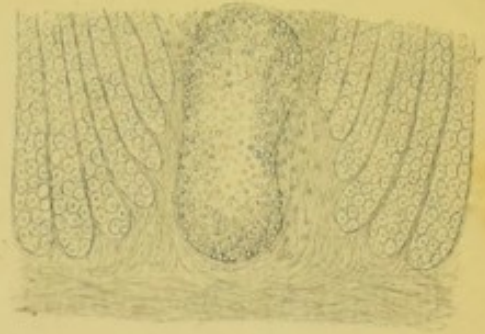
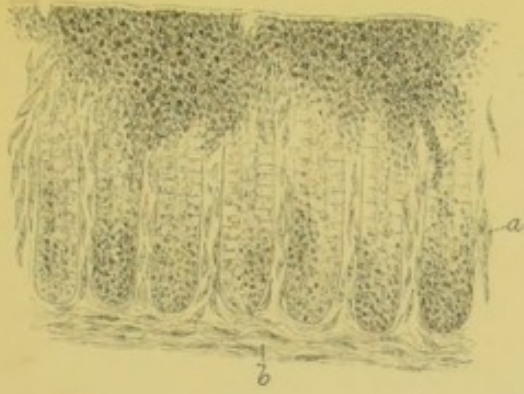
*Fig. 15* represents the infiltration of the Tissue with Lymphatic elements in a case of Chronic Catarrh of the Stomach, associated with Heart Disease. There is no distinct limitation of the structure as in *figs. 13 and 14*  $\times 100$  diam.

*Fig. 16* exhibits the Structure of this Tissue  $\times 1,250$  diam. (reduced), showing cell elements imbedded in an alveolar network.

*Fig. 17* shows the same infiltration among the Tubules from a case of Cholera,  $\times 600$  diam. The walls of the lymphatic cells are indistinct, being blended with the intercellular substance of the alveolar network. At (*a a a*) are transverse sections of the Glands of the Stomach, seen in profile, filled with Glandular Epithelium.

*Fig. 18.* Vertical Section of commencing Ulceration of a "Solitary gland" of the Stomach in a case of Tuberculosis. The tissue between the Tubes at (*a a*) is infiltrated with lymphatic elements, and the tubes and intervening tissue have broken down over the centre of the "Gland." The base of the ulceration is thus formed of lymphatic tissue; at (*b*) is seen a similar smaller growth invading the tissue around the bases of the Stomach Tubes. The clear space in the centre of the Gland is due to a portion of the tissue having broken out in the preparation of the section.

*Fig. 19.* Vertical Section through a "Follicular Ulcer" in a case of Typhoid Fever, showing the spaces between the tubules infiltrated with lymphatic elements, which are undergoing fatty and glandular degeneration, leading to the breaking down of the tissue.  $\times 200$  diam. (reduced).







# ON DYSPEPSIA.

## CHAPTER I.

### *INTRODUCTION.*

#### ON THE NOSOLOGICAL CLASSIFICATION OF DYSPEPSIA.

A COMPLETE history of the various opinions which have prevailed concerning the nature and causes of disturbances of the digestive process, and of the classifications of diseases of the stomach founded upon these, would, though of considerable historical interest, be considerably beyond the scope of the present work.<sup>1</sup> It is not, however, unimportant that some general view should be entertained of the leading theories by which it has been attempted to explain the nature of these affections, since ideas which have once been prominent in the history of medicine tend continually to recur either in their original shape, or under altered forms, and to exercise no small influence on the plans of treatment pursued for the affections to which they relate.

Thus the term "bilious," which is still in use to signify a disorder of the digestion, has descended to us as the representative of the speculations of Hippocrates, and other early writers,

<sup>1</sup> For more detailed accounts of this branch of the history of medicine the reader is referred to Broussais, "Examen des Doctrines Médicales;" also to Dr. J. Todd's learned and excellent article on Indigestion, Cyc. Pract. Med. vol. iii., and to Virchow's "Historisches Kritisches und Positives zur Lehre der Unterleibs-Affectionen," Archiv für Path. Anat. &c., vol. v.

respecting the alterations of the bile. Again, the *strictum* and *laxum* of the earlier methodists, and the theories of Hoffmann and Stahl concerning acrimonies, acidities, and crudities of the primæ viæ, may be said to have laid the foundation for various opinions on the subject of atony and obstruction of the stomach and intestines which, through other writers, have descended to later periods.

The use of purgative and tonic remedies in the treatment of dyspeptic disturbances, is the direct result of such views as the foregoing regarding their nature and origin; and the manner in which either of these classes of remedies has been employed has depended on the predominance, for the most part, of one or other of the hypotheses to which I have here alluded.

It is true, indeed, that many writers since the days of Celsus and Morgagni have recognised various organic diseases of the stomach; but the theories of their production and of their influence on digestion have tended in great measure to a one-sidedness both in pathology and treatment, which has rendered the distinction and diagnosis of these disorders a matter of considerable difficulty.

Many of the classifications of the disorders of digestion included under the title of dyspepsia, have been based upon an ontological foundation, by which this condition was regarded as a distinct disease, and the place consequently assigned to it in nosological treatises has varied with the pathological views entertained by the authors of these systems.

Among the most important of these, from its influence on succeeding writers, must be ranked the Nosology of Cullen, who, by placing dyspepsia among the neuroses, of the order *Adynamia*, has contributed largely to the English view of the general atonic character of the affection, and not a little to the treatment which has been directed to its cure. It is true that he admitted a gastritis, or inflammation of the stomach, but only recognised as such a severe and acute disease, having no features in common with the minor shades of this morbid action, which are a very frequent cause of disturbance of the digestive act. He stated, indeed, that dyspepsia may arise from organic disease of the stomach, as "tumour, ulcer, scirrhusity," or "from some affections of other parts of the body,"

but he regarded it as being in these cases either symptomatic, or "secondary and sympathetic," and classified the forms of the latter condition as dyspepsia febrilis, hypochondriaca, hysterica, chlorotica, catamenialis, hæmorrhoidalis, cachectica, arthritica, nephritica; while he placed pyrosis in a separate category among the paralytic affections.

That he regarded dyspepsia in the main as an atonic affection is, however, evident from his final statement: "I shall still consider the imbecility of the stomach as the proximate and almost sole cause of dyspepsia, and I the more readily admit of this manner of proceeding, as in my opinion the doctrine applies very fully and clearly to the explaining the whole of the practice which experience has established as the most successful in the treatment of this disease."<sup>1</sup>

To the French school we are indebted for the recognition by Pinel,<sup>2</sup> at the beginning of the present century, of the analogy existing between the catarrhal affections of the gastro-intestinal canal, and those of other mucous membranes, and at a somewhat later period for the masterpieces of exact observation and sound reasoning recorded in the writings of Andral and Louis. Its authors however have, since the writings of Broussais,<sup>3</sup> been divided between his views, which attributed all derangement of digestion to an inflammatory origin, and the opinion of those who, recoiling from the exaggeration of some of his statements, have so far gone into the opposite extreme as to regard the greater part of the symptoms associated with impairments of digestion as the results of disordered innervation. The chief support of the latter opinion is to be found in the works of Barras,<sup>4</sup> who, though he re-

<sup>1</sup> He, however, expresses his dissatisfaction with the classification:—"We have established a genus of disease under the title of dyspepsia, and, perhaps, there was no avoiding it; but it is too general, and under that generality of little use. It comprehends every irregularity in the functions of the stomach, but these are certainly of great diversity in their nature and causes, and we want more certainty and precision than we yet have."

<sup>2</sup> Nosograph. Philosoph.

<sup>3</sup> Histoire des Phlegmasies Chroniques, 2d ed. 1816. "Toutes les fièvres essentielles des auteurs se rapportent à la gastro-enterite; ils l'ont tous méconnue lorsqu'elle se trouve sans douleur locale et même lorsqu'il s'y trouve des douleurs, les regardant toujours comme un accident." Lec. sur les Phleg. Gastriques, 1823, p. 113; also, Examen des Doct. Méd. Aph. ccxxii. & ccxxiii.

<sup>4</sup> Traités des Gastralgies et des Enteralgies, 1827.

cognised a form of chronic gastritis, and laid down certain rules for diagnosis between its symptoms and the disorders of the former class, must be regarded in the present day as having greatly exaggerated the comparative frequency of nervous disturbances, and also to have included under the category of gastralgia many cases of simple atony, and also of inflammatory affections and of ulcer. A similar variation of opinion has also, since the writings of Broussais, prevailed extensively among English authors;<sup>1</sup> and it may be noted that, though they have largely recognised the influence of organic disease in disturbing the digestive functions, there has been little attempt among them to follow any logical classification, but the title of dyspepsia, or indigestion, has been retained for purely functional disturbances of the stomach,<sup>2</sup> while the plans of treatment laid down have been directed principally to the relief of various individual symptoms.

The method of classification from symptoms followed by some of the German writers<sup>3</sup> at the end of the last and the beginning of the present century, who have principally taken PAIN as the basis of their arrangement, has recently been adopted in France by MM. Chomel,<sup>4</sup> Beau,<sup>5</sup> and Guipon,<sup>6</sup> who, possibly from a feeling of the hopelessness of attaining to any sounder system, have maintained the *essential* nature of dyspepsia. In accordance with this view, they have divided the disorders of digestion into Idiopathic or Essential, and Symptomatic (signifying by the latter term all such derangements as result from organic affections of the stomach, or from diseases of other organs), and they have established sub-varieties of the former class, depending on the prominence of one or more of the symptoms present. These, however, though less complicated than those of some of

<sup>1</sup> See Wilson Philip on Indigestion, and Johnson on Morbid Sensibility of the Stomach and Bowels. The former of these authors attributes the *earlier* stages of indigestion to perverted nervous action, the *later* ones to chronic inflammation; while Dr. Johnson ascribes them to *irritation*, meaning apparently by this term a condition of disturbed innervation.

<sup>2</sup> Abercrombie, Dis. of Stomach; Pemberton on Abdominal Viscera.

<sup>3</sup> Schmidtman, Summ. Obs. Med. Prax.; J. Frank, Prax. Med. Univ. Præcep. III. i.; and Truka, Hist. Cardialgiæ.

<sup>4</sup> Traité des Dyspepsies, 1857.

<sup>5</sup> Gaz. de Hôpitaux, 1859, recently republished, 1866.

<sup>6</sup> Traité de la Dyspepsie, 1864. Ouv. couronné par l'Acad. Imp. de Méd.

the earlier nosologists, and especially of Sauvages<sup>1</sup> and Cullen, appear to afford only an unsatisfactory basis for the true classification of the forms of these affections, since the symptoms thus enumerated as the basis of their divisions are common to indigestions arising both from organic and from functional causes.<sup>2</sup>

As regards the use of the word "essential," employed by these authors, but of which I can find no precise definition attempted, except by M. Trousseau,<sup>3</sup> I would venture to remark that every dyspepsia must depend, either directly on alterations of the secretions or movements of the stomach, or on accidental and extrinsic causes. If all those varieties of the disorder are to be excluded from the category of essential which result from organic disease, or from perverted innervation arising from diseases of neighbouring or remote viscera, as not being essential, but symptomatic, there only remain those forms in which indigestion is caused by unsuitable food, or by purely functional disturbances operating directly through the nervous system, or through weakness arising from the general malnutrition of the patient but not associated with appreciable organic disease. But as regards these latter classes, the disturbances caused by food depend, in many cases, on the state of the stomach existing before the food was introduced; and in others, the symptoms are the result of a state of irritation excited by the unsuitable diet. It is difficult to understand how a perversion of the functions of the stomach arising from a concussion of the brain can differ essentially from that caused by a moral emotion, or by the invasion of a fever, or by a sudden or violent physical pain; or that a nervous disturbance proceeding directly from a cerebral cause, can be placed in a different category to one of a similar character arising from disease existing in another organ, and affecting the stomach by reflex action.

<sup>1</sup> *Nosologia Methodica*, 1768.

<sup>2</sup> M. Chomel's division of idiopathic dyspepsia, is as follows: flatulent, gastralgic, enteralgic, boulimic, acid, alkaline, and dyspepsia of liquids.

M. Guïpon divides idiopathic dyspepsia into acute and chronic, and of the latter form he enumerates the following varieties: flatulent, gastralgic, acid, atonic, boulimic, and "hypercrinique ou pituiteuse;" he also subdivides dyspepsia into gastric and intestinal, and establishes the following varieties of the latter order, viz. flatulent, enteralgic, acid, atonic, and duodenal.

<sup>3</sup> "Dyspepsie essentielle, c'est à dire ayant en elle la raison suffisante de son existence."—*Traité de Thérap.* ii. 477.

This epithet appears also to have the disadvantage of imparting to our conception of the disorder an ontological character, from which it should be the great aim of all medicine to become free. The immediate cause of dyspepsia must depend either on the nature of the food or on the condition of the stomach. If on the former, it can hardly be called essential; if on the latter, the use of this term can at best be regarded as but a cloak for ignorance, the satisfied adoption of which is likely to be attended with the further disadvantage of preventing inquiry into the condition of the stomach in which it has its origin.

It cannot be doubted that the most satisfactory arrangement which can be adopted, of the various forms and symptoms of indigestion, must be one based upon the pathological states of the viscera in which they originate. It is only, however, of later years that any considerable advance has been made in this direction, towards which our progress has been impeded by many errors, the nature of which has only of late become more fully understood. Among these may be pointed out the fact that the disease now known as chronic ulcer, was scarcely recognised before the time of Cuveilhier and Rokitanski, and that its influence, and also that of cancer, in the production of pain and vomiting, were by no means fully appreciated by earlier writers. Until a very recent period, also, the pathological appearances produced by inflammation had been hardly discriminated with sufficient accuracy to form a basis for diagnosis, since both ulcer and cancer, and even the *post-mortem* softenings of the stomach, having been regarded as evidences of this process, deductions drawn from cases in which these conditions were observed have only tended to confuse, instead of to elucidate the history of its symptoms; while the difficulty of defining the limits of this class has been further increased by the fact that many cases of typhoid fever have been included among its varieties, both before and since the time of Broussais.<sup>1</sup>

A further source of confusion is that arising from the indefinite manner in which the terms *atony* and *irritation* are employed in the description of conditions of the abdominal viscera.

The idea attached to atony may be said to have a certain dis-

<sup>1</sup> This appears true of Roederer and Wagler, "De Morbo Mucoso," J. Frank, and Schmidtman, not to mention more recent writers.

tinectness when it is held to signify a simple impairment of vital activity of a purely negative character, where the nutritive and functional powers are diminished in a nearly equal and direct ratio; as distinguished from their perversion or destruction, as seen in inflammation or gangrene, or the frequent implication of the latter without the former, as observed in paralysis;<sup>1</sup> but it yet often carries with it a meaning derived from the contractile theory originally attached to the word by Stahl, Hoffmann, and Cullen; the latter of whom regarded the atony of the stomach, which he considered the cause of dyspepsia, as residing chiefly in its muscular coat. Our knowledge of the "vital movement" of elementary and complex tissues has, however, vastly extended since the limitations originally imposed upon the word by these authors; and, though the word atony is often used in a wider sense than its root, *tone*, which is still chiefly applied to muscular tissues, the applicability of either, even to glandular structures, is less questionable in this sense, when we remember the pressure force exerted during their act of secretion. It is, however, desirable to endeavour to divest the term of idealistic conceptions, and to restrict its application, as far as possible, to cases of simple weakness, unattended with appreciable organic disease; and although, as it will hereafter appear, when the pathology of atonic dyspepsia is more fully discussed, this distinction is not one which can be absolutely enforced, yet the exceptional cases are only such as show the mutual dependence of function and nutrition in the molecular sense of the latter term.

Of the word "*irritation*," it may truly be said that it is one of the *eidola fori* of our science, as it is constantly used in a double sense, and often has a meaning attached to it different from that which it was intended to convey: being held to signify in some cases functional disturbances affecting chiefly the nervous system, and in others derangements in the circulation and nutrition of the parts in which it occurs, so closely allied to the phenomena of inflammation that no boundary-line of distinction can be clearly established between them.

Virchow has, indeed, done much towards laying down a clearer

<sup>1</sup> Virchow, *Tonus und Atonie*, Archiv, vi. 139.



basis for its employment by distinguishing the vital actions which may be signified by it into functional, nutritive, and formative; but as the two former are in most cases almost inseparably allied, the only means of practically avoiding fallacies in the meaning attached to the word is to define strictly in all cases in which it is used, whether merely a perverted functional disturbance is meant, or whether it is also intended to convey the notion of those alterations of nutrition and circulation which form the earlier stages of the inflammatory process.

As applied to conditions of the stomach associated with dyspepsia, I believe that the latter is the sense in which the word can be most accurately used; though this is, I admit, fully open to discussion; and authors of high repute may be cited, who have applied it with the exclusion of this meaning. But as the irritation is in this case usually the result of direct local agencies, the effects of which are in all tissues much more commonly followed by the anatomical alterations to which we have referred than is observed when disorder of function proceeds from causes operating solely through the nervous system, I think, though the definition is a somewhat arbitrary one, that as regards this disease, the term is best employed in the sense here indicated.<sup>1</sup>

The recognition of the inflammatory, nervous and atonic forms of dyspepsia which, independently of other organic causes, must form the basis of any true pathological classification of its varieties, appears to have been first distinctly made, in this country at least, by Sir J. Clark.<sup>2</sup> The same system was shortly afterwards followed by the late Dr. J. Todd,<sup>3</sup> who has divided the varieties of dyspepsia into atonic, irritable, inflammatory, follicular, and scrofulous; following out his classification into an enumeration of the symptoms arising from each of these conditions, according to the part of the alimentary canal which is the seat of the disease.

The last-named author employs the term "irritable" in a

<sup>1</sup> I have purposely avoided any lengthened discussion on the origin and uses of this term, which the reader may find in Broussais' "Examen," and in Virchow's article, "Reizung und Reizbarkeit:" Archiv, xiv.

<sup>2</sup> Climate, 1830.

<sup>3</sup> Cyc. Pract. Med. vol. iii.

different sense to the signification which I am disposed to attach to it, including under this class the whole series of primary and secondary disturbances of the functions of the stomach arising from perverted innervation, and of which he has given a very excellent and complete description. I am, however, inclined to think that many of the conditions which he describes under this head, and which correspond to the nervous dyspepsia of Sir J. Clark, belong rather to those forms marked by simple atony or loss of power, which may indeed result from derangements of the nervous system, but which are usually associated with a general condition of weakness, and differ markedly from the class where the symptoms result from undue nervous excitability—the latter, as it appears to me, constituting a well-defined group, which it is desirable to distinguish from other varieties. The forms also which he has described as follicular and scrofulous (the first of which corresponds to the “*Dyspepsie pituiteuse*” of M. Guipon), appear to be only varieties of conditions resulting from chronic inflammatory action, in which, however, we have not as yet discovered any anatomical differences of a sufficiently well-marked character to enable us to describe them as separate diseases.

This is particularly true of the scrofulous variety, which in the stomach presents no appearances sufficing to distinguish it absolutely from other inflammatory processes; though the importance of recognising the constitutional diathesis present cannot be over-estimated, and has been fully insisted upon by Sir J. Clark. The enlargement also of the solitary glands in the duodenum and in the pyloric portions of the stomach, though often very prominent in this affection, and also in some cases where inflammatory (or gastritic dyspepsia, Sir J. Clark) is allied with phthisis, is by no means limited to or specifically characteristic of these states; and my own observations have failed to convince me that the duodenum is at all so prominently affected in relation to the stomach as Dr. Todd's description would lead his readers to believe. I am inclined to the opinion that the stomach is very seldom affected to any extent by inflammatory action, without a marked implication of the duodenal mucous membrane, in which, from the combined causes of its

comparative thinness, the large size of the Brunnerian and solitary glands; and possibly also from its position, which tends to permit the blood contained in its vessels to remain in them after death, the changes induced by inflammation are often more distinctly seen.

The path of accurate pathological observation has of late been further followed with great advantage by recent English and German writers,<sup>1</sup> among the former of whom may be especially noted Drs. Parker, Budd, Handfield Jones, Chambers, Habershon, Brinton, Hunt, and Lees, who have assigned, if in somewhat varying degrees, still a large share of the morbid phenomena ordinarily classified under the title of dyspepsia to distinct pathological causes. To Dr. Handfield Jones,<sup>2</sup> whose observations were shortly followed by those of Dr. Habershon,<sup>3</sup> is to be attributed the merit of having been the first in this country to describe many degenerative conditions in the glands of the stomach associated with defects in functional power of the organ, and of which very similar accounts were given almost simultaneously in Germany by Schlaepfer;<sup>4</sup> and the discovery of these tends still further to reduce the category of functional dyspepsias, and to give to our knowledge on this head, to use the words of Cullen, "more precision and accuracy." Later observations of the same character have been made by the author,<sup>5</sup> and still more recently by Dr. Fenwick,<sup>6</sup> which have tended to throw further light on those varieties of dyspepsia hitherto classed as being purely symptomatic of, or sympathetic with, other co-existing diseases, and also on many forms which have been believed to depend on constitutional states of the system,<sup>7</sup> and to show that in these also the stomach undergoes nutritive changes of a distinctly anatomical character, which not only explain some of the

<sup>1</sup> Rokitanski, Bamberger, Wunderlich, Niemeyer, &c.

<sup>2</sup> Path. Soc. Trans. vols. iv. and v. 1853-4. Med.-Chir. Trans. 1854. Diseases of Stomach, 1855.

<sup>3</sup> Guy's Hosp. Rep. 3d Series, ii. 1855. Diseases of Alimentary Canal, 1857.

<sup>4</sup> Virchow's Archiv, vii. 1854.

<sup>5</sup> Contributions to the Pathology of the Glandular Structures of the Stomach. Med.-Chir. Trans. 1858.

<sup>6</sup> On the Condition of the Stomach and Intestines in Scarlet Fever. Ib. 1864.

<sup>7</sup> Morbid Changes in Stomach and Intestinal Villi in persons who have died of Cancer. Ib. 1865.

phenomena observed, but will, the author believes, materially assist in the elucidation and classification of the disturbances of digestion with which they are associated.

It will be seen from the accounts given in the section on the causes of dyspepsia arising from organic affections of the stomach, that the digestion is more or less affected by nearly every disease to which the organ is liable; and it might be argued from thence that if dyspepsia is only a symptom, it is improper to retain for it a separate title, or to give it a place among nosological classifications—or that a work proposing to treat of it should embrace an account of the whole of the diseases of the stomach in their relation to it. With regard to the latter course, I would, however, remark that the signs of the organic diseases of a non-inflammatory character differ in other respects materially from those by which the ordinary class of cases of dyspepsia are distinguished; and that though their influence in its production is not to be left out of sight in a diagnostic point of view, yet that it still seems to serve a practical object to retain the title for certain classes of cases, which, though of varying origin, have certain points of resemblance to one another, the recognition of which, as well as their differences, are most important in respect of treatment.

Cases are indeed recorded of severe and even fatal forms of functional disorder of the stomach, for which neither a remote nor a proximate cause has been discovered by careful research on the part of most skilful and competent observers.<sup>1</sup> They are, however, comparatively so rare that it appears impossible to erect them into a separate category of an essential dyspepsia, and, though it is eminently desirable to recollect that such cases may occasionally occur, it appears more philosophical to await their more complete elucidation by further observation. Some of them may indeed be possibly referred to disturbed innervation, as in a case by Andral,<sup>2</sup> when the disorder which ended fatally commenced with mental distress; nor can the suspicion of an organic cause which eluded observation be eliminated from another

<sup>1</sup> See a remarkable case of this kind, by Dr. Budd, terminating fatally after repeated attacks of pain and vomiting, p. 261 *et seq.* Also another by Andral, Clin. Med. ii. 179.

<sup>2</sup> *Ib.*

case by the same observer,<sup>1</sup> when the disease dated from an attack of cholera.<sup>2</sup> Moreover, as from our ignorance of their nature, they cannot be said to afford any special indications for treatment, and are also variable in their symptoms, there appear to be no definite grounds for their classification, whereas in the other forms to which we have alluded the connexion of the symptoms with their cause is of the most essential importance for their treatment and cure. Although the functional disorders of the stomach, depending on disturbed innervation, must be regarded as occurring with considerable frequency, it appears probable that as pathological research becomes more extended, the category of so-called essential dyspepsias will be proportionately diminished, and that a very large number of affections of the digestive process hitherto placed under this head will be found to be referable to sub-acute inflammatory or degenerative conditions, requiring a totally different plan of treatment from the indiscriminate use of tonics and purgatives, to which, under the diagnosis of atonic dyspepsia, or liver affections, so many of these cases have been subjected. Many also of the disturbances of digestion hitherto termed sympathetic depend on organic alterations of the tissues, in which the stomach participates in diseases affecting the whole of the organism, and require some revision of the views entertained with regard both to their pathological and clinical relationships to these disorders.

The recognition of this implication of the stomach in the derangements of nutrition which occur in all febrile conditions, corrects the extravagance of the theory put forward by Broussais, that in all the specific fevers the affection of the stomach is the cause of the pyrexia. It is equally opposed, on the other hand, to the views of those who, in the reaction against his doctrines, and following the schools of Cullen and Brown, have denied the participation of the stomach in these general affections, and have attributed all forms of indigestion to atony. It admits that a pyrexia may result from an inflammatory condition of the gastric mucous membrane, but shews that

<sup>1</sup> Andral, Clin. Méd. ii. Obs. iv.

<sup>2</sup> This question will be further discussed in the consideration of the *post-mortem* evidences of inflammatory action.

both may frequently be the result of a common cause affecting all the tissues simultaneously, or that the nutrition of the stomach may be impaired by any febrile disease, however originating. It serves also to explain the doctrines of the sympathies of organs and tissues taught by Cullen and antecedent writers, in terms of the preciser knowledge so ably insisted on by Mr. Paget,<sup>1</sup> that the nutritive condition of any part of the body is dependent on that of all other parts. In one sense it may indeed be said with Cullen, that all dyspepsias are atonic, and result from "imbecility" of the stomach to digest food, for a perfect digestive process cannot err on the side of excess; but the practical value of distinguishing the causes of this "imbecility," cannot be over-estimated in the treatment of these affections. Our aim must be to separate the arrest or perversion of secretion or movement arising from organic affections from similar conditions, resulting from pure weakness, and these again from forms of indigestion depending on degenerations of the secreting structures; and, on the other hand, to distinguish the whole of this category from the dyspepsias which are the effects of a diet unsuitable in kind, or improper in quantity. The difficulties in this attempt are not inconsiderable, because the primary effects observed are often very similar, and it is frequently only by the investigation of the concomitant conditions that the true causation can be detected; and the difficulty of even a correct pathological classification, appears to depend at present upon any precise modes of distinguishing from one another the affections arising from the following causes:—

1. The dyspepsia of simple functional atony, from those forms depending on non-inflammatory degenerations on the one hand, or on disturbed innervation on the other.

2. That though dyspepsia from food may depend solely, either on the nature of the alimentary materials, or on their being taken in quantities disproportioned to the digestive powers of the stomach; yet that the symptoms so produced are frequently the result in a great measure of secondary irritation thus excited in the gastro-intestinal canal, and hence that the distinctions between atonic dyspepsia, dyspepsia ab ingestis,

<sup>1</sup> Lect. Surg. Pathol.

and subacute inflammatory dyspepsia, cannot be in all cases sharply defined.

3. The effects produced by causes of direct irritation acting on the mucous membrane, and those arising from altered innervation, are in many cases so similar, that an accurate distinction between nervous irritation and minor degrees of inflammatory action cannot always be clearly established; and the influence of the nervous system, and the share attributable to it as the immediate excitant of morbid actions, will be variously estimated according to the views entertained by individual observers of the influence of disturbances of innervation in the production of nutritive changes either of the degenerative or inflammatory types.

The main features of each class are, however, the author ventures to believe, defined with sufficient distinctness to be of great assistance in practical medicine, and in the descriptions about to follow he purposes to restrict the name atonic dyspepsia to functional derangements, arising from general or local causes of weakness, or associated with non-inflammatory degenerations, while a large number of the symptoms ordinarily categorised under this title, and even many of those arising from defects in food, will be treated of under the head of inflammatory conditions, which offer a more satisfactory explanation of the condition present than any other which can be adopted. The disease indeed is, in a large number of cases, rather in the food, or in the habits of the eater, than in the digestive system; but the author believes that, in the majority of such instances, the immediate effect is an irritation of the inflammatory type, transient indeed in its effects, but capable, when often repeated, of inducing more serious injury.

It is unquestionable from the light which recent physiological researches have thrown upon the functions of the liver and the pancreas, and upon the properties of the intestinal secretions, that disorders of these organs may pervert or hinder the process of digestion in the intestinal canal, independently of any derangement of the functions of the stomach, and cases occasionally occur in which such a distinction can be clearly made. On the other hand, it is equally true that an imperfect performance of the functions of the stomach will transmit

alimentary matters to the intestines in a condition unsuited for the further changes which they are there destined to undergo,<sup>1</sup> and hence the symptoms of disorder in the latter are really in great measure only indicative of antecedent derangements in the processes of digestion in the stomach : so that in many instances, any accurate separation of gastric and intestinal indigestions is at present in great measure impracticable, and this difficulty is further increased by the fact that the same conditions which affect and pervert the normal functions of the stomach frequently prevail to a greater or less degree throughout the whole of the alimentary canal.

<sup>1</sup> Though there is reason to believe that the pancreatic fluid, and the intestinal secretions, exert a solvent action on albumen, yet Busch's observations have shown that albuminous food, introduced into duodenal fistulæ, though undergoing some subsequent digestive changes, speedily becomes offensive. Virch. Archiv, xiv.



## CHAPTER II.

### OF THE GENERAL SYMPTOMATOLOGY OF THE STOMACH.

**I**N a work professing to treat only of a limited class of the diseases to which the stomach is liable, it might at first sight appear unnecessary to dwell at any length on the symptoms by which the derangements in its functions or structure are disclosed to us. Many of these, however, are not limited to any single affection, but are present with varying degrees of intensity and in different varieties of combination in nearly all the disorders, both functional and organic, by which it is affected. Their importance, however, as a means of diagnosis, requires a separate consideration of the causes of those which are of most common occurrence, especially as they often are the only ground of complaint by patients, and the cause for which medical assistance is sought. Disorders of the stomach are also characterised by this peculiarity—that their effects are often chiefly, and sometimes solely, manifested by disturbances of the functions or the nutrition of other and distant parts, whose relation to the original seat of disease is often very obscure; and a knowledge of this connexion is essential, not only to the diagnosis of the causes of such derangements, but also to the success of treatment directed to their relief or cure. Many of the symptoms proper to the organ itself are only perversions of its normal physiological functions, a true understanding of which is a necessary prelude to a proper comprehension of the phenomena of its diseases; and although the prosecution of this latter inquiry, in all its bearings, would lie beyond the scope of this work,—and indeed, in spite of much modern research, our knowledge even of the physiological processes which are daily performed by it are

in many respects as yet only imperfectly understood,—yet some allusion to them can hardly be dispensed with.

The semeiology of the stomach may be classified under the following heads :—

*A.* Limited to the stomach.

1. Objective symptoms depending on alterations in its size, shape, position, and relation to neighbouring organs.

2. Subjective, consisting for the most part in disturbances of sensation.

3. A mixed class, which are partly objective and partly subjective in their nature, such as flatulence, acidity, eructation, and vomiting.

*B.* Secondary affections of other organs, which either form part of the gastro-intestinal canal, or have no direct connexion with it, the symptoms of which may be either objective or subjective, or may present a combination of both of these.

The questions relating to alterations in the size, form, or position of the stomach, belong for the most part to a class of diseases which lie beyond the scope of this work, and which will therefore be only incidentally alluded to in relation to some points of diagnosis. The secondary affections of other organs may also, with some exceptions, be best considered under the heads of the diseases in which they take their origin: but there are certain phenomena of the latter class, the diagnostic value of which varies considerably according either to their associations with others, the order of their sequence, or their relation to other concomitant diseases, and which appear to merit a special consideration, and to which therefore some of the following Sections will be devoted.

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SECTION I.—*On the Appearance of the Tongue as a Symptom of Disorder of the Stomach.*

The aspect of the tongue was held by the older writers on medicine to be one of the most important criteria of the state of the digestive organs, and its morbid appearances were therefore carefully observed and minutely described by them as indications both for diagnosis and treatment.

In more recent periods, however, the value of the evidence furnished by this organ has been, if not entirely denied, at least so greatly depreciated, that it seems desirable to ascertain what are the limits of our knowledge with regard to the association of changes on its surface with those occurring in lower portions of the alimentary canal.

The question appears to be capable of being resolved into three principal divisions:—

1. What are the nature and causes of the alterations in the tongue which have been regarded as diagnostic of affections of the stomach?

2. In what other diseases, occurring independently of stomach affections, are these changes observed?

3. What is the nature of the alterations of the digestive organs with which these conditions of the tongue have been found to be associated?

The appearances of the tongue which have been most commonly believed to be associated with diseases of the rest of the intestinal canal, are (*a*) an increase of its epithelial covering or "fur," which may present various degrees of thickness, and different shades of colours; (*b*) enlargement of its papillæ; (*c*) various shades and degrees of redness of the mucous membrane; and (*d*) certain alterations in its size and shape.

(1) The fur or coating (*saburra*) has been shown by microscopic examination<sup>1</sup> to consist of epithelium scales, which are often fattily degenerated, and sometimes massed together, of free fat drops and of confervoid growths; of these the largest proportion is formed of the epithelial cells which are derived from the covering of the organ, together with the saliva and buccal mucus, which in drying form a thick glutinous material, conglomerating the other elements into a mass.

The fur may be of greater or less thickness, dry or moist, uniform or accumulated more particularly at the posterior portions, and it is sometimes deeply fissured by sulci, which occasionally extend into the mucous membrane beneath. At other times it may separate in flakes from the surface, which then often looks raw, and of a deeper red than natural, but which may,

<sup>1</sup> Miquel, Prag. Vierteljahr. iv. 1850. Kölliker, Microscop. Anat. ii. § 2, p. 30.

when the process of separation is gradual, present no deviation from the normal appearance.

Mixed with the fur may be sometimes found pigment, blood corpuscles, mucous or pus corpuscles, or the remains of vegetable and animal portions of food.

The colour may be white or milky, or may present various shades of yellow or brown.

The nature and cause of some of the changes in colour are very imperfectly understood. Many of them arise from articles of food, medicinal substances, tobacco, &c.,<sup>1</sup> and a large proportion of the other brown varieties are associated with slight degrees of hæmorrhage from the gums; while some others, and especially those occurring in fevers, remain to a large extent unexplained. Excepting, however, those cases where there is direct pigmentary discoloration from jaundice, when other tissues (particularly the conjunctivæ) participate in the change, there is no foundation for the common belief that the yellow fur on the tongue has any necessary connexion with hepatic disorder.

As regards the chief causes to which the production of this fur is attributable, may be mentioned—

(a) Idiopathic conditions in which the tongue of some persons may, consistently with apparently perfect general health, form and throw off a much larger amount of epithelial covering than is ordinarily the case; and inquiry should be directed to this point before any general conclusions are formed respecting the indications to be drawn from its presence.

(b) States in which a coating is formed on the tongue, by the simple drying of inspissated mucus and saliva through the mouth being kept open, as is often the case during sleep.

(c) Conditions of irritation in the mouth itself, giving rise to an increased production of epithelium on the cheeks, gums, and tongue, and which, from their similarity to the state of other mucous membranes where increased secretion attended with shedding of the epithelial covering is the result of irritation or sub-acute inflammatory action, are usually termed catarrhal. The belief that this is the true pathology of this state, is also favoured by the coincidence in many such cases either of

<sup>1</sup> Dr. Chambers has cited an instance where the tongue was coloured brown from the occupation of tasting tea. "Indigestions," p. 111.

a general redness of the surface, beneath the thickened epithelium, or of hyperæmia and enlargement of the papillæ, especially of the papillæ fungiformes of the lateral and anterior portions ; and in some instances the inflammatory state is still further evidenced by the production of aphthæ, which frequently result in slight and superficial ulcerations, with a reddened base, and often surrounded by a reddened margin.

Such conditions of the tongue may be due to local causes, and especially to carious teeth,<sup>1</sup> or to other irritations of the fifth nerve,<sup>2</sup> or to accumulation of food around the bases of the teeth, or to medicinal agents specially irritating the salivary glands and mouth, as iodide of potassium and mercury,<sup>3</sup> or to the habit of smoking (though this does not ordinarily produce a thickened epithelial fur, nor hyperæmia of the papillæ fungiformes, its effects being generally limited to an enlargement of the papillæ filiformes, which gives to the surface a finely-roughened aspect). As smoking, however, is not an unfrequent cause of stomach affections, our observations on this head are always attended with certain grounds of fallacy.

(2) The largest class of diseases not primarily affecting the stomach, with which a furred state of the tongue is most frequently found to co-exist, are, the acute febrile and inflammatory affections ; and in them a correct estimation of the semeiological nature of these appearances is a matter of considerable difficulty.

The dryness of the tongue in fevers and in the later stages of adynamic diseases, is due, in part, to the mouth being kept open during respiration ; but this cause is far from explaining the whole of this phenomenon, and a much larger share in its production is attributable to the arrest of secretion, from this as from many of the other mucous surfaces and glandular organs, which forms one of the striking peculiarities of these diseases.

The redness, the enlarged papillæ, and the increased production of fattily degenerated epithelium, are all, however, phenomena indicative of the inflammatory condition ; and it

<sup>1</sup> For some curious instances of this kind, where the fur was situated on the same side as the carious teeth, see Hilton, "Lectures on Rest and Pain," p. 195, *et seq.*

<sup>2</sup> Anstie, *Lancet*, 1866, ii. 200.

<sup>3</sup> Copland's Dictionary, iii. 1078-9.

would be certainly remarkable that the mouth should *alone* show evidences of this condition in so many diverse morbid states, which have only in common the one general element of pyrexia.

Pathological research, however, tends increasingly to show that the pyrexial state, by affecting the nutrition of all the tissues of the body, gives rise to a series of anatomical changes which in many other instances, as well as in the one now under consideration, are frequently undistinguishable from those which mark the existence of inflammatory action ; and there are very few of these disorders in which, at least, the *functions* of the stomach are not more or less deranged, while direct anatomical evidences of coincident organic alterations of this organ may be found in a considerable proportion.

It is chiefly, however, on evidence based upon this class of diseases that discredit has been thrown on the value of the appearance of the tongue as a sign of gastro-intestinal disorder ; and though the statement regarding the absence of uniformity of coincidence between changes in the tongue and those observed in the stomach rests on such authority as that of Louis<sup>1</sup> and Andral, yet a careful examination of the premises which support their conclusions tends to throw some doubt on their validity, or at least to show that the question requires further examination, since both these authors regard as diseased states of the stomach various forms of softening, and also the condition of mammillation, which are now generally removed from the category of pathological alterations. The microscope also has revealed to us alterations in its structure, many of which are only recognised with difficulty without its assistance, and of which therefore it is only right to conclude that the knowledge of the authors just referred to was less perfect than that which we now possess. If we add to this the fact that the slighter departures from health to disease are very liable to be overlooked in this organ, and that many of the signs of the latter, especially those of undue vascularity, often become indistinct after death, it is easy to understand that the statements of Andral,<sup>2</sup> also made on the relative appearances

<sup>1</sup> *Fièvre Typhoïde*, i. 475 ; *Phthisis*—Walshe's Trans. 220.

<sup>2</sup> *Clin. Méd.* i. 531.

presented by the stomach and the tongue in cases of typhoid fever, but sometimes quoted by other authors as extending to other classes of disease, to the effect, to quote his own words, that “(1) No constant relation can be established between the state of the tongue and that of the stomach; (2) Each of the modifications which the tongue can offer, in colour or in coating, does not correspond with a special modification of the stomach; (3) The stomach may present after death conditions resembling one another, however dissimilar may have been those of the tongue;”—and founded, as they undoubtedly were, on a rigorous analysis of the phenomena which came within his cognizance, may yet fail in all instances to express the true relationship between the affections of the two membranes. Further, when it is borne in mind that Andral<sup>1</sup> regarded as the results of inflammation both cancer and the chronic or perforating ulcer of the stomach, which are diseases universally admitted to be unattended by any constant morbid changes of the tongue, we can easily understand how he came to the conclusion that healthy states of this organ may co-exist with diseased conditions of the stomach, and *vice versa*.

In some of the febrile diseases the appearance of the tongue has been regarded as almost *sui generis*, and of a specific character. This is especially the case in scarlatina, but even here the recent observations of Dr. Fenwick<sup>2</sup> have shown to how large an extent the stomach participates in the organic alterations induced by this affection. In another large class the buccal and lingual surfaces appear to suffer through participating by continuity in the inflammatory conditions of other portions of the gastro-pulmonary mucous membrane. Thus, affections of the nose and pharynx may be allied with a furred tongue, and bronchitic, or laryngeal, or pulmonary inflammatory states may, it is said,<sup>3</sup> produce similar appearances. It is difficult, however, in such cases to exclude the possibility of a catarrhal state of the stomach being simultaneously present, especially as these are

<sup>1</sup> Clin. Méd. ii. 31, *et seq.*

<sup>2</sup> Med.-Chir. Trans. xlvii. “On the State of the Stomach and Intestines in Scarlatina.”

<sup>3</sup> Rostan, Cours de Médecine Clinique, pp. 61-2.

very frequent accompaniments of inflammatory conditions of the respiratory passages; and as far as my own observations have extended, I should be disposed to believe that a furred tongue, with signs indicative of irritation, is a very rare event in cases of uncomplicated idiopathic bronchitis, in which the stomach is not also implicated.

In tonsillitis, on the other hand, the rapidity and extent with which the tongue is affected is proportionably greater than in almost any other of the febrile diseases which we are considering. In such cases, any one who has witnessed the almost constant correspondence between the changes in the tongue and the state of the fauces, both as regards invasion, acme, and decline, can hardly fail to believe that the alterations in these parts are very similar, if not identical, in their nature; and that, although the stomach undoubtedly does participate in the disturbance of nutrition accompanying the pyrexial fever which attends the angina, yet that here, at least, the condition of the tongue is disproportioned to the amount of the constitutional affection, and is largely dependent on local causes.

(3) Conversely, the observations of a certain interdependence of inflammatory changes in the tongue and stomach are too numerous to be even quoted in this place, though the invaluable observations of Dr. Beaumont on Alexis St. Martin, which afford us, as it were, the evidences during life of anatomical conditions which can only be laboriously elucidated among many fallacies after death, are too important to be passed by without notice. They present the most convincing proof which we possess of the frequent coincidence of the affections of which we are now speaking, numerous instances of which can be gathered from all parts of his work.<sup>1</sup> Moreover, we are not without further analogies which may give an *à priori* support to this view, in the increased salivation which attends so many irritative conditions of the stomach, and which, whether regarded as functional or organic—a pure neurosis, as believed by some—or possibly associated, in some cases, with anatomical changes in the glands—point strongly to the coetaneous affection of parts even so widely remote as these might at first sight appear to be, but

<sup>1</sup> See especially, "Experiments and Observations," &c. by Dr. William Beaumont: Combe's edition, 1838, pp. 170, 171, 173, 177-8, 250.



each of which is yet capable of influencing the vital actions of the others, in a manner which cannot be produced without changes in the circulation, and frequently also in the structure of the parts concerned.

The writings also of Andral<sup>1</sup> supply us with repeated instances of simultaneous affections of the stomach and tongue, where the alterations described in each of these parts bear a striking resemblance to one another, when allowance has been made for the differences in their anatomical texture.

Both Andral's and Beaumont's observations show that it is especially with the irritative and inflammatory conditions of the stomach and intestines that these alterations in the tongue most constantly co-exist. Of other affections of the stomach, unless irritation is also present, we could hardly expect the tongue to give evidence, at least by any change of a similar nature. And thus it is that from the tongue and mouth remaining unaffected in the pure neuroses of the stomach, or in obstructions of its cardiac and pyloric orifices, in dilatations resulting from the latter cause, in thickenings of the sub-mucous tissue without implication of the mucous membrane, and even in the more formidable affections of cancer and ulcer (so long as these are not attended by an inflammatory condition of the general mucous surface), has arisen the erroneous idea that their changes are of little value in assisting to a diagnosis of diseases of this organ—a proposition which is perfectly true if applied to all diseases indiscriminately, but which would, if absolutely received, deprive us of information which is of great value in relation to irritative conditions, to which alone such semeiology is applicable, subject to the careful elimination of the local and other general sources of fallacy to which allusion has been already made.

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## SECTION II.—*Derangements of the Appetite, and Thirst.*

Although derangements of the appetite not unfrequently occur among the symptoms of disorder of the stomach, yet it must be recollected that the sense of desire for food does not depend on this organ alone, but that it represents a certain

<sup>1</sup> Clin. Méd. ii. : Gastrite Aigué.

state of the nervous system induced in most cases by special conditions of the general nutrition in which waste is producing a corresponding effort at repair. As it can, however, in some instances be directly excited by stimulant substances applied to the stomach, it is not improbable that the condition of this organ participates more or less directly in the production of the sensation; and that in consequence of this its double origin, deficiencies, perversions, or excesses of the appetite, may be attributable to causes affecting either the nutrition or innervation of the stomach alone, or of the system generally.

*Anorexia, or loss of appetite*, is found to be generally associated with inflammatory states of the stomach, though when these are sub-acute, or exist in a chronic form, the opposite condition is sometimes observed. In cancer of the stomach this symptom is frequently very prominent, and it also accompanies derangement of other parts of the digestive tract, among which constipation may be mentioned as a very frequent cause of its presence. On the other hand, it occurs in an equally marked form in febrile states associated with general perversions of the nutrition of the tissues, in which the stomach participates; and also in other conditions of the system, marked by impaired nutritive activity, or by exhaustion or other perversions of innervation—among the former of which may be enumerated the effects of deficient muscular exercise, of old age, of long-continued habits of abstinence, and of hot climates; while the causes most commonly in operation in the production of the latter are, the exhaustion from excessive fatigue, whether muscular or intellectual, or from prolonged fasting, the various depressing moral emotions, pain, and the influence of narcotic remedies.

*Excessive appetite (boulimia, fames canina, cynorexia)* may again occur under a variety of conditions, some of which are referable to anatomical conditions of the stomach, others to general states of the system, and others to disturbances of innervation.

With some persons the habit of eating to excess is so constantly indulged in that it becomes a constitutional peculiarity, and in such patients there may be either a general obesity, or they may still remain spare and thin; the food taken not being assimilated (*Bulimia Hellenicum*, Cullen).

In some cases various organic alterations of the stomach, or of other of the abdominal viscera, have been found associated with this symptom, among which have been described worms in the stomach and intestines, great enlargement of the stomach (though it may be questioned whether this change be a cause or a consequence of the affection), induration and thickening of its coats, enlargement of the valvulæ conniventes of the intestines (Beclard), absence of the gall-bladder, and insertion of the common bile duct into the pylorus. The establishment of biliary fistulæ in dogs is known to have the same effect, though the symptom is not noticed as a rule in any of the diseases of the liver most commonly met with.

This condition of appetite is not unfrequently observed in certain constitutional conditions, as in diabetes and in the convalescence from acute diseases, or during recovery from excessive exhaustion from other causes, in which cases, if the desire for food be not speedily satisfied, feelings of faintness and sinking speedily supervene. Certain nervous affections also are sometimes attended by this symptom, which occurs in some forms of insanity, and at the commencement of attacks of hydrocephalus or epilepsy (Copland); and it is met with in various forms of hysteria and hypochondriasis, both of which are, however, occasionally associated with complete anorexia on the one hand, or on the other, with some of the various perversions next to be noticed.

In a minor degree an uneasy craving for food also accompanies many irritative conditions of the mucous membrane, and is often observed when acidity is present. In these cases, however, the appetite is speedily satisfied, and even when the sense of hunger is present the sight of food may be repulsive.

*Perversion or depravation of the appetite (Pica, Malacia, Pseudorexia)* often but not necessarily co-exists with boulimia, and implies a craving desire for articles of food which are repugnant to ordinary tastes, or an excessive indulgence in the use of substances which usually are only taken in limited quantity. In some cases it appears to betoken a special state of the stomach, but in others this condition of the appetite depends on some general cause, and is most commonly found associated with disturbances of innervation.

Thus, the quantities of chalk eaten by some patients point probably to an excessive acidity in the primæ viæ, and direct evidence of this condition is in some cases attainable through eructation and vomiting; but in others, where offensive and loathsome materials have been eaten, the latter series of causes are more commonly in operation.

These perversions are more common in the female than in the male sex, and are especially frequent in pregnancy, chlorosis, and hysteria; they occur also in mania and idiotcy, though, when met with in the last-named state, it has been generally considered as probable that the sense of taste is perverted or wanting.<sup>1</sup>

Of the alterations which have now been considered, the loss of appetite is of most value as a symptom of disorder of the stomach; though caution is requisite in this respect not only in the discrimination of its cause, but also in the use of remedies calculated to arouse or increase the sensation when it is absent or defective, and which, under the name of tonics, but partaking, as the majority of them do, of the nature of stimulants, are not unfrequently prejudicial to a weak or irritable condition of the organ.<sup>2</sup>

*Thirst* is a sensation which is ordinarily, even less than hunger, referred directly to the stomach, being mainly felt in the fauces.<sup>3</sup> It may, moreover, be relieved by the introduction of fluid directly into the blood,<sup>4</sup> but, on the other hand, may be excited by irritants introduced into the stomach. It is almost invariably present in pyrexial conditions, and in any state involving an excessive loss of fluid by any of the secretions; and hence it occurs in a very marked form in diabetes, and is

<sup>1</sup> For more complete information on this subject the reader is referred to Copland's "Dict. of Medicine," art. "Appetite," and Landre Beauvais, art. "Boulimia," Dict. Sciences Méd. iii.

<sup>2</sup> This subject will be further treated of under the indications given for the use of these remedies in diseases of the stomach, when an attempt will be made to show that the sense of appetite excited by their agency is by no means constantly proportioned to a corresponding increase in the digestive powers.

<sup>3</sup> Carpenter, Princ. Human Physiol. p. 52. Bernard's experiments on dogs in whom a gastric fistula had been established, afford convincing proofs that the sensation is not due to mere local conditions of the mouth and fauces. Though the animal drank largely, yet the thirst was not allayed until the fluid was allowed to remain in the stomach. Liq. de l'Org. i. 51.

<sup>4</sup> Carpenter, Princ. Human Physiol. p. 52.

more felt in hot than in cold seasons. Independently, however, of the causes here enumerated, thirst is a very constant concomitant of irritative conditions of the stomach, when it usually appears some hours after a meal, and is occasionally, when other causes, and particularly habit, can be excluded, a valuable adjuvant in the diagnosis of these states.

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### SECTION III.—*Flatulence.*

By flatulence is meant an excessive formation or accumulation of gas either in the stomach or bowels, giving rise to undue distension of these viscera, and often attended with borborygmi or colicky pains, which are followed in some cases by the expulsion of the gas, though there is reason to believe that this may also be occasionally absorbed.

It is only to an undue accumulation of this nature that any pathological significance can be attached, since it is probable that some air is always to be found in the intestinal canal, the calibre of which, however, as may be observed in animals opened immediately after death, is much smaller than might be believed from the results of post-mortem examinations made after relaxation of the muscular coat has ensued.

The terms in use to signify the conditions of distension are tympanitis and meteorismus, the latter being employed for excessive degrees of distension common to the whole tract, and occurring acutely; but both, as in ordinary use, apply more especially to the intestine rather than to the stomach, for which latter there is no distinctive nomenclature.

The sources of the gas found in these situations have been long a subject of discussion, and opinions are not as yet absolutely decided whether some secretion of this nature may not take place from the mucous membrane of the stomach and intestines. This view, which received in some measure the support of John Hunter<sup>1</sup> (who, however, with his usual caution, admitted that it was not capable of receiving direct proof, and also that in many cases the gases formed were derived from fermentative changes,

<sup>1</sup> Obs. on certain Parts of the Animal Economy, 1792, p. 206.

the result of imperfect digestion of the food),<sup>1</sup> is based chiefly on the rapid distension which the stomach or some portions of the intestines may undergo, either spontaneously when empty, or within a period after the ingestion of food which may be reasonably supposed to have been too short to allow of the fermentative process to have reached a height sufficient to account for the evolution of the amount of gas present. There is, however, an entire absence of evidence tending to show the occurrence of any such secretion; and though it is possible that some diffusion may take place between gases already present in the intestine and those in the blood, all recently and carefully conducted experiments on portions of ligatured intestine negative the idea of a free secretion occurring from the mucous membrane;<sup>2</sup> and as regards the distension of the stomach under the circumstances alluded to, other explanations, which appear to present a greater degree of probability, may be found to account for the phenomenon.

(1) It is believed by many that in the cases of sudden flatulent distension which occur in hysterical subjects under emotional influences, much of the gas present consists of air swallowed, and the power of thus distending the stomach is in some persons subject to the control of the will, and can by them be employed as a means to excite vomiting.<sup>3</sup> (2) In other cases, again, especially in atonic and weakened conditions, it would appear to the author that the stomach, instead of remaining contracted when empty, has its muscular coats relaxed, and becomes filled with air entering from the cardia,<sup>4</sup> and that the feeling of distension and subsequent expulsion of gas which follows the ingestion of food, arises from the contraction thus excited. It is probably also to similar conditions that the local distensions of the intestines may be due, which occur in cachectic and chlorotic individuals, or in the course of severe prostrating disorders, or from excessive local irritation or inflammation, whether of the peritoneal, muscular, or mucous coats, and which may arise from paralytic or

<sup>1</sup> Obs. on certain Parts of the Animal Economy, 1729, p. 203.

<sup>2</sup> Kühne, Lehrbuch der Phys. Chem. 141.

<sup>3</sup> Frerichs, Wagner's Handwörterbuch der Physiologie, art. "Verdauung," p. 867. Bamberger, *loc. cit.* 237.

<sup>4</sup> Budge has shown that a large amount of air enters the stomach before the act of vomiting.

weakened conditions of the organic muscular fibre of the digestive tract. The most marked effects of this nature are produced by peritonitis, when the action is probably of a twofold kind, and results both from implication of the sympathetic and spinal nerves, and also from direct extension of the inflammatory process to the muscular coat. Similar conditions not unfrequently accompany or follow the excessive use of purgative remedies, and are observed also in inflammatory states of the mucous membrane; or, lastly, they may result from direct cerebral or spinal irritation, as these distensions frequently accompany hysteria and paralysis, and more particularly those forms of the latter which depend on lesions of the spinal cord.<sup>1</sup>

If therefore we exclude the idea of a direct secretion as a cause of these accumulations, we may reduce their sources to two,<sup>2</sup> which are—(1) Atmospheric air swallowed with the saliva and food; (2) The products of fermentative decomposition of the ingesta: and the analyses of the gaseous contents of the gastro-intestinal canal confirm the opinion thus advanced as to their origin.

The oxygen of the air swallowed appears rapidly to enter into combination either with matters present in the stomach, or to be absorbed by the blood in the capillaries of the mucous membrane, and the gases ordinarily found consist almost entirely of nitrogen, carbonic acid, and hydrogen. In the stomach traces of oxygen still remain, but are entirely absent in the intestinal canal, where the nitrogen represents the residual component of the atmosphere, and the gradually increasing proportion of hydrogen and its carburetted and sulphuretted compounds point to their origin being mainly attributable to fermentative changes occurring in the ingesta,<sup>3</sup> and possibly (in unhealthy conditions of the system) in the secretions of the intestinal canal themselves. It is to the latter causes that the excessive production of flatus is due in the majority of instances in which it occurs, since the other conditions before mentioned are rare when taken into

<sup>1</sup> Bamberger, *loc. cit.* 236.

<sup>2</sup> As a third source might be mentioned here, gases contained in effervescing liquids, which, however, when taken in moderation, are either eructed, or possibly absorbed, as, under normal circumstances, they give no further indication of their presence.

<sup>3</sup> Lehmann, *Handb. der Phys. Chem.* 271.

comparison with the frequency of the disorder—the source of which must in most instances be sought in disturbances of the digestive process, the natural influence of which, in checking fermentative action, may be so perverted as to allow or even favour the occurrence of changes of this nature. Such perversions must, it is evident, depend on altered relations of the food to the gastro-intestinal secretions, and may arise (1) from improper qualities of the former, as when matters already fermenting are introduced into the intestinal canal—or (2) from the ingestion of an amount of food disproportioned to the digestive powers of the gastric juice—or (3) from deficiency in quantity and defects in quality of the salivary and gastro-intestinal secretions, or of the order and regularity in which the food is exposed to their influence. The last-named class alone requires special attention in this place. And among the causes so operative may be mentioned—

1. All conditions, whether arising from functional or organic disorders of the alimentary canal, which can interfere with an adequate secretion of gastric juice in the stomach, or with the proper supply of bile,<sup>1</sup> pancreatic fluid, and intestinal secretions in its lower portions.

2. Abnormal products of the mucous membranes, and especially mucus, have a special tendency to set up this fermentative action, and their effects are chiefly apparent on the amylaceous and saccharine articles of diet, which may undergo the alcoholic, acetic, butyric, viscous or lactic fermentations; the three first-named evolving either carbonic acid, or a mixture of carbonic acid and hydrogen, while the last, though not necessarily associated with the formation of free gases, is yet so frequently found to pass into the changes resulting in butyric acid, in which these are evolved, that an explanation is easily afforded of the occurrence of flatulence when substances are taken in which the lactic acid fermentation is specially known to occur, as is the case with milk, the flatulent effects of which have been noted since the days of Hippocrates.<sup>2</sup>

The gaseous compounds which contain sulphur are more directly derived from protein substances, and especially from

<sup>1</sup> Dogs in whom biliary fistulæ have been established, pass a great quantity of offensive flatus per anum.

<sup>2</sup> Aph. 64, sec. v.



those which are rich in this element, such as eggs, leguminous vegetables, and certain of the cruciferæ.

3. Arrest of the food in the stomach, by obstruction of the pyloric orifice, preventing its further changes in the intestines, speedily gives rise to fermentative action, attended with a great development of gas together with the formation of torulæ or the sarcinæ ventriculi.

4. Changes of an improper character having been once set up or determined in the passage of the food through the stomach, are frequently continued throughout the intestinal canal, until the evacuation of the imperfectly digested matter ensues per anum ; and if by constipation or otherwise this be delayed, the fæcal masses often continue to yield considerable quantities of gas, which becomes impregnated with their peculiar odour, while the pultaceous and frothy character of the evacuations serve as further evidence of the changes which they have undergone.

5. Causes preventing absorption of the alimentary matters may probably also act in the same direction, and this is true not only of catarrhal conditions of the intestinal mucous membrane, but is seen also in those cases when from diseases of the mesenteric glands their function is peculiarly interfered with, and in conjunction with which extreme degrees of tympanitic distension are frequently observed.

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#### SECTION IV.—*Acidity and Pyrosis.*

These symptoms are frequently included in one category as the results of processes of abnormal secretion occurring in the stomach ; but with regard to the former it must be remarked that though sometimes arising in this manner, yet that in a large proportion of the cases in which an excessive amount of acid is formed in the stomach, its origin is to be sought in fermentative changes rather than in excess or perversion of the natural secretions of the mucous membrane ; and we are therefore compelled to distinguish its modes of origin under the two heads of acidity from fermentation, and acidity from hypersecretion.

(a) *Acidity through fermentative action* takes place under cir-

circumstances similar to those in which flatulence occurs, in which it has been seen that the acetous and butyric and lactic acid fermentations are very common in the amylaceous and saccharine articles of food.

The facility as well as the rapidity with which the formation of lactic acid takes place under circumstances favouring its production, affords an explanation not only of the frequency with which it is found in the stomach, but also of the opinions formerly entertained by many observers, (and from which Physiology can hardly be said as yet to be entirely free,) that this acid was a product of its secretion, and was the chief agent in the digestion of the food; and to the same fact is also attributable the somewhat undue share often ascribed to hypersecretion in the explanation of the phenomena of acidity.

The causes of the production of this symptom from fermentative changes having been already dwelt upon under the head of flatulence, only require to be briefly recapitulated here. They may be summed up as, (1) conditions in which digestion is simply delayed; (2) those in which mucus possessing a catalytic power is secreted by the stomach; (3) cases where the food is retained in the stomach by obstructions at the pyloric orifice, and which, as pointed out by Cullen,<sup>1</sup> are the sources of the extremest degrees of this affection.

4. Cases where food in a state of fermentation, or capable of exciting catalytic action, is introduced into the stomach in quantities sufficient to overcome the antiseptic properties of the gastric juice.

5. Allied to the above may also be mentioned conditions of the saliva and buccal secretions, and especially acid states of the latter, which tend to cause improper changes in the starchy compounds during the process of mastication.

6. And to these must be added cases where, in otherwise healthy subjects, an excess of saccharine or amylaceous diet is habitually taken with the food.

An explanation is thus afforded of the frequent coincidence of acidity and flatulence, as both originate from almost identical changes in the food. It may happen that one is sometimes more prominent than the other, or that flatus may be formed in the

<sup>1</sup> Works, ii. 379.

intestines when only minor degrees of acidity are observed in the stomach—a condition which may be explained by the fermentative action which has only commenced in the upper part of the canal being continued through its entire course: nor need it be wondered at that these symptoms are among the most common evidences of gastric disorder, as almost any cause capable of disturbing the digestive acts may serve as the agency by which they are induced.

In addition to the above class, which includes a much more considerable number of cases than was at one time believed, there is however another, in which we are compelled to admit that a true hypersecretion takes place from the mucous membrane, giving rise to the disorder usually termed *pyrosis*.<sup>1</sup> The products thus formed vary however considerably in their reaction, this being sometimes of an acid and sometimes of a neutral character; and we are hardly as yet capable of distinguishing the special conditions in which these differences originate, as sometimes one and sometimes the other appear under circumstances apparently similar. It has been advanced by some recent writers that the neutral fluids thus ejected consist principally of saliva which has been swallowed, after having been secreted under conditions of reflex irritation proceeding from the stomach,<sup>2</sup> and this view has been chiefly based on the observation of Frerichs,<sup>3</sup> that an appreciable amount of sulphocyanide of potassium has been discovered in them. Without disputing the possibility that some portion of these fluids may owe their origin to this cause, it yet, however, seems improbable that it can be their exclusive or even their most frequent or principal source. In a large number of cases, patients who are subject to neutral or alkaline pyrosis are by no means conscious of an amount of salivation at all proportioned to the quantity of fluid

<sup>1</sup> Pyrosis, Soda ( $\pi\upsilon\rho$ , fire), and meaning really the heartburn which accompanies hypersecretion, is often employed to signify an idiopathic *functional* disturbance, in which this excessive secretion forms a prominent symptom. It will be shown in the following pages that this limitation is one that is neither strictly accurate nor practically available, as the affection may arise from organic disease of the stomach, or be a symptom through reflex agency of diseases in distant organs.

<sup>2</sup> That the saliva is thus secreted, is shown by the observations of Beaumont, *loc. cit.* 132.

<sup>3</sup> Handwörterbuch der Phys., art. "Verdaunung," p. 791.

ejected, and the sulphocyanide of potassium and buccal epithelium found in the vomited matters may be easily accounted for by the saliva secreted and swallowed during the nausea preceding their regurgitation, or which has mingled with the secretions of the stomach in the act of vomiting. We also must recollect that the stomach is largely endowed with glands whose secretion consists of an alkaline<sup>1</sup> mucus, which, though ordinarily very tenacious, and which sometimes is ejected in this condition in very large quantities,<sup>2</sup> may, in every probability, when we reason from the phenomena witnessed in other mucous membranes, acquire the more fluid character which is sometimes observed in the watery flux to which the term gastrorrhœa has been applied.

The question regarding the circumstances in which these perversions of secretion take their origin is one of considerable interest; and though the data are not quite positive, and are mingled with some of the fallacies and difficulties to which allusion has just been made, we have yet a sufficient number of facts illustrating these phenomena to justify a fair amount of inference as to the circumstances with which they concur.

*In limine* it may be stated that the effects of inflammatory conditions have been hitherto shown to be invariably attended with arrest or diminution of the acid secretions of the stomach,<sup>3</sup> but at the same time to be frequently associated with the formation of a large amount of mucus of an alkaline reaction. It is probable, therefore, that the former of these, when appearing in undue amount, cannot be owing to inflammatory processes, and that in their case an origin must be sought in other conditions of perverted secretion, but that the alkaline varieties may originate under circumstances of both organic and functional irritation.

The principal agencies, however, which are concerned in the production of hypersecretions both of an acid and alkaline character, are those which are connected either with direct or

<sup>1</sup> This reaction was shown by Bidder and Schmidt to be independent of that of the saliva swallowed. *Die Verdauung's-säfte und der Stoffwechsel*, 40.

<sup>2</sup> See Andral, *Clin. Méd.* ii. p. 80.

<sup>3</sup> Bernard has shown that in this condition the ordinary stimulants of the gastric juice, and even the application of alkalies (the most powerful of this class), fail to excite secretion. *Arch. Gén. Suppl.* 1846, p. 7.

reflex irritation of the nervous system, and it is especially to these that allusion will now be made.

The influence of the nervous system on the secretions of the stomach has been a subject regarding which very contradictory statements have been made, though it has been long known that they may be excited or arrested by emotional causes, and that the flow of gastric juice may, like that of the saliva, be caused by the mere sight of food.

The chief experiments have been made with regard to the effects of section of the pneumogastric nerves; and the results of these have varied greatly in the hands of different observers. Bernard<sup>1</sup> and Frerichs<sup>2</sup> asserted that after this operation the secretion of the stomach was alkaline, and had lost the power of coagulating milk; while others state that it still remains acid;<sup>3</sup> and others again that there is a diminution of the amount secreted, and an impairment, though not an arrest, of the digestive process.<sup>4</sup> Bernard has, however, found that galvanizing the sympathetic branches proceeding to the stomach arrested,<sup>5</sup> while stimulation of the pneumogastric nerves,<sup>6</sup> or section of the fourth ventricle above their origin,<sup>7</sup> greatly increased the secretion.

These observations, though somewhat discrepant, still show that a very decided influence is exerted both quantitatively and qualitatively on the gastric secretions, through altered conditions of nervous agency. The inference also of the possibility as well as the frequency of the occurrence of such alterations is further justified by Bernard and Ludwig's, and by Kölliker's and Müller's<sup>8</sup> experiments on the influence of the nerves on the secretions of the salivary and pancreatic glands, and on the intestinal secre-

<sup>1</sup> *Liq. de l'Org.* ii. 372. *Lec. Syst. Nerv.* ii. 417, 421.

<sup>2</sup> *Wagner's Handwörterbuch*, iv.; art. "Verdauung," p. 283.

<sup>3</sup> *Brücke, Sitzungsbericht der KK. Akad zu Wien*, xxxvii. 168.

<sup>4</sup> *Bidder and Schmidt, Die Verdauung's-säfte und der Stoffwechsel*, p. 26.

Kölliker and Müller, *Würzburg Verhandl.* 1855, p. 220, have arrived at the conclusion that food was digested after the operation, but that the secretion was altered, being less acid than natural. For the report of numerous other observations on this subject see *Carpenter's Physiology*, ed. 1864, pp. 87, 88; also *Longet's Physiologie*, 1861, i. 257.

<sup>5</sup> *Medical Times and Gazette*, 1860.

<sup>6</sup> *Lec. Syst. Nerv.* ii. 438.

<sup>7</sup> *Ib.* 461.

<sup>8</sup> *Würzb. Verhandl. loc. cit.*

tions;<sup>1</sup> by which it is shown, especially with regard to those first named, that they can be either completely arrested or materially changed by section or stimulation of the nerves of these parts, and that a copious and incessant secretion, but greatly altered in quality, follows the complete division of all their sources of nervous supply.<sup>2</sup> When we consider the relation of these physiological facts to the phenomena presented by disease, it is to be remarked with regard to the latter that the conditions in which hypersecretion is observed, are (1) those in which other phenomena indicative of perverted nervous action are discoverable, not only in the stomach, but also in other parts of the system; and (2), that it is more common in cases of cancer and ulcer than in any other organic affections, its frequency in these diseases being explicable by the fact that, by invading the deeper coats of the stomach, they cause a more serious implication of its nerves than is produced by the more superficial effects of inflammatory action. With regard to the first series, it may be noted that they occur either in states of general weakness or of undue excitability of the nervous system, and that they are then frequently attended with severe pain and vomiting, which are often quite out of proportion to the other disturbances of digestion present, and which appear independently of other phenomena indicative of organic disease;—cases in which it is probable that hypersecretion may take place from the mucous membranes with the same facility and in the same disproportion to the exciting cause, as is observed with regard to the profuse perspiration which the slightest exertion will induce in debilitated subjects.

In other instances the symptom appears among a series of reflex phenomena of a similar character, depending on irritation existing in other organs—among the most marked instances of which may be cited the various disorders of the uterus, and especially the state of pregnancy, of which it is so constant an accompaniment, and which is not unfrequently associated with similar conditions of other glandular organs, and especially with an excessive flow of saliva, which appear to point most conclusively to this mode of origin. To these also may

<sup>1</sup> Bernard, *Liq. de l'Org.* ii. 341.

<sup>2</sup> Kühne, *Lehrbuch der Phys. Chemie.*

be added in all probability disorders of dentition,<sup>1</sup> and the effect produced by the passage of a gall-stone, to which attention has been fully drawn by Dr. Budd.<sup>2</sup>

The history of pyrosis, as it occurs endemically among the poorer classes of Scotland and other northern countries, and the comparative frequency with which it is associated with anæmia and cachexia,<sup>3</sup> point, not only to its origin in those persons whose nervous powers are weakened by insufficient and improper food, but also to the fact that the continued exhibition of the latter may possibly so pervert the balance of function of the stomach that it reacts excessively, but with a perverted secretion, on the application of normal stimuli. A similar condition may possibly be the explanation of its occasional occurrence in the wealthier classes when no other adequate cause can be found for its appearance; since it appears probable from observations made by Corvisart, Frerichs, and Bardeleben, that there is a great variety in the character of the secretions afforded by the stomach under the influence of different stimuli.

Thus Bardeleben and Frerichs<sup>4</sup> found that the introduction of common salt in powder into a dog's stomach produced a quantity of mucous secretion which was either very feebly acid, or neutral, or alkaline, in its reaction.

Blondlot<sup>5</sup> and Beaumont<sup>6</sup> have shown that the operation of cathartics is to cause a great increase of the mucous secretion; and Corvisart<sup>7</sup> found not only that ipecacuanha produced the same results, but further that artificial irritation by mechanical means, as sand or charcoal, gives rise to a secretion which, though acid, has less digestive powers than that evoked by other means.

<sup>1</sup> These disorders, though placed by Dr. Budd under sympathetic irritation of the stomach, are often of a more mixed character, and frequently result from improper food given at the time of weaning; and though in some cases the sympathetic affection of the stomach may be a pure neurosis, yet in others it belongs to the catarrhal character.

<sup>2</sup> *Loc. cit.* p. 191.

<sup>3</sup> Budd, *loc. cit.* p. 275. I have, however, seen cases of this affection in female patients in whom, though presenting family histories of an hysterical tendency, no appearance of either of the above states was present, and whose menstruation was perfectly regular.

<sup>4</sup> *Loc. cit.* p. 788.

<sup>5</sup> *Traité Analytique*, p. 213.

<sup>6</sup> *Loc. cit.* p. 182.

<sup>7</sup> Quoted from a written communication to Longet, "Physiologie," 1861, i. 184.

It has been long a general subject of belief that acidity of the primæ viæ may depend in some degree on the presence of abnormal matters in the blood; and judging from pathological observations, especially in gouty subjects, this would seem a not unreasonable inference, though the presence of uric acid has never been shown in the gastric secretions, and many of the earlier views entertained regarding the secretion of various acids from the stomach, when injected into the blood, have been shown by Longet<sup>1</sup> to rest on no secure basis of observation.

With regard to gout, it must also be remembered that the conditions of acidity in the stomach in this disease are manifold, and that it may depend not only on the hypersecretion, at present under consideration, but also on fermentative changes induced in the food either through imperfect digestion, or from perverted secretions furnished during the subacute inflammatory conditions of the stomach to which gouty patients are peculiarly liable. There is, however, another class of cases in which abnormal materials in the blood have this effect, since Bernard has shown that after extirpation of the kidneys a continuous secretion is furnished by the stomach, which, although acid and possessing digestive properties, is found on the addition of liq. potassæ to contain large quantities of ammonia,<sup>2</sup>—a fact which may seem in part to explain much of the disorder in the functions of this organ which occurs in the course of Bright's disease.

Although many of the symptoms by which the presence in the stomach of an excess of free acids is revealed to us are common to all the circumstances under which they are produced, yet there are certain characteristics distinguishing the two main classes which have now been considered, which in a measure, and according to their greater or less prominence, may serve to indicate the different causes from which they originate. It must however be borne in mind, that in many cases the state present is a complex one, and that neurotic affections giving rise to hypersecretion may alternate as well as co-exist with either catarrhal or atonic conditions, which are

<sup>1</sup> These views are alluded to by Longet, "Physiologie," i. 186, and are to be found in an inaugural Thesis of Bernard in 1843.

<sup>2</sup> Liquides de l'Organisme, ii. 49.



the most common causes of fermentative changes in the food ; so that, although in many the leading features are distinguishable, cases are nevertheless presented in practice which frequently deviate to a greater or less extent from the more distinctive lines of classification.

The process of *digestion* is often impaired in both forms, but to a more marked degree in the fermentative variety ; though the injury to this function in that resulting from hypersecretion is easily comprehended when we recall the observations that the fluids thus produced, though presenting a highly acid reaction, may still possess very little true digestive powers.<sup>1</sup> The more neutral secretions occasionally furnished under these influences seem, however, to be almost totally deficient in the properties which distinguish the normal gastric juice.

*Heartburn* is also common to both forms, and as far as this symptom is concerned it possesses few distinguishing qualities. The sensation is usually one of heat or burning at the cardiac orifice of the stomach, accompanied with a feeling of fulness and desire to eructate, experienced in the upper part of the pharynx, and which may long precede, or even exist without, any distinct regurgitation of acid. When this latter ensues, the sensation of acidity is distinctly felt in the upper part of the pharynx, and the mouth becomes filled with a fluid which is often sufficiently acid to set the teeth on edge, and portions of food may sometimes, though not always, be simultaneously returned. In other cases, when the amount of acid is greater (and this is especially, though by no means exclusively, true of the acidity of hypersecretion), vomiting may set in, and large quantities of a highly acid fluid may be ejected ;<sup>1</sup> the origin of which may in some instances be distinctly determined by its chemical reaction.<sup>2</sup>

<sup>1</sup> Brücke found that alterations of the proportion of acid beyond the limits of 0·1 or 0·2 per cent. hindered solution in artificial digestion, though probably a higher degree of acid is present in the natural gastric juice. He also found that the amount of pepsine contained in the fluid directly influenced the rate of digestion.—Sitzungsbericht der KK. Akad zu Wien, xxxvii. 1859, p. 138.

<sup>2</sup> Thus Dr. Golding Bird, "Urinary Deposits," p. 162, found in a case of scirrhus of the pylorus, associated with acid vomiting, "an amount of *hydrochloric acid* in the matter ejected equal to 22 grains of the pharmaceutical acid in the pint, in addition to some organic acid (lactic) sufficient to neutralize 7 grains of pure potassa.'

*Pain*, though not a constant attendant on acidity, is occasionally met with in connexion with both forms, and in both it may occur at variable times after food has been taken. In the acidity resulting from fermentation it is usually later in its appearance, and is associated with other signs and symptoms of flatulence, and with a sense of distension passing into cramp-like and colicky pains. The pain connected with hypersecretion has often a more burning constringing character, and is generally felt behind the sternum; and though in some cases of pyrosis it is sometimes not felt until two or three hours after a meal, yet in the majority it is perceived at a much earlier period, and often immediately follows the ingestion of food, and is accompanied by the heartburn and eructations which indicate its cause. It is almost a peculiarity of the latter form that it is equally, and sometimes even more speedily, evoked by a small meal, such as a biscuit or a cup of warm fluid, especially if associated with a glass of wine (alcohol being one of the most marked stimuli of the gastric secretion), than by a larger supply of food—the explanation of which is probably due to the fact that the amount of secretion is disproportioned to the stimulus which excites it, and that the excess, not being neutralized by food, acts as an irritant on the mucous membrane.

The pain attendant on hypersecretion is also in a large number of cases distinguished by the fact that it is most felt when the stomach is empty, and is relieved by the ingestion of food. In fact, this variety is often marked by a craving for food amounting at times almost to a boulimia, and in hysterical females is often associated with some of the perversions of appetite, or pica, which induces them to eat large quantities of antacid substances: while though, in acidity from fermentation, some relief is occasionally felt from eating, yet it is usually of short duration, and is speedily followed by an increase of distress and of discomfort.

The injurious effects on the system and on the nutrition of the patient are more marked in cases of acidity from fermentative change than in acidity from hypersecretion. It is reasonable to infer, though direct proof is wanting, that this may be in part due to the absorption of imperfectly elaborated, or improperly changed, materials in the food. Fermented liquors and other

substances which give rise to acid dyspepsia markedly interfere with the action of the liver, as is seen by the constipation and paleness of the stools which frequently follow their use. The frequency also with which two very marked diathetic diseases—viz. gout and rheumatism—are preceded by this form of derangement, points at least to some possible participation of this process in the series of phenomena by which these attacks are ushered in. Sallowiness of complexion and dryness of skin may be in part due to the general cause of the acidity, but a very frequent result of these attacks is frontal headache of the severe form commonly known as the sick headache, which, though a so frequent concomitant of this condition, has probably a more general origin than in the special symptom now under consideration.

Contrary to what might have been expected, the urine more frequently shows an alkalescent reaction in the fermentative than in the secretory variety of gastric acidity; and this tendency, which is associated with great depression of spirits and loss of intellectual and bodily energy, is especially induced by vegetable diet. This fact, of which I have observed numerous examples, tends strongly to support Dr. Roberts' <sup>1</sup> view that the alkalinity in these cases is due rather to the addition to the blood of the alkaline bases of the food than to the withdrawal from it of acids, especially as the loss of these is to a certain extent neutralized by the alkaline secretions of the liver, pancreas, and intestinal canal. The acids formed from the food being all oxidizable before they reach the kidneys, cannot suffice to restore the normal reaction of the urine, while its alkaline tendency is probably increased by the diminution of the secretions from the other glandular organs before alluded to, caused by the imperfect stomachal digestion.<sup>2</sup>

Although the ordinary constitutional effects of acidity from fermentation are more marked than those from hypersecretion, it must be remembered that very serious results may occasionally ensue from the latter when carried to an extreme degree, owing to the vomiting and exhaustion to which it may give rise. This

<sup>1</sup> Urinary and Renal Diseases, p. 25.

<sup>2</sup> Schiff and Corvisart have both expressed their belief that the secretion from the pancreas is largely influenced by the due absorption of peptones from the stomach.

is especially true of the condition of pregnancy, when the life of the patient may be endangered from this cause, and numerous fatal cases of this character have been recorded, while others have only been saved from a similar issue by the induction of premature labour.<sup>1</sup> M. Chomel<sup>2</sup> has also added to these a category where, after the cholera epidemic of 1832, he observed eighteen cases of vomiting of acid matters, of which sixteen ended fatally, and he remarks that occasional cases have occurred in his practice since that period. The vomiting in cholera, it may be parenthetically remarked, has been in the author's experience almost invariably neutral in reaction, and the affection of the stomach in the acute forms has appeared to him to present the characters of a highly marked catarrhal and inflammatory condition; circumstances in which, as before remarked, acid secretions are hardly ever observed to occur. These cases of M. Chomel present some difficulty, the more so as *post-mortem* examinations were very rare; and we must remain in doubt whether they were examples of perverted secretion, or whether the acid matters vomited (of which no analysis was made) were not the products of fermentative processes in the food taken, which, as is seen in the case of children, may be thus changed with great rapidity.

The indications for arriving at a diagnosis between the two forms of acidity which have now been described, can only be regarded as of approximative value. The differences in the relation which they bear to disturbances of the digestion are, however, very marked, since acidity from fermentation is a common result of these disorders, while that from hypersecretion is either a cause or a final effect of other causes inducing such derangements.

It has been shown that none of the symptoms by which they are accompanied are positively distinctive of either variety. The matters vomited may also fail to afford any reliable test of their mode of origin, except such as may be derived from a quantitative chemical analysis, or from the occasional presence of confervoid growths, which may indicate the existence of fermentative action in the stomach.

<sup>1</sup> See some cases by Guipon, "Traité de la Dyspepsie," pp. 347, *et seq.*

<sup>2</sup> Des Dyspepsies, p. 144.

The following table may, however, serve to exhibit in a concise form the chief points of distinction between them:—

ACIDITY FROM FERMENTATION.	FLATULENCE.	ACIDITY FROM HYPERSECRETION.
Common.		Rare.
RELATION TO FOOD.		
Usually attains height some hours after food, and is more marked in proportion to the size of the meal, and inversely to the diges- tive powers.		Occurs in empty stomach or rapidly after food, and is often of great intensity after a small meal.
PAIN.		
Less severe.		More severe.
VOMITING.		
Rare.		Common.
VOMITED MATTERS.		
May contain organic acids, torulæ, and sarcinæ.		May contain an excess of hydro- chloric acid.
RELATION TO OTHER PHENOMENA.		
Occurs in connexion with causes which impede digestion.		Most common as a reflex symptom or in connexion with other nervous disturbance, or with ulcer and cancer of the stomach.

#### SECTION V.—*Pain in the Stomach*

Has received various names; the most common of which are *cardialgia*, *gastrodynia*, or *gastralgia*.<sup>1</sup>

The subjective symptoms embraced under these terms, and belonging to the category of perverted sensation, present all possible variations in degree, severity, and duration, from the

<sup>1</sup> These terms have been applied with such varying meanings by different writers, that it is scarcely correct to speak of them as strictly synonymous, except as being expressions of the common element of perverted sensation. The first two are in most common use in this country, where *Cardialgia* is more commonly identified with *Acidity* or *Heartburn* (Copland, *Dict.* ii. 329; Cullen, *loc. cit.* ii. 465), and *Gastrodynia* for *Pain* in the stricter sense of the word. On the other hand, in France and Germany (Georget, *Dict. de Méd.*, art. "Gastralgie;" Romberg, *Dis. Nerv. Syst.* i. pp. 104, 129; Bamberger, *Krank. der Chylopoiet. Syst.* 163) *Cardialgia* (which is the classical expression of the older writers, Hoffmann, J. Frank, Schmidtman, and Truka) is used for the severer forms of pain, associated with intense depression and faintness, and is sometimes further limited to those of paroxysmal and spasmodic nature; while *Gastrodynia* is employed for pain of

uneasy consciousness of the possession of a stomach to pain of a severe and almost unendurable character.

By many of the older writers, to whom allusion has been made, it has been regarded as a distinct entity, and treated of with but little reference to its cause; and by some of these it has been made the basis of a classification for gastric diseases. The result of this manner of treating the subject has been to cause a confusion between pain resulting from organic and from functional causes, from which, and owing to the difficulty of distinguishing them in all cases during life, our medical literature can as yet scarcely be considered as entirely free.

There is a considerable variety in the exact site to which pain originating in the stomach is referred, though this is less remarkable when we consider the extent and complexity of the sources whence its nervous supply is derived. It will be seen later, that pain and other nervous disturbances may be felt in and referred to the stomach, which are really only expressions of disorders having their seat in distant organs, but it also is frequently found that diseases of this viscus may be the starting-point of abnormal sensation in remote parts. This is, however, rather true of more distant parts,—as in cases when the disease of the stomach is revealed by cerebral pain or neuralgia of the fifth nerve<sup>1</sup> and of the thoracic and abdominal muscles,—than of the more contiguous viscera contained in these cavities, which are much more liable to give rise to pain which is referred to the stomach than to suffer in a similar manner from its disorders.<sup>2</sup>

Some of the slighter forms of uneasy sensation, as weight, oppression, and distension, not unaptly point to physical conditions connected either with the presence of abnormal quantities less severity, but more continuous in character. The term *Gastralgia*, very little employed in this country, is used in France to signify a much wider range of phenomena, but all embracing various forms of uneasiness observed during the digestive process. *Barras* defines it as signifying the “morbid sensibility of the stomach” of *Johnson*; but under the theory of the neurotic origin of *dyspepsia*, he applies it to almost all forms of indigestion not having an inflammatory or organic cause. See also *Valleix*, “*Guide du Médecin Pract.*” iv. 3.

<sup>1</sup> *Andral*, *Clin. Méd.* ii. 158.

<sup>2</sup> The contiguity of site formerly led many to attribute pain originating in the stomach and duodenum to the liver, but this error is now much less frequent, and, though by no means entirely abandoned, is still to some degree maintained with regard to the origin of many dyspeptic disturbances in which the affection of the liver is only secondary to gastric or duodenal disorders.

of undigested food, or of the gaseous products of its decomposition. In the severer forms of pain it is however important to remember that the *nature* of the sensation is seldom characteristic of its mode of origin, for it has been observed that there is little difference in this respect between the pain arising from severe organic affections, and that occurring in cases where no alteration of the coats of the stomach has been found after death ;<sup>1</sup> and its semeiological value can only therefore be estimated by the aid of the concomitant phenomena with which it is attended.

The importance of the symptom appears, however, to render it desirable that a general summary should be given of its most frequent modes of origin and causation ; for though there are few diseases of the stomach in which it is entirely absent, it forms a much more marked feature in some than in others.

That the stomach ordinarily possesses a certain degree of sensibility is shown by the observation of Beaumont, who, on passing a thermometer towards the pyloric region in the case of Alexis St. Martin, found that it gave rise to severe cramp-like pain and distress, and left a soreness which continued for some hours afterwards.<sup>2</sup> In other cases of the same kind the sensations produced by the contact of foreign bodies with the mucous membrane at other parts than the pyloric region, have been rather those of sickness and faintness than of actual pain.<sup>3</sup>

There can be little doubt, however, that the mucous membrane of the stomach, like other tissues, acquires increased sensibility under the influence of disease, though the variations in its manifestation under these conditions is not always easily explicable. There are, however, at least two distinct methods through which painful sensation can be produced ; and when it can be made practically available, this distinction is of some importance as a clue to treatment. Thus in one set of cases it may be referred to the direct agency of the sensory nerves of the mucous and submucous tissues ; while in another, cramp or spasm of the muscular coat appears to be its determining cause ; but it must be admitted that in a third class, the co-existence of both of these becomes a matter of great probability.

<sup>1</sup> Andral, Clin. Méd. ii. 179.

<sup>2</sup> Loc. cit. pp. 105, 228-9.

<sup>3</sup> Murchison, Med.-Chir. Trans. xli. p. 16. See also Beaumont's Experiments in numerous instances.

The conditions of the stomach giving rise to pain may be summarily expressed as follows:—

1. The presence in its interior of foreign substances of an irritating character.
2. Organic diseases altering the anatomical structure of its coats.
3. Perversions of its secretions.
4. Perversions of innervation :
  - a. Proper to stomach.
  - b. Reflected from other organs.
  - c. Originating in the nervous centres.

1. As regards foreign bodies whose influence is purely mechanical, it is probable that they may excite pain in the same manner as was observed in Beaumont's case, by causing spasmodic contraction of the pylorus ; and pain of this kind, to which a similar explanation is applicable, is sometimes observed when indigestible articles of food have been taken. In the same category may be mentioned the abnormal presence of blood in large quantities, either swallowed or effused from the coats of the stomach, and of bile which has regurgitated from the duodenum.<sup>1</sup> Sharp substances wounding the coats of the stomach are also capable of causing pain of great severity,<sup>2</sup> arising, in all probability, from direct injury to its nerves. The corrosive poisons, such as the mineral acids, the caustic alkalies, arsenic, and antimonial preparations, probably give rise to pain (which is usually described as of a burning character) not only from direct injury to the nervous structures of the mucous membrane, but also through exciting inflammation of its coats.

2. Among the organic causes, the effect of *inflammation*—unless when caused by corrosive poisons, or when of great intensity, or complicated by aphthous ulcerations, hæmorrhagic erosions, or implication of the peritoneal coat—is rather to cause uneasiness and distress than pain of a severe kind. The inflammatory process may, however, be accompanied by irritating secretions, or be complicated by some forms of irritative neuralgia or by spasmodic

<sup>1</sup> See Beaumont, *loc. cit.* p. 269.

<sup>2</sup> See a case quoted from Velpeau by Dr. Budd, of a fork swallowed ; *loc. cit.* p. 276. Also a case by Mr. Marshall, where a number of pins were found in the stomach : *Med.-Chir. Trans.* xxxv. Also a case by Marcet (*Med.-Chir. Trans.* xii.), of a man who, on several different occasions, swallowed a number of clasp-knives.



contraction of its walls, which greatly intensify the suffering arising from the original condition, and therefore, though generally true, the statement of the minor degree of pain attending this process requires to be received with a certain amount of caution.

*Cancer and Chronic Ulcer* of the mucous membrane are, on the other hand, the most frequent sources of severe and continuous pain of the stomach. Their prominence in this respect is due not only to the frequency with which branches of nerves are implicated in the destructive processes which they occasion, or (in the case of ulceration) in cicatricial contractions resulting from the cure of these, but also in part to the irritating secretions by which they are so commonly accompanied, and to the irregular contractions of the muscular coat arising from the alterations in size and shape to which the stomach is liable from the cicatrices remaining after the healing of ulcers. There are, however, exceptional cases in which both these diseases may proceed to a fatal termination without any occurrences of the symptom in question.

In the same category may be mentioned diseases obstructing the pyloric orifice, which give rise to pain, not only by the spasmodic muscular contraction through which the stomach endeavours to propel its contents into the duodenum; but also by the irritating products and the flatulent distension of the organ which result in these cases from the fermentation of the food; and further, as in some cases these obstructions are caused by ulcers, either simple or cancerous, the effect of the originally painful affection is aggravated by its position.

3. The effect of perverted secretions in causing pain is also well marked, and is evident not only when these are of an acid and apparently irritating character, but also even when neutral fluids are regurgitated. In the latter case, and also perhaps to some degree in the former, it may be questioned whether the pain is due solely to the presence of the unhealthy secretion, or whether both are not the simultaneous expression of the same condition of disordered innervation, though the relief that in some cases of pyrosis follows the ejection of the fluid would seem to point to its standing in some causal relation to the abnormal sensation. As regards pain arising from acidity, it was noticed when this subject was more fully discussed, that in

a large proportion of cases when the contents of the stomach are found to present this reaction in an abnormal degree, its origin is traceable to fermentative processes, where the large quantity of gas evolved causes spasmodic contractions, and it will be ordinarily found that pain resulting from this cause occurs some hours after meals.

4. The most difficult question connected with the subject of gastric pain is, however, that of how far it may be due to a spontaneous neurosis. This subject will be further considered under the head of those forms of dyspepsia of which pain forms a prominent symptom; but it may be remarked in this place that cases are comparatively rare in which it occurs, uncomplicated by some form of abnormal secretion, or without spasm associated with excessive flatulence and acidity from indigestion.<sup>1</sup> There does, however, appear to be a small class of cases where pain of a purely neuralgic character is felt in the stomach, especially in hysterical and chlorotic women during the menstrual period, and also in hypochondriac individuals of the male sex who have been reduced by debilitating causes, and in both it not unfrequently appears to alternate with neuralgic pains in other parts.<sup>2</sup> Such pain is also liable to occur in patients of a rheumatic and gouty diathesis;<sup>3</sup> while in others its regularly intermitting character raises the suspicion of its being due to a malarial poison.<sup>4</sup> And one remarkable feature, which greatly assists the diagnosis, is that in many of these cases the digestion in the intervals of pain appears to be entirely unaffected.

One very important fact has, however, been pointed out by M. Bricquet,<sup>5</sup> viz. that pain of this character, which has been described by previous writers as existing in the stomach, frequently has its exclusive seat in the abdominal muscles, and belongs to the class of affections termed by him myosalgia, and

<sup>1</sup> Frerichs, art. "Verdauung," *loc. cit.*, found in the matters vomited by chlorotic women, abundant evidence of the acid decomposition of starchy food.

<sup>2</sup> See Andral, *Clin. Méd.* ii. 297.

<sup>3</sup> See several cases of this kind in Whytt, *On Nervous Disorders*. Also Romberg's *Personal Experiences*, *loc. cit.* 129.

<sup>4</sup> Andral, *loc. cit.* 129. Also Niemeyer, *Lehrbuch Path. Therap.* ii. 545; Chambers' *Indigestions*, p. 148. The latter author remarks that pain in the stomach, when due to this cause, is not excited by food, nor accompanied by tenderness at the epigastrium.

<sup>5</sup> *Traité Clinique et Thérapeutique de l'Hystérie*, 1859, p. 216 *et seq.*

corresponding to the myalgia of Dr. Inman.<sup>1</sup> It is distinguished by a superficial tenderness, which is sometimes very intense, and is capable of being elicited by a degree of pressure insufficient to affect the abdominal viscera; by its preferential seat in the left recti and obliqui abdominis; by its existence, not only in their fleshy parts, but in their attachments to the ribs, where moderate pressure cannot affect the stomach; by its not unfrequently extending to the pectoralis major; and in all these cases by its occurring chiefly in the left side, and by its frequent independence of the digestive acts. This pain frequently occurs together with severe dorsal pain (the rhachialgia of Bricquet), which is most common between the sixth and eighth dorsal vertebræ, and which may be distinguished by tenderness on pressure on the apophyses of the vertebræ, and along the vertebral groove. Bricquet is of opinion that the abdominal pain (to which he gives the term epigastralgia) may be induced by sympathy, or in a reflex manner, when the stomach is affected;<sup>2</sup> but there appears little doubt from his researches that it can exist in an independent form, and that it has been a frequent source of fallacy in observations recorded on the subject of hysterical gastrodynia.

The fact, however, which Bamberger recalls should not be lost sight of, that chlorotic and anæmic women are not unfrequently the subjects of gastric ulcer, which may at times run its course unattended by the more prominent symptoms which usually characterise this disease. The occurrence of severe abdominal pain in such cases is always a matter of suspicion, and requires caution in treatment. On the other hand, I have met with unequivocal tenderness on superficial pressure in the vertebral groove and in the abdominal muscles in cases where there was severe dorsal and epigastric pain, attended with other and unequivocal symptoms of the presence of ulceration.<sup>3</sup>

Another question which must yet be regarded as undecided,

<sup>1</sup> "Spinal Irritation;" Foundation for a New Theory, &c.

<sup>2</sup> This opinion is to some degree corroborated by Bernard's observation, that pricking of the solar plexus, and of the semilunar ganglion, caused involuntary movements of the pectoral and abdominal muscles, and also of the diaphragm.—Lec. Syst. Nerv. i. 368.

<sup>3</sup> Traube has noticed both hyperæsthesia and anæsthesia of the cutaneous surface in cases of ulcer of the stomach. Deutsche Klinik, 1861, p. 63.

in cases of pure neuralgia of the stomach, is that relating to the nerves involved, and to the peripheric or central origin of the affection. Romberg divides these neuralgias into two classes,—those of the cæliac axis, and of the vagus, and distinguishes the former by the attending sense of faintness, while the latter is often marked by perversions of appetite; but the variety in the symptoms, and the difficulty even in the diagnosis of the primary nervous affection, renders this test apparently unreliable.<sup>1</sup> There can be little doubt that in many cases, especially of chlorosis, the neuralgia is part of a general condition, disappearing as it does on the improvement of the state of the blood.<sup>2</sup> Direct evidence of pain of this class originating in the central organs of the brain or cord, is only rarely afforded,<sup>3</sup> though the absence of any other demonstrable cause may at times lead to the suspicion of such a mode of causation.<sup>4</sup>

Further it is to be noticed that, as in the case of vomiting, many of the painful affections of the stomach originate in reflected sensations having their origin in distant organs. Among those which stand in the most frequent causal relationship of this character, must be mentioned the uterus and ovaries, and many severe cases of gastrodynia are directly connected with disturbances of the menstrual function, and cease on the restoration of this to its normal condition.<sup>5</sup> Gall-stones and diseases of the duodenum and abdominal aneurism<sup>6</sup> are also frequent causes of pain, where the participation of the stomach is shown by the vomiting which attends the other phenomena present.

Diseases of the heart and lungs, and especially pericarditis,<sup>7</sup> are also not unfrequently causes of epigastric pain, which

<sup>1</sup> It may be noted, however, that Bernard found that, after section of the pneumogastric nerves, the mucous membrane of the stomach was insensible to pinching. *Lec. Syst. Nerv.* ii. 424.

<sup>2</sup> See Bamberger and Niemeyer, *loc. cit.*

<sup>3</sup> See, however, a case given in the chapter on Nervous Disorders of the Stomach, where epigastric pain as well as vomiting, without disease of the stomach, occurred in connexion with hæmorrhage of the brain.

<sup>4</sup> See a case by Bamberger, *loc. cit.* 168. Also Andral, before quoted.

<sup>5</sup> Niemeyer cites a case where the attacks of gastrodynia only returned at the menstrual period. *Loc. cit.* 545.

<sup>6</sup> Lebert, *Handb. der Sp. Path. Therap.* (Virchow), vol. v. Abth. ii. p. 53.

<sup>7</sup> Andral, *Clin. Méd.* ii. 148.

may in some cases, especially of the last-named affection, constitute their chief symptom.

DIAGNOSIS.—There is no writer on the diseases of the stomach who has not confessed to the difficulty of forming in all cases an accurate diagnosis regarding the origin and import of sensations which, though similar in character, may have such varied and essentially different modes of origin; and the records of errors in diagnosis freely admitted by the most competent observers abound in medical literature.

The chief difficulty lies in the discrimination of pain of purely neuralgic character from that which exists in cases of ulcer, and in the early stages of cancer, and a satisfactory conclusion can be formed only by a very careful investigation of the ætiological circumstances attending each individual case; and even with regard to these, exceptional conditions are so frequent as to invalidate almost every general rule that can be laid down.

Purely neuralgic pain is more common in the earlier periods of life after puberty, and especially in the female sex, and is then often attended with other nervous phenomena; but, as has been remarked before, these patients are very liable to ulcer of the stomach.<sup>1</sup> On the other hand, at more advanced ages, cancer may exist for years without any other symptom than violent gastrodynia, which may be completely intermitting in its character and may be unattended in the intervals of the attacks by any appreciable disturbance of the digestive functions.

The relation of the pain to the state of the stomach with regard to food, often however, as pointed out by Abercrombie, affords indications of some importance. Thus pain experienced when the stomach is empty is less common in ulcer and cancer than in cases of a less dangerous character; while that following the ingestion of food has a gravity inversely proportioned to the time which may elapse before the pain is felt. If occurring late, it may be due to flatulence, though here the possibility of pyloric obstruction should warn us against a too hasty diagnosis. In general it may be stated that, even in the absence of hæmatemesis or signs of pyloric obstruction, pain of great severity

<sup>1</sup> Whytt, and other writers on nervous disorders, mention vomiting of coffee-ground matters among the symptoms of nervous gastrodynia.

occurring early and continuing long after the ingestion of food, especially when associated with vomiting, and when combined with pain in the spine or scapular region, is always to be regarded with grave suspicion of its origin in organic disease.

The indications obtainable by the effects of pressure in causing tenderness or aggravation of pain already existing, though of some approximative value, are also not such as can be certainly relied on as an absolute test of the nature of its cause. The uneasiness and pain of subacute or acute inflammatory action is almost invariably aggravated by this procedure, as is also that arising from ulcer and cancer; though in cases of the latter diseases much depends on the position of the lesion in the anterior or posterior walls of the stomach, and exceptional instances are recorded where even in these firm pressure has afforded relief.<sup>1</sup> Purely nervous pain, on the other hand (independently of cases of superficial tenderness in the outer wall), is sometimes increased by gentle but relieved by a firmer pressure; and pain from flatulent spasm is often markedly alleviated in this manner.

Some other affections which may simulate gastric pain deserve also a brief notice in this place.

Pain in the course of the transverse colon is among the most frequent of these, and it is often associated with an amount of flatulent distension which may add greatly to the difficulties of diagnosis of its seat. There is, however, generally a distinct difference, especially on gentle percussion, between the notes to be elicited from the two organs, that arising from a distended colon being the less prolonged, and having a higher pitch. Pain also from this source is seldom so much felt at the ensiform cartilage as in the right or left hypochondriac regions, and it frequently extends in the direction of the sigmoid flexure. It is also associated with colicky pains and irregular contractions, which may be seen or felt by the hand, together with borborygmi, distension, and other signs of intestinal flatulence, and with migratory pains in other parts of the abdomen.

Rheumatic pains in the abdominal muscles are another source

<sup>1</sup> Miquel has advanced the not improbable explanation that the relief thus experienced may be due to the effect of pressure in restraining the movements of the stomach. Zeitsch. Hannover Heilk, 1864, p. 17.

of fallacy,<sup>1</sup> which can be best distinguished by their superficial character and by tenderness on pressure and pain on movement.

Numerous instances, again, have been quoted by various writers, of epigastric pain depending on functional or organic diseases of the spinal cord. In the former class of cases, when affecting the skin, it is distinguished by the very superficial tenderness (which disappears on deeper pressure<sup>2</sup>), by the discovery, of other painful points in the course of the nerves affected, by the absence of all symptoms referable to the stomach, and by the co-existence of an hysterical diathesis; while the distinctive characters of pain residing in the muscles have been already referred to. In the latter case the presence of spinal tenderness, as ascertained by cold, heat, pressure, &c., the co-existence of some perversions of the functions of sensation or motor power in the lower extremities, and even in the absence of the latter, the symmetrical character of the affection,<sup>3</sup> and the relief by rest, will generally suffice to indicate (in the absence of symptoms referable to the abdominal viscera) the nature of the affection.

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#### SECTION VI.—*Vomiting.*

Vomiting is a complex act, involving muscles which are widely separated from one another, and which are supplied by nerves whose central origins have very little in common. In its occurrence there is a participation of the abdominal muscles and diaphragm, and of the other respiratory muscles, as well as of the stomach, the œsophagus, the pharynx, and the larynx; and, as Bamberger has remarked, the part taken by each of these factors varies considerably, both in the order of their occurrence, and in their influence on the process. Thus, as Majendie and Budge<sup>4</sup> have shown, the influence of emetics may give rise to the expulsion of food from the stomach, through the action solely of the diaphragm and of the abdominal muscles; while, when an

<sup>1</sup> Bamberger, *loc. cit.* 171.

<sup>2</sup> This is, however, a peculiarity of some forms of pain undoubtedly originating in the stomach, and which cannot, therefore, be relied upon.

<sup>3</sup> Hilton, *Lectures on Rest and Pain*, pp. 79, 80.

<sup>4</sup> *Die Lehre von Erbrechen.*

irritant is directly applied to the pyloric orifice, its contractions precede those of other parts ; and, on the other hand, when vomiting is excited by irritation of the fauces, pharyngeal movements appear as the first among the series, though the reverse is the case under other circumstances.

But without entering into the details of the mechanism of the expulsive process (which belong more exclusively to the domain of physiology), it is important that from a clinical point of view, vomiting should be regarded as capable of originating from stimulation either of the central or of the peripheric extremities of the nerves supplying the parts which participate in the act, and also from irritation of other parts whose central connexions with those more immediately concerned can only be inferred from the phenomena witnessed.

It appears, therefore, that vomiting, like many of the symptoms which have been previously considered, may be due to other influences than those directly affecting the stomach ; but, on the other hand, as these are its most frequent causes, it is not unimportant briefly to review the chief of the conditions from which it may arise.

These, for convenience, may be divided into the two chief classes of vomiting from central and from reflex causes ; and the latter may be again distinguished into (*a*) the cases when it arises from peripheric stimulation of the stomach and fauces, and (*b*) those in which it appears among phenomena resulting from the irritation of other and distant parts.

(*a*) The effect of irritation on the upper part of the tract is so well known as only to require a passing allusion. In the stomach the necessary conditions of irritation may be produced by direct pressure artificially exerted on the epigastrium, or caused by the enlargement or displacement of contiguous organs, and especially of the liver ; or they may depend on matters introduced or formed in its cavity, or from the implication of its nerves in diseased processes by which the organ is affected. Thus it may be excited by irritant substances of all kinds, especially the corrosive poisons, the effects of many of which persist after the cause has been removed, through the production of organic alterations of an inflammatory or ulcerative character in the mucous membrane ; or by accumulations of



materials formed by the stomach, or introduced into it, which are incapable either from their nature or their amount of undergoing the normal digestive process, such as mucus, excessive acid, bile, or blood (whether proceeding from the stomach, or swallowed after having been effused from the lungs, nose, or fauces). In this category may also be placed the vomiting from over-distension which occurs with such frequency in suckling children, and which is, however, greatly facilitated by the form and position of the organ in the earlier period of life.<sup>1</sup> Most of the organic diseases of the stomach, though differing widely in their nature, have also this disturbance in common, though the immediate cause of its production is often as varied as the anatomical conditions in which it originates. In some it is due to enormous accumulations of food resulting from obstructions of the pyloric orifice;<sup>2</sup> in others, as in inflammatory affections of the peritoneal and mucous coats, it is caused not only by the direct irritation excited in the peripheric nerves, but also in the case of the latter by the altered secretions which are the result of the process; while all these causes may, with the addition of hæmorrhage, concur in giving rise to vomiting in cancerous and ulcerative affections of the organ, or in the rarer cases in which a portion of its coats has been incarcerated as a hernia in the abdominal parietes.<sup>3</sup>

(b) The influence of peripheric irritation of distant parts, or when the exciting cause acts (to retain Bamberger's term) by irradiation, also requires a passing mention.

<sup>1</sup> Schultze describes the stomach of the infant as resembling in form that of the carnivora, while in the adult it approximates far more to the type of the herbivorous classes. In the former the position approaches the vertical, and the shape is conical; the œsophagus is placed at the left extremity, opposite to the pylorus; the lesser curvature is lengthened, and the greater curvature shortened; while, in the adult, the latter is proportionally increased, and the fundus developed into a sac, to the right of which the œsophagus is inserted in closer proximity to the pylorus than in the child. Hence the contents in the child are propelled in directions passing almost straight from the œsophagus to the pylorus, and *vice versa*; while, in the adult, the antiperistaltic movement propels the food, not towards the diaphragmal opening, but into the sac of the fundus. Hufeland's Journal, 1835, No. 3, quoted by Henoch.

<sup>2</sup> It must be remembered also that a spurious form of vomiting is associated with obstructions of the cardia, owing to the retained food being regurgitated from the distended œsophagus.

<sup>3</sup> See a case quoted by Dr. Walshe, "Cancer," p. 292. Also one by Mr. Moore, Med.-Chir. Trans. xlvi.

Some of these agencies, however, though placed in this category, may perhaps be referable to anastomoses between the pneumogastric nerves and those supplying the parts whence the irritation proceeds. Of this kind are cases where vomiting occurs in connexion with hepatic abscess,<sup>1</sup> or from the impaction of a gall-stone in one of the ducts of the liver,<sup>2</sup> or in cases of peritonitis; or of ulceration, invagination, herniæ,<sup>3</sup> or other obstructions of the intestines,<sup>4</sup> or of simple faecal accumulations in these viscera; or of epiploic herniæ,<sup>5</sup> which have escaped into the groin or through the umbilicus, and give rise to irritation of the stomach, through dragging on the greater curvature. Here also must be mentioned those instances where vomiting occurs in connexion with disorders of the respiratory apparatus, as in the invasion of pneumonia<sup>6</sup> and bronchitis, or after violent paroxysms of coughing, as in phthisis<sup>7</sup> and hooping cough; or by irritation of the external ear.<sup>8</sup> In other instances the connexion is not apparent or explicable by any anatomical relations with which we are acquainted, as in vomiting from renal colic, injury to the testicle, diseases of the uterus<sup>9</sup> and ovaries, or

<sup>1</sup> Budd, Stomach, 192.

<sup>2</sup> Ibid.

<sup>3</sup> Bamberger remarks that a sudden invasion of vomiting, attended with pain and distension of the abdomen, should always excite a suspicion of hernia. *Loc. cit. note*, 184.

<sup>4</sup> Andral, Clin. Méd. ii. 174. I have lately met with a case, where ulceration of the large intestines was attended with such constant vomiting, as to give rise to the suspicion of ulceration of the intestine.

<sup>5</sup> Chomel, Des Dyspepsies, pp. 133, 134, quotes Pipelet (*Mém. de l'Acad. de Chirurgie*) as the discoverer of these hernias. He says that they are very small, and are recognised by the facility with which they can be reduced, but that they cannot be retained *in situ* by the ordinary truss, and that for this purpose a small hemisphere of ivory or wax, fastened by diachylon, is the best means to be employed.

<sup>6</sup> Chomel, *loc. cit.* 132, points out that a long-continued rigor in old people, attended with vomiting, is often the precursor of an attack of pneumonia. The diagnosis is aided by the fever, prostration, and pain in the back.

<sup>7</sup> Vomiting in phthisis, or from disease of the lungs uncomplicated with that of the stomach, is however in my experience comparatively rare, except in the cases where it is directly brought on by efforts of coughing, or by tough mucus adhering to the upper part of the pharynx.

<sup>8</sup> Pechlin and Arnold, quoted by Romberg; Sieveking's Trans. Syd. Soc. Ed. ii. 17.

<sup>9</sup> In a case related by Gooch, from Denman's Experiences, vomiting followed each attempt to tighten a ligature passed round an inverted uterus, but ceased as soon as the ligature was slackened. *Dis. of Women and Children*, by Ferguson; New Syd. Soc. p. 137.

pregnancy. Caution must, however, be exercised in attributing all cases of vomiting which occur in connexion with this last-named condition solely to disturbed innervation, as in some cases the symptom has been found associated with ulcer,<sup>1</sup> and in many others there is such a considerable alteration in the secretions and functions of the stomach, that although *post-mortem* evidence has in some instances failed to reveal appreciable organic alterations, yet it is difficult to eliminate the possibility of such arising as complications.

Vomiting arising from derangement of the nervous centres may be subdivided into three classes:—(1) Cases where it is associated with anatomical lesions, or disturbances in the circulation of these parts, and especially of the brain; (2) Those resulting from the effect of toxic agents on the brain or cord; and (3) Vomiting, whose functional origin is inferred either from its evident association with other nervous disturbances belonging to this class, or from certain peculiarities in the concomitant symptoms, or from its existence under conditions for which no other adequate explanation can be found.

The frequency with which the symptom in question is associated with organic diseases of the brain, has been remarked by all writers since the days of Abercrombie, who pointed out that it not unfrequently happens that the symptoms of the primary disorder are masked or obscured by those proceeding from the stomach, among which vomiting is often the chief and most characteristic.

Thus, it appears among other nervous phenomena in cases of suddenly induced cerebral anæmia,<sup>2</sup> and in other cases where the condition is not as yet fully elucidated, as in some cases of commencing paralysis after diphtheria,<sup>3</sup> but where, from the simultaneous affection of the heart and pharyngeal muscles, there is reason to believe that some lesion

<sup>1</sup> Hodgkin, Diseases of Mucous and Serous Membranes, ii. 371, quoted by Bamberger. The nervous character of the vomiting associated with many of these causes, is, however, in some measure shown by its occurrence on the assumption of the erect posture, and by its ceasing when a recumbent position is assumed, as well as by the manner in which it can frequently be checked by taking small quantities of food before rising.

<sup>2</sup> Marshall Hall in Med.-Chir. Trans. xiii.; Kussmaul and Tenner, on Convulsions—New Syd. Soc. pp. 28, 30.

<sup>3</sup> Jenner, On Diphtheria, p. 42.

of the central roots of the par vagum is present. Further, it is a frequent complication of concussion of the brain; and Sir B. Brodie<sup>1</sup> has remarked that it followed the elevation of depressed portions of the skull in the operation of trepanning. It would, however, appear from an examination of Abercrombie's recorded cases, that there is hardly any disease of the cerebral centres with which vomiting may not be associated, either at its outset, or even throughout its entire course,<sup>2</sup> though the persistence of this symptom under these circumstances is more common as a complication of meningeal irritation or of tumour than in cerebral softening or hæmorrhage. Its frequency in tubercular meningitis is indeed so well known that it would only require a passing notice in this place, were it not for the difficulty which sometimes exists in distinguishing vomiting from this cause from that arising from disordered conditions of the stomach, and for the consequent danger of thus overlooking the onset of the graver disease in the more prominent symptoms of the lesser malady; and more particularly as in some cases of this disease other symptoms of gastric disturbance may be present.

Generally, however, it may be noted that vomiting arising from the stomach is attended with more or less pain, with a furred tongue, with constipation or diarrhœa, load at the stomach, and is preceded for a long period by a sense of nausea.

The vomiting from cerebral causes, on the other hand, usually presents an absence of these symptoms, or at least, when present, they are much less marked than when the cause resides in the stomach. This is especially true of the nausea, and its absence as a precursory symptom, especially when the tongue is clean, should always raise grave suspicions of the nature of the affection to which the vomiting is due.<sup>3</sup>

In some cases of apoplectiform attacks, whether from softening or hæmorrhage, the first symptoms are faintness and vomiting,<sup>4</sup> and it is only at a later period that more distinctive phenomena

<sup>1</sup> Med.-Chir. Trans. xiv. 355.

<sup>2</sup> The part of the brain affected appears to exert little or no influence in determining the occurrence of this symptom.

<sup>3</sup> Andral, Clin. Méd. v. 212.

<sup>4</sup> Abercrombie's Second Form of Apoplectic Attack, p. 204.

make their appearance. In others the vomiting may be so violent and persistent, that though associated with nervous disturbance, the true nature of the affection may be overlooked. A case of this nature occurred to the author, in a boy who was brought into the Edinburgh Infirmary suffering from violent and repeated vomiting, and with a history that he had eaten a large quantity of decayed oranges, to which this symptom, together with his semi-comatose condition and the epileptiform convulsions which occurred from time to time, were for some time attributed, but in whom cerebellar hæmorrhage was discovered after death, which occurred within six hours.<sup>1</sup> Pain in the head is so frequently associated with disturbances of digestion, and under the name of sick headache is so constant a concomitant of the affection in question, that this symptom is of less value as a criterion of the existence of disease of the brain than might at first sight be supposed, especially as when it occurs, even in cases of simple indigestion, it is frequently attended with some disturbance of vision, and with considerable intolerance of light. The vomiting of cerebral origin may, however, often be distinguished by its occurrence at irregular periods, and by efforts at retching which are frequently independent of the presence of food<sup>2</sup> in the stomach. Romberg (*loc. cit.*) gives the following criteria for the discrimination of vomiting of cerebral origin:—

1. The influence of the position of the head: the vomiting is arrested in the horizontal, and recurs and is frequently repeated in the erect position.

2. The prevailing absence of premonitory nausea.

3. The peculiar character of the act of vomiting: the contents of the stomach are ejected without fatigue or retching, as the milk is rejected by babies at the breast.

4. The complication with other phenomena, the more frequent of which are pains in the head, constipation, and the irregularity of the cardiac and radial pulse, which is increased during and subsequent to the act of vomiting. The value of some of these have, however, been disputed by later writers,<sup>3</sup> and the accuracy of the diagnosis must, in many cases, depend on a careful com-

<sup>1</sup> This case is recorded in Dr. Bennett's "Princ. and Pract. Med." p. 406.

<sup>2</sup> Abercrombie, Path. and Pract. Researches on Disease of the Brain and Cord, ed. 1834, p. 87.

<sup>3</sup> Hensch, ii. 232.

parison of the predominance of one or other of the symptoms present, though it can occasionally only receive its full confirmation on the appearance of other and more unmistakeable symptoms of disturbed innervation.

The following table exhibits the principal points of contrast here detailed :—

GASTRIC VOMITING.	CEREBRAL VOMITING.
EPIGASTRIC PAIN AND TENDERNESS.	
Common, and in some cases very marked.	Rare.
NAUSEA.	
Constant.	Frequently absent.
OPPRESSION AND WEIGHT AT EPIGASTRIUM.	
Constant.	Rare.
BOWELS.	
Condition variable.	Constipation.
TONGUE.	
Loaded, except in some cases of cancer and ulcer, where other of the above symptoms exist.	Often clean.
HEADACHE.	
Less intense. Chiefly frontal. Invasion gradual. Relieved by vomiting.	Often violent. Invasion sudden.
VERTIGO.	
Comparatively rare. Relieved by vomiting.	Very frequent. Not relieved.
OTHER NERVOUS PHENOMENA.	
Only rarely present, and then only in slighter forms, and relieved by vomiting.	Indistinctness of vision, or diplopia. Confusion of ideas. Loss of memory. Not relieved by vomiting. Anæsthesia or paræsthesia, paralysis or cramp, convulsion, and coma, common, or soon supervene. <sup>1</sup>

The toxic agents capable of exciting vomiting by their action on the nervous centres must only be briefly passed here in review. Among them are to be mentioned tobacco, digitalis,<sup>2</sup> opium(?),<sup>3</sup>

<sup>1</sup> Before quitting this subject it may be desirable to recall an interesting case, quoted by Romberg, from P. Frank, of a patient in whom, after suffering for years from nausea and vomiting, the vagus within the thorax was found pressed upon by "steatomatous" tumours.

<sup>2</sup> Clarus, *Arzeneimittellehrē*, 596. Andral, *Path. Int.* i. 147, says that digitalis will produce this effect when introduced into the rectum.

<sup>3</sup> Buchheim, *Arzeneimittellehre*, 558. Andral, v. 270.

cyanide of potassium applied externally,<sup>1</sup> lobelia, and the vapour of chloroform. Majendie's often quoted experiment, which demonstrated the possibility of exciting vomiting after the removal of the stomach by the ingestion of tartar emetic into the veins, would show that this agent may probably be placed in the same category, especially since Budge<sup>2</sup> has shown that, after removal of the hemispheres of the brain, the administration of this drug is not followed by vomiting.

Closely allied to the effects caused by poisons of this nature in the production of vomiting, is the occurrence of this symptom in connexion with various disorders of the blood, and regarding the nature of which association we are still in ignorance. It may indeed be a doubtful question (as has already been stated, and to which allusion will be made hereafter) whether in many of the acute disorders in which this symptom occurs, organic alterations of the stomach are not present to a degree sufficient to account for its presence; and in others, whether the elimination of some morbid material by its secreting surface may not be considered as the direct exciting cause. Under this head may be placed the vomiting which occurs in Bright's disease, where the demonstrated presence of urea in the contents of the stomach may possibly be held to explain the disorder in its function, but where also there is not unfrequently considerable evidence of irritation or subacute inflammation affecting the mucous membrane. So also in many other febrile and inflammatory affections, especially at the outset of pneumonia, the question whether the vomiting be due to nervous disturbance or to the participation of the stomach in changes induced by the febrile condition, or by some common cause of blood-poisoning, must be considered as still in abeyance. In scarlatina the symptom is often a very prominent one, and a case occurred to the author, in which, during a delay in the appearance of the eruption extending over a period of four days, the only symptoms present were an intense general febrile condition, associated with uncontrollable vomiting, which ceased on the appearance of the eruption. In this affection, however, the recent researches of Dr. Fenwick have shown that there is an almost constant affection of the stomach of an acute inflammatory or catarrhal nature, and that the vomited

<sup>1</sup> Andral, v. 270.

<sup>2</sup> Quoted by Henoch, ii. 336.

matters contain casts of tubes<sup>1</sup> analogous to those found in the urine, as the result of the nephritis which so commonly complicates this disease, and which bear out strongly the parallel which Dr. Fenwick has drawn between the desquamative affection of the cutaneous and mucous surfaces; and reason will be given hereafter for the belief that the vomiting of cholera is due to a very similar cause.

Probably, however, the occurrence of vomiting in the cold stage of intermittent fevers<sup>2</sup> can only justly be attributed to a nervous origin, as also when it is associated with disease of the suprarenal capsules.

The functional disturbances of the nervous centres associated with this symptom are also numerous and manifold. It may be produced by emotional causes—shock, or fright, or fear. It is also a frequent attendant of the hysterical condition, in which it often occurs in a very uncontrollable form. In this affection it is often distinguished by its being unattended by any other evidence of gastric disorder, the tongue being clean and the appetite good, though occasionally depraved; and it is remarkable that in many of these cases there is very little emaciation or loss of strength during its continuance, and its origin can usually be ascertained by its being associated with or by its having superseded other nervous disturbances of a more or less distinctly hysterical character.<sup>3</sup>

Affections of the senses not unfrequently give rise to the symptom. Thus it may be produced by severe pain; or be caused by a nauseous or disgusting taste or smell, by bright light, and especially by the sight of objects in motion—under which head it is probable that sea-sickness is to be placed, which, if not entirely due to this cause, is very largely influenced by it, and can frequently be averted by steadily keeping the eyes shut when the body is maintained in the recumbent position. The mere feeling, however, of some peculiarities in the movement of the body may also give rise to a similar train of phenomena closely allied to sea-sickness, of which swinging, or riding backward in a carriage, afford very frequent instances.

<sup>1</sup> *Loc. cit.*

<sup>2</sup> Hensch, *loc. cit.* ii. 337. Habershon, *Obs. Alim. Canal*, p. 140.

<sup>3</sup> See Andral, *Clin. Méd.* ii. 196, 199.



The indications obtainable from the vomited matters require, in relation to the special object of this work, to be only very briefly passed in review. Thus food may either be returned unaltered, as in some cases of nervous vomiting, where it is ejected almost as soon as it is swallowed; or it may present evidences of fermentative changes, varying with the length of time during which it has been delayed in the stomach, but which more particularly affect the starchy substances. These are in some cases changed into a tenacious glutinous material, resembling some of the products derived from the lactic acid fermentation,<sup>1</sup> while in others they are found to be frothy from the evolution of carbonic acid, and associated with the formation of large quantities of the *Torula cerevisia*.<sup>2</sup> In other instances alcohol<sup>3</sup> has been found, together with amylic alcohol and the butyric, lactic, and acetic acids. These changes occur in the most extreme degree when the food is delayed in the stomach by obstructions at the pyloric orifice, under which circumstances the *Sarcina ventriculi* of Goodsir is found in the scum which rises on the surface. This growth assumes the form of oblong plates, divided by desiccations into four secondary, sixteen tertiary, and sixty-four elementary rectangular cells, which measure from  $\frac{1}{800}$  to  $\frac{1}{1000}$  of an inch along each of their sides, and from this arrangement it received the name of *sarcina* or woolpack, given to it by its discoverer.<sup>4</sup> Its appearance is, however, by no means diagnostic of pyloric obstruction, as it is found in other diseases of the stomach, and has also been observed in other tissues and fluids of the body; and it is a question whether, though formed during the fermentative process, it is really capable of setting up this action.<sup>5</sup>

Independently of food, other matters vomited are sometimes of value in the indications which they afford of disease of the stomach. Thus mucus is almost invariably an evidence of

<sup>1</sup> Frerichs, in Wagner's Handwörterbuch der Physiologie, art. "Verdauung," p. 804.

<sup>2</sup> Ibid.

<sup>3</sup> Graham, quoted by Jenner, *Med. Times and Gaz.* Aug. 1851, p. 192; also Schulzen, *Arch. Anat. Phys.* 1864, pp. 491—498.

<sup>4</sup> *Ed. Med. Surg. Journ.* vol. lvii.

<sup>5</sup> Kühne, *Lehrbuch der Phy. Chemie*, p. 59, says that he has kept *sarcinæ* with vomited matters, and also with solutions of sugar, for days, without the slightest development of gases ensuing.

catarrhal conditions ; while with respect to other fluids, whether acid or alkaline, the chief conditions under which they are secreted have been already alluded to under the heads of Pain and Acidity.

Bile commonly appears whenever the straining is long and violent ; it is not therefore indicative of any special disease, though its presence in the stomach serves at all times to retard the digestive process.

Pus, as such, is not formed in the stomach, except in those rarer instances where suppuration takes place in the submucous coat ; and its presence in vomited matters is therefore indicative of its having been formed in the œsophagus, or that it has entered the stomach from some external source.<sup>1</sup>

Vomiting of foreign products, as worms or echinococci, are among the rarities of medical literature ; in the case of the latter their appearance would most probably be indicative of a communication having been established between the cavity of the stomach and an echinococcus cyst in the liver.

It is believed by some practitioners that cancer cells can be distinguished among the products of vomiting when the disease affects the stomach. I know of no authentic instance where such an observation has been made of an indubitable kind ; while the improbability that any portion of a cancer would be separated in a condition in which its cells would still present their distinctive characters, coupled with the fallacies presented by the appearances of swollen epithelial cells, from the stomach and mouth, or from the pharyngeal, or œsophageal surfaces, should cause such evidence to be received only with the greatest care and caution.

Dr. Quain and Mr. Beardsley have, however, recorded a case where a polypoid growth similar to those ordinarily found in the stomach was ejected entire,<sup>2</sup> but the pedunculated character of these formations would allow of their separation with much greater ease than in the case of cancers, portions of which are ordinarily only removed by sloughing processes which destroy the characters by which they can be recognised.

<sup>1</sup> See a case of this nature where pus was vomited from a fistulous communication between the œsophagus and pericardium, Dr. Chambers' *Indigestions*, p. 175. The same author says that he has seen this product in matters vomited in cases of cancer of the œsophagus and cardia.

<sup>2</sup> *Trans. Path. Soc.* viii. 219.

Fæcal vomiting can as a rule only occur under conditions either of direct communication of some portion of the intestine (usually the colon) with the stomach, or as the result of obstruction to the passage of the fæces through the intestines; though Bricquet has recorded a case, observed under circumstances when imposition appears to have been impossible, of an hysterical patient who speedily vomited matters introduced into the rectum.<sup>1</sup>

Vomiting of blood, or hæmatemesis, so rarely occurs in the diseases which are the special object of this work, that I shall abstain from a discussion of the very numerous causes from which it may arise. It may, however, be pointed out that in addition to its origin in cancer and ulcer, it may also arise very frequently from some of the diseases of the heart and liver which are frequent causes of congestion and of chronic catarrhal inflammation of the stomach;—cases where the diagnosis from the severer diseases before alluded to can only be made by the absence of their leading symptoms, and the discovery of a cause for the congestion sufficient to explain the phenomenon.

<sup>1</sup> Loc. cit. p. 315.

## CHAPTER III.

### ON THE GENERAL SYMPTOMS AND CAUSES OF DYSPEPSIA.

#### SECTION I.—*Symptoms.*

THE most important of all the departures from the healthy state of the stomach, are those derangements which hinder or pervert the normal performance of its principal physiological function, and to which the general names of *dyspepsia*, *aepsia*, or *indigestion* have been applied, signifying thereby any retardation or perversion of the changes normally undergone by the food in its process of conversion into a state suitable for the nutrition of the organism. The indications of this defect are of very variable kind, and may be reduced to the classification previously given, under which the various symptoms arising from stomach disorders are capable of being included. Many of them which are referable to the stomach and intestinal canal are both objective and subjective in their character; others, again, consist in perversions of the functions of the nervous system; while a third class, which may truly be termed secondary, are the consequences of mal-nutrition in distant parts, arising from depravation or insufficiency in the supply of nutritive material, caused by the imperfect elaboration of the food in the primæ viæ.

Hence, when viewed as a whole, the indigestion of food can only be regarded as a symptom revealed to us by a series of phenomena, some of which are the primary results of the imperfect changes in the alimentary substances, while others again are the more or less remote effects of these. The former, though varying within certain limits, according to the nature of the

food, are common to all forms of indigestion ; but though of great importance as indicating the existence of this state, they are yet only secondary in diagnostic value to those symptoms through which the state of the stomach in which they primarily originate can be distinguished, and on the recognition of which any successful attempt at a pathological classification and consequent diagnosis must depend. The distinction is not indeed always an easy one, since the acids and gases produced by the alterations in the food almost constantly give rise to other secondary disturbances in all the chylopoietic viscera, which in some cases, and especially through the pain which they produce, are liable to be confounded with those originating in morbid states of these organs. Still, however, the separation of these classes is practically so important, that it is desirable as far as possible to maintain it, though it may be difficult to determine in which category any single symptom is to be placed when regarded apart from the whole group with which it is associated.

In such a mode of arrangement the symptoms arising directly from abnormal changes in the food,—such as acidity, flatulence, eructation, distension of the stomach and intestines with gas, borborygmi, and alterations in the fæcal evacuations,—serve as evidences of abnormal fermentative processes, the nature, causes, and effects of which have been already discussed. Those, on the other hand, which may be regarded as more direct signs of disturbance of the stomach (though sometimes only resulting from the former), are weight, uneasiness, sinking, craving, emptiness, or pain of different degrees of intensity, appearing either when the stomach is empty, or at variable periods after the ingestion of food. With them also must be placed affections of the appetite and thirst, either on the side of excess or deficiency or perversion ; and in the same category must be included symptoms arising in parts which are more remote, but yet forming part of the gastro-intestinal canal, as the tongue, mouth, salivary glands, and fauces. Or the condition may only be revealed by symptoms appearing in other organs, the connexion of whose disorders with that of the stomach has been spoken of as being of a secondary nature, and which may be enumerated according to the parts in which they occur, viz. :—

*Disturbances of the nervous system*, indicated by neuralgic pains of the thoracic and abdominal muscles, weakness and weariness, or painful aching in the limbs; by headache, vertigo, perversions of vision, impaired intellectual activity, loss of memory, depression of spirits, anxiety, fear, morosity or irritability of temper; or by the various forms of hypochondriasis, melancholia or hysteria; or, in some instances, by convulsive attacks.

*Alterations in the urinary secretions*, consisting sometimes of excess of watery fluids, or of urea; sometimes of diminution of the total amount, associated with lateritious sediments;—or of variations in its reaction, which sometimes shows an excessive acidity, and at other times is alkaline at the moment of emission, and containing in the latter case an undue amount of phosphates;—or in its contents, which may be abnormal, and exhibit albumen, sugar, cystine, or the salts of oxalic acid.

*Disturbances in the generative organs*, evidenced by perversions of the menstrual function, or by leucorrhœa in the female; or by impotence, priapism, or spermatorrhœa, in the male.

*Alterations in the skin*, manifested sometimes by febrile heat and suppression of perspiration, in other cases by general coldness and chilliness, especially of the extremities, with perspiration on very slight exertion; or by alterations in its colour or texture, which may be earthy or sallow in tint, or dry and coarse; or by various eruptions, among the most frequent of which are erythema, eczema, herpes, acne, impetigo, lichen, and urticaria.

*Alterations in the circulation*, evidenced by frequent palpitation, occurring either spontaneously, or on very slight exertion; by irregular action and intermission in the rhythm of the heart's contractions; and by weakness or excitability of pulse.

*Alterations in the respiration*, as shown by dyspnœa occurring spontaneously, with a sense of load at the chest, or on slight exertion; or by cough, usually dry; or by asthmatic paroxysms.

*Alterations in the general nutrition*, as shown by anæmia; by emaciation, affecting all the tissues, but especially seen in certain parts, as in greyness or loss of the hair, caries of the teeth, retraction of the gums, and incurvation of the nails, which are thin and friable; or by excessive liability to inflammation, from slight causes, of the mucous membranes, and particularly of

the conjunctivæ and throat. To which we may add, in persons predisposed to such affections, a liability to gout or rheumatism, or to renal or pulmonary affections; so that, by very common consent, pulmonary phthisis has been frequently regarded as a consequence of long-continued derangement of the digestion.<sup>1</sup>

These symptoms are very variously grouped, and sometimes occur with great irregularity, and it is important to note that those affecting the stomach may in some cases be far less prominent than others which, though occurring in distant parts, are still valuable evidence of the primary disturbance which exists in the functions of digestion.

And it must further be remarked, that many of them are not referable to the disorder of the stomach alone, but to perversions of the functions of the lower portion of the intestinal canal.

The secondary disturbances in the nervous system belong in an almost equal degree to derangements of the stomach and of the intestines; for, as Beaumont has shown that vertigo was a common effect of irritation of the former, so, on the other hand, clinical experience is constantly demonstrating that this symptom is equally produced from flatulence and other derangements of the functions or condition of the latter. Many also of the moral and emotional disorders, and particularly depression of spirits, irritability of temper, and hypochondriasis, appear often to depend directly on the condition of constipation so frequently present; and though the origin of this is threefold,—resulting from imperfect changes in the food, diminished peristalsis of the muscular coats of the bowels, and from deficiency of secretion from the mucous membrane, the liver, and the pancreas,—it is probably in a great measure to the last-named cause, which must materially affect the composition of the blood, that the nervous phenomena of this class are mainly attributable.<sup>2</sup>

<sup>1</sup> See especially Wilson Philip and Dr. Hughes Bennett. This subject will be more fully dwelt upon hereafter.

<sup>2</sup> This subject has been fully treated of by Dr. Chambers, "Lectures, chiefly Clinical."

SECTION II.—*General Causes of Dyspepsia.*

In considering the general causes of dyspepsia, we must remember that it is not a disease *per se*, but is the sign of any derangement occurring in the relationship between the stomach and intestines and the food presented to them. It must also be borne in mind that this relationship is twofold, and depends not only on a healthy state of these viscera, but also on a proper adaptation of the ingesta both in quantity and kind to the wants of the system, and to the properties and powers of the stomach, and that any aberration in either direction may serve as the starting-point of these derangements. The causes of dyspepsia may therefore be conveniently divided into those which directly depend on unsuitability of the food, and those which affect the physiological functions of the chylopoietic viscera, and particularly of the stomach.

I. DYSPEPSIA FROM UNSUITABILITY OF FOOD (*Dyspepsia ab ingestis*) stands, at least in degree of frequency, in an almost equal rank with that arising from disturbances primarily originating in the stomach, and may depend upon errors in diet, referable either to the quality or to the quantity of the food taken.

1. As regards quality—

(a) Aberrations may occur in regard to the proper proportions of the different kinds of nutritive matter which the food may contain; for the human digestive apparatus is adapted for the elaboration of a mixed diet of animal and vegetable substances, and any undue preponderance of either has been proved by long experience to be injurious not only to the system at large, but also to the stomach. If the diet consists too exclusively of protein substances, the amount necessary to be supplied in order to repair the waste of the hydrocarbons in respiration and in other requirements of the system, is greater than the stomach alone is capable of digesting, except at long intervals, or under peculiar conditions of muscular exertion. On the other hand, an excess of saccharine or amylaceous materials, while stimulating the secretion of the gastric juice, will by their mere presence in the stomach



give rise to an excessive secretion of a free acid,<sup>1</sup> with which they are incapable of combining during the act of digestion, and which therefore will pass with them into the intestinal canal, deranging the functions both of the bile and pancreatic fluid. Moreover, an excess of starchy substances seems positively incapable of being digested; and when thus taken, a large quantity passes unchanged by the fæces,<sup>2</sup> and other portions undergo fermentative changes, and give rise to flatulence, to which persons living on an exclusively vegetable diet are peculiarly liable. Bidder and Schmidt<sup>3</sup> have also shown that an excess of fat taken with the food hinders the secretion of the liver; and the effects of such a diet in which this preponderates are, under ordinary circumstances, injurious in a twofold direction, through preventing the formation of the bile, which has so important an influence in aiding the secondary digestion and absorption of these substances from the intestines.

(β) Though all food, both animal and vegetable, contains a certain amount of indigestible matter, which ultimately passes out of the body by the fæces, and in moderate proportions is probably beneficial in stimulating the peristaltic actions of the intestinal canal; and the necessity for which is shown by the habit of those nations which live chiefly on fatty substances, of mingling them with some solid indigestible ingredients, as sawdust or clay;<sup>4</sup> yet an excess of these, especially as they occur with greatest abundance in vegetable food, is very liable to irritate the stomach, and is a frequent cause of indigestion in the poorer classes.

(γ) The digestibility of various aliments is largely influenced by the manner of preparation. With regard to animal substances, the positive necessity for previous *cooking* is not so evident as in those derived from the vegetable kingdom. If heat be applied too rapidly to the former, the firmness of the coagulation thus produced in the albuminous constituents is positively prejudicial to the digestive process; while, on the other hand, the process of slowly stewing meat, which softens the fibres and diminishes their

<sup>1</sup> Bernard finds that exciting secretion of gastric juice in dogs, without food, exhausts the animal. Lec. Phys. Exp. ii. 420.

<sup>2</sup> Parkes, Pract. Hygiène, p. 153.

<sup>3</sup> Loc. cit. pp. 146—149, 236.

<sup>4</sup> Paris, Treat. on Diet and Reg. p. 131.

cohesion, is a great aid to the action of the gastric juice.<sup>1</sup> It is only necessary in support of this proposition to allude to the influence of cookery upon eggs, which affords a threefold illustration of these principles. It is now generally believed that uncooked albumen<sup>2</sup> is less digestible than that which is slightly coagulated, while the indigestibility of a hard-boiled egg is too well known to require more than a passing allusion. It is, however, on vegetable substances that the influence of cookery is most apparent. The effect of boiling or other moist heat is to cause the starch grains to swell and burst the walls of indigestible cellulose in which they are confined, thus bringing them more easily under the influence of the saliva, which is exerted with greater rapidity and facility in the swollen and softened condition than in their natural state.

( $\delta$ ) Next in order in this category may be mentioned alimentary substances which have undergone changes rendering them unfit for food, either from their irritant action on the alimentary canal, or through their liability to further putrefactive or fermentative changes, or to arrest or pervert the normal process of digestion in the stomach. Among these may be mentioned diseased meat, decomposing sausages, poisonous fish, ergoted bread (which has been known to cause gangrenous spots in the stomach<sup>3</sup>), fungi in bread,<sup>4</sup> and substances introduced in a state of fermentation, as sour bread, sour milk, and imperfectly fermented beer or wine. The use of impure water,<sup>5</sup>—especially

<sup>1</sup> Bernard found that cooked meat is more rapidly digested than raw, and that intestinal digestion is greatly assisted by this process. *Lec. Phys. Exp. Appliqué*, ii. 402, 444.

See also Weber and Budge, "Nonnulla de Digestibilitate Carnis." (*Gryphiæ*, 1858.) Mulder also has shown that fibrin and albumen become by cooking more highly oxidized and more soluble in water. Moleschott's "Diätetik," p. 450, quoted by Chambers, "Indigestions."

<sup>2</sup> Kühne, *Lehrbuch der Phys. Chemie*, i. 46; Meissner, *Zeitsch. Rat. Med.* 3d Ser. viii. 292; Arnold, *Ueber die Verdauung des Thierischen Eiweisses*. *Canstatt's Jahresb.* 1858, i. 38.

<sup>3</sup> Reynaud, *De la Gangrène*, p. 146.

<sup>4</sup> Cause epidemic diarrhoea—Parkes, *Pract. Hygiène*, p. 193.

<sup>5</sup> See Parkes, on *Pract. Hygiène*, pp. 47, 48, for much information on this subject. "It is a well-known fact, that grooms object to giving hard water to horses, on the ground that it makes their coat staring and rough—a result which has been attributed to some derangement of digestion." Water containing more than eight grains of each substance in the gallon, "individually or collectively," appears to be injurious to many persons. Confirmatory evidence will be found in Todd, "Indigestion," *Cyc. Pract. Med.* iii. 627; also in Brinton, "Dis. of Stomach," p. 311.

of such as contains sulphate or carbonate of lime, or chloride of calcium, or magnesian salts in excess, and even in some instances of ferruginous water,—has been observed to prove a cause of dyspepsia, which appears from the symptoms described to have approached the irritative type. The effects of other impurities, as animal and vegetable matter, or the salts of lead, are well known, but appear rather to be exerted on the intestinal canal than on the stomach—which, however, probably in many cases sympathises in the derangement thus produced.

Again, alcohol, in addition to other injurious effects, may, when taken in excess, arrest the action of pepsine, though in ordinary states of dilution it appears incapable of exerting this influence. In the same class must be placed diluents in too great quantity, or ice, or large draughts of cold water taken during meals, which hinder digestion both by lowering the temperature of the stomach and by diluting excessively the gastric juice.<sup>1</sup>

( $\epsilon$ ) Next in order, we must remember that imperfect mastication tends remarkably to retard the digestive act,<sup>2</sup> and that both the protein and starchy elements of food are thus affected: the former by being introduced into the stomach in a form in which they are only slowly and with difficulty subjected to the action of the gastric juice,<sup>3</sup> the latter from the want of the direct effect produced by the saliva, in consequence of which the starch not only acts as a foreign body on the stomach, but tends, when it has arrived there, to undergo fermentative changes. Hence, as will be seen hereafter, insufficient mastication is a very common cause of irritative dyspepsia, and also of acidity and

<sup>1</sup> This only applies to an excess of these fluids. There are some cases of atonic dyspepsia when the enfeebled solvent power of the gastric juice will not bear dilution, and when digestion is promoted by abstinence from fluids during meals; but, in the majority of instances, the habit of drinking whilst taking food is only injurious when the use of fluids is substituted as a diluent for the saliva and buccal secretions, and the food is thus washed down after imperfect mastication and insalivation. Bidder and Schmidt have shown that a certain supply of water favours the secretion of the gastric juice. If fluids are injurious when taken with meals, they should be drunk an hour or two after, since numerous authors (Schwann, "Müller's Archiv," 1836; Meissner, *loc. cit.*; Kühne, *loc. cit.* p. 39) have shown that the absorption of the peptones already formed, and which hinder digestion, is favoured by further dilution.

<sup>2</sup> The influence of mastication in promoting digestion was noticed by Spallanzani, "Exp. sur la Digestion," 1783, p. 243.

<sup>3</sup> The saliva appears to have little or no effect on these substances.

flatulence. In addition to the frequency with which this form of indigestion is met with in those who eat hastily, it must be mentioned that it tends specially to occur at two different epochs of life—firstly, at the period of the second dentition, when, after children have become accustomed to a mixed diet, perfect mastication is prevented (unless great care be exercised), by the partial loss of the first teeth before they are replaced by the permanent set; and secondly, in old age, when a similar cause comes into operation.

Imperfect changes in the amylaceous substances may also result from diseased states of the salivary glands and of the saliva. It may be sufficient briefly to mention here those cases where, through fistula or otherwise, the supply of saliva is necessarily deficient in quantity; but there are other morbid conditions, in which the saliva presents aberrations in quality, which, though the nature of their operation has not been fully elucidated, must, it is believed, exercise an injurious influence on the digestion of the starchy matters of the food. Thus, in some irritative conditions of the gland, when large quantities are expectorated, as occasionally occurs in the salivation attending pregnancy and in some paralytic conditions, and also in the excessive secretion under abnormal stimuli which takes place under the abuse of the habits of smoking and chewing, there is reason to believe, from the similarity of these conditions to those where excessive secretion has been artificially produced, that its quality may be materially changed.<sup>1</sup>

Changes in the chemical reaction of the saliva must also exercise an important influence on the metamorphosis of starchy matters. The buccal mucus frequently tends to acquire an acid reaction, and in such circumstances causes starch rapidly to undergo a series of changes ending in lactic acid. This tendency, which is ordinarily counteracted by the alkaline saliva of the mouth, is, however, liable to ensue when the saliva is acid, a state which has been observed under many different circumstances.<sup>2</sup> It is moreover not improbable that other perversions

<sup>1</sup> See Kühne, *Lehrbuch der Phys. Chem.*, Lief. i. pp. 5, 23.

<sup>2</sup> See Wright, *Lancet*, 1842-3; Lehmann, *Handb. der Phys. Chemie*, p. 252; and Kühne, *loc. cit.* pp. 11, 24. See also Frerichs, art. "Verdauung," *loc. cit.* 761. M. Chomel, "Des Dyspepsies," treats of this acid condition of the saliva as

of the salivary secretion may occur, affecting its action on starch, with which we are as yet unacquainted, but of which some indication may be afforded by the observation that the saliva in some cases of dyspepsia has been found deficient in sulphocyanide of potassium.<sup>1</sup>

Further, though foreign to this branch of the subject, it may be noted that the alkaline saliva is one of the most powerful stimuli for the secretion of the gastric juice, and that a deficiency in its quantity, or perversions of the quality of its reaction, are probably not without considerable influence on the proper secretion of the latter of these fluids.

(ξ) Even when not defective in quality, food may be wanting in substances capable of stimulating the secretion of the saliva and gastric juice. Savoury substances, and especially common salt, have generally had this function attributed to them; and even of the other condiments it must be recollected that habit may render the use of a certain amount necessary, when they have been long and habitually taken with the food.

Climate and other conditions, possibly of race, but more probably connected with the diets of different countries, largely influence the conditions under which a greater or less amount of these substances is hurtful or beneficial. They can be more freely taken by the old than by the young, and in the former they often appear to aid digestion. The use of hot curries and peppers by Europeans in Eastern countries would seem to arise from an attempt to stimulate the appetite and the secretions of the mouth and stomach, which share in the exhaustion produced in the system by the heat of the climate; and a large amount is certainly taken under such circumstances with an impunity which would hardly be enjoyed if these substances were indulged in by an ordinary inhabitant of a more temperate climate. To the natives indeed the addition of condiments to a diet almost exclusively consisting of rice, probably aids its

a distinct form of dyspepsia. The propriety of such a classification may, however, be doubted after the observations of Frerichs, who has shown the frequency of the affection, not only as a concomitant of many and various disorders of the stomach (inflammatory and cancerous), but also of many other local and constitutional diseases (diabetes, encephalitis and pleuritis, acute rheumatism, uterine affections, and arthritis).

<sup>1</sup> Bamberger, *loc. cit.* p. 283.

digestion and prevents flatulence by promoting the flow of saliva. Beaumont and other subsequent authors have, however, shown that, except when taken in great moderation, these substances have ordinarily very little power of aiding stomachal digestion,<sup>1</sup> by which the assimilation of protein matters is mainly effected. The subject in this respect appears still somewhat obscure, but there can be very little doubt that an excess under ordinary circumstances may act injuriously by causing irritation of the stomach, and thus positively lessening the secretion of the gastric juice; and, even when their habitual use has diminished the tendency to this effect, they render the mucous membrane less capable of responding to the stimulus of ordinary food.

(η) Lastly must be mentioned in this category those peculiar idiosyncrasies which are occasionally exhibited by persons whose digestion is otherwise good, but in whom many of the severer symptoms of dyspepsia may be excited by the use of certain even of the ordinary articles of diet: of these shellfish afford perhaps the most common examples, but in others there appears a similar incapability of digesting milk or eggs, cooked butter,<sup>2</sup> or even mutton.<sup>3</sup> The converse, however, is sometimes the case, and in some diseased conditions articles of diet which are ordinarily ranked as indigestible appear to excite less disturbance than those which *à priori* might be deemed of a more suitable character.

2. It might appear almost unnecessary to dwell at any length on the influence of an excess of food beyond the powers of the stomach in causing dyspepsia. Such a perverted relationship involves the very essential condition of failure; and yet it is unfortunately the one which of all others may be said to be the most common, and that not only when the stomach is weakened by disease, and the patient is incapable of accurately estimating his digestive powers, but under circumstances when, in an otherwise healthy subject, the appetite is artificially stimulated by the refinements of cookery. Such abuses have been so constant a theme of moralists and physicians that further comment would appear unnecessary, were it not that in

<sup>1</sup> See the observations on the effects of stimulants under the head of Acidity.

<sup>2</sup> Chomel, *Des Dyspepsies*, p. 8.

<sup>3</sup> Sir T. Watson, *Princ. and Pract. of Physic*, ii. 457.

minor degrees, which would be insufficient to convict of gluttony, the habit is continued in all classes whose means enable them to procure sufficient food, to an extent which impairs the comfort of many a sufferer from what is supposed to be a weak digestion, but which is only weak relatively to the wishes, rather than to the real wants of the patient. The secretion of the gastric juice, at least in a healthy state, seems in some yet unexplained manner to be proportioned to the amount of material required for the repair of the waste of the system, and in the majority of cases food introduced in excess of this acts as a foreign body, and undergoes fermentative or putrefying chemical changes; or in the comparatively few instances where these do not ensue, and the food is digested and assimilated, it gives rise to obesity and other evils, on which it would be beyond our province to dwell.<sup>1</sup>

Irregularity, and especially too small intervals between the periods of meals, involving the taking of food before the preceding supply has been digested and removed from the stomach, is another most frequent, and, when indulged, a necessary source of indigestion. It is well known that the digestive powers of a given amount of the gastric secretion are limited, though the absorption of the peptones already formed, while the pepsine is retained in the stomach<sup>2</sup> by the dialytic action of the mucous membrane, greatly extends the duration of its action. It is nevertheless evident that, if as much food has been taken at one meal as the stomach can digest, the addition of a fresh supply before the former has passed from its cavity, will only delay the changes which the whole has under such circumstances to undergo. Some food has been shown by Busch's observations to pass rapidly into the duodenum; but a period of nearly five hours<sup>3</sup> must elapse before the whole of a full meal has passed through the pylorus, and in addition to this it is most important that a period of rest varying from one to two hours should be allowed to the organ. There are few medical men who are not acquainted with patients who allow a much shorter interval than this

<sup>1</sup> See Dr. Parkes' excellent summary of these conditions in his treatise on "Pract. Hygiène."

<sup>2</sup> See Kühne, *loc. cit.* 39.

<sup>3</sup> Weber and Budge, *loc. cit.*; Kühne, *loc. cit.*

between each of the three principal meals of the day, and the effects of such a system of eating are as injurious as, and practically are identical with, those of excessive eating; though it is often difficult to convince those who indulge in it of the error in their habits.<sup>1</sup> Many delicate people think that it is necessary to eat often to keep up their strength, but fail to recollect that when meals are taken frequently each should be small, and that when meat is eaten three times daily in tolerable quantities, the addition of milk, eggs, wine, and beef-tea in the intervals, destroys the beneficial effects of all. It must be borne in mind also, in estimating the effects of a given diet on the health of a patient, that the amount required varies with the expenditure of the system, and that a sedentary life, whether habitual or suddenly entered upon, necessitates a reduction of the food taken if health is to be maintained. The breach of this rule is often observed, and the ill effects produced on those who, having previously lived an active life, retain their customary habits of eating in periods of enforced or voluntarily idleness, has long been well known. Indeed, in all dyspeptic derangements, it is important for the practitioner to be on his guard against possible errors in diet, and especially against those which, having become a question of habit, and of relative rather than absolute quantity of the food taken, are the more likely to elude both his own and his patient's observation.

Deficiency of food, though often mentioned among the causes of dyspepsia, and unfortunately holding among these but too prominent a place in the poorer classes of society, acts probably only in an indirect manner on the digestive powers by weakening those of the whole system. In these cases the food is also too frequently of innutritious quality, and the sloppy tea and bread which forms so large a proportion of the diet of many of our hospital patients, is a constant source of the flatulent disturbances from which they suffer, and which, under the circumstances in which they are placed, are often very difficult to relieve. The effects of starvation, and the dangers of indiscriminately giving nourishment in these cases, are familiar to all readers of physiological works, and will be referred to under the head of *Atonic Dyspepsia*.

<sup>1</sup> See a case in point by Sir T. Watson, "Princ. and Pract. of Medicine," ii. 450.



II. CAUSES OF INDIGESTION WHICH ARE IMMEDIATELY REFERABLE TO THE STATE OF THE STOMACH, are those which affect either the secretions by which the chemical changes in the food are effected, or the movements by which these changes are assisted, and by which also the partially digested food is conveyed into the duodenum; or the absorption of such materials as when present in excess may hinder the digestive process.

Our information regarding the manner in which the last-named of these factors is affected by any of the pathological conditions with which we are acquainted, is as yet very imperfect. We know that the digestive process is aided by the absorption of peptones:<sup>1</sup> and from the fact that grape-sugar is also largely absorbed from the stomach, it is probable that if, through unhealthy conditions of the mucous membrane, the blood, or the lymphatics, any hindrances to absorption should occur, their unfavourable influence in this respect would be far from immaterial, and in the case of glucose they are probably, though seldom acting singly, the cause of the excessive acidity sometimes observed.

The other agencies in the process may be either abnormally increased or diminished, or perverted; and as with all such changes dyspeptic derangements are known to occur, it might be possible to use this mode of division as a means of distinguishing varieties of the disorder. Such a classification appears, however, less logically applicable than that which it is proposed to adopt, since these alterations will be found to be present in a great variety of diseases of the stomach, and to be common elements both to those in which anatomical alterations are known to be present, and in others where no such changes have as yet been discovered. We shall therefore limit ourselves here to a brief exposition of the causes of these derangements of function, reserving the fuller description of their mode of operation, and also of their effects, for the sections devoted to the special descriptions of the symptoms, and to the discussion of the pathology of these disorders.

The following scheme appears to embrace most of the conditions by which the functions of the stomach may be deranged. It will be noticed, that in many, the disorder thus produced

<sup>1</sup> See *ante*.

does not depend primarily on an affection of this viscus, but is frequently the result of agencies operating through parts of the system which have no immediate relation to the digestive process. The causes of dyspepsia are thus in many cases of a hygienic character,<sup>1</sup> depending on the habits of life of the sufferer from this complaint, or on constitutional conditions resulting from these, and to which our attention must be mainly directed in any attempts for their relief and cure.

### CONDITIONS OF THE STOMACH AFFECTING EITHER SECRETION OR MOVEMENT.

#### I. ORGANIC ALTERATIONS REFERABLE TO ANATOMICAL CHANGES.<sup>2</sup>

- |  |   |                                   |  |
|--|---|-----------------------------------|--|
| A. <i>Local</i> . . .                      | } | Congestive.                       |  |
|  |   | Inflammatory.                     |  |
|  |   | Degenerative and Atrophous.       |  |
|  |   | Ulcers.                           |  |
|  |   | New formations.                   | { Thickenings.<br>Morbid growths.<br>Cicatrices. |
|  |   | Alterations in shape or position. |  |
| B. <i>Due to general states of system.</i> | { | Pyrexial.                         |  |
|  | { | Pregnancy (?).                    |  |

#### II. FUNCTIONAL DERANGEMENTS NOT ASSOCIATED WITH ANATOMICAL CHANGES.

- |                           |   |   |
|---------------------------|---|---|
| A. <i>General</i> . . .   | { | Constitutional states of system, involving impaired vital power, or altered qualities of the blood.                 |
| B. <i>Neuroses</i> . . .  | { | Hysterical. Hypochondriacal. Moral. Emotional. Intellectual. Fatigue. Shock. Sympathy with diseases of other parts. |
| C. <i>Idiosyncrasies.</i> |   |   |

With regard to this arrangement, it must be observed that, in many of the diseases thus enumerated, both the movements as well as the secretions (and also probably the absorptive powers) of the stomach are simultaneously affected. The relative degree in which each of these functions suffers varies, however, in different affections, and therefore for a full comprehension of these effects it will be proper to pass briefly in review the causes of their derangements as they affect each singly.

<sup>1</sup> See some excellent remarks on this subject in a pamphlet by M. Durand Fardel, "De la Dyspepsie," 1854.

This includes such changes as are discoverable by microscopic research.

I. Derangements of the movements of the stomach as a cause of indigestion.

The aids afforded to the digestion by the movements of the stomach are of a twofold nature, acting firstly by maintaining the regular and rhythmical movement of the food in its interior, by which the alimentary matter is brought completely in contact with the gastric secretions ; and secondly, by expelling it into the intestines after it has undergone the proper degree of elaboration. These actions may be perverted by causes which may either (1) produce deficiency of such movements, or (2) may pervert their harmony and rhythmical order, or (3) may abnormally increase the resistance at the pylorus to the exit of the food ; or which, on the other hand, may (4), by exciting too great a peristaltic action, cause the food to pass with undue rapidity into the intestinal portion of the canal. Effects of the first-named class may be produced by atrophy and dilatation of the organ through paralytic conditions, induced either by impaired innervation or by alteration of the nutrition of its muscular fibres. Similar changes, which are in all probability referable to the same immediate causes, result from severe or long-continued inflammatory affections of the peritoneal, and to a less degree of the mucous membrane ; for though the evidences of the latter are usually shown by vomiting, the final result is to cause a suspension or destruction of the contractile powers of the muscular coat.<sup>1</sup>

It is probable also that similar conditions of defective muscular power may occur in cases where no organic alteration can be discovered,<sup>2</sup> but which are characterised by impaired states of the general nutrition, to which more special allusion will be made hereafter.

Irregularities of contraction are produced by adhesions to neighbouring organs ; by the dragging of omental hernias upon the stomach ; by morbid thickenings and growths in its walls ; by deep ulcerations extending into its muscular coats, accompanied with thickening of the surrounding tissue ; and by cicatricial contractions resulting from the cure of such ulcera-

<sup>1</sup> Analogous to the fatty degeneration of the heart often seen in pericarditis.

<sup>2</sup> Chomel, *loc. cit.* p. 48, describes among the causes of dyspepsia, relaxation of the abdominal muscles occurring after pregnancy.

tions. Similar effects are produced by the displacements of the stomach occasioned by tight lacing;<sup>1</sup> or by simple pressure on the organ when distended with food, such as is caused by a stooping position after meals, as in writing, or in many trades, especially in those where the needle is used, or in that of the shoemaker; while the pressure of other organs, or of tumours originating externally to the stomach, upon the pyloric region, or ulcerations, contractions, tumours, or the impaction of foreign bodies occurring at this outlet, will, unless compensated for by an adequate increase in the muscular coats, act as obstructions to the due propulsion of the food.

Excessive contraction of the coats may, on the other hand, hurry the food too quickly from the stomach; and though it has been shown by Bernard,<sup>2</sup> Busch,<sup>3</sup> and Kühne,<sup>4</sup> that some food does within a very short period after its ingestion pass comparatively unaltered into the intestines, yet normally by far the greater portion is digested in the stomach, and the effect of its too speedy exit before it has undergone proper elaboration will be to embarrass the functions of the liver and pancreas. Such undue rapidity of passage may in some instances be produced by reflex contractions excited through minor degrees of inflammatory action of the mucous membrane, which are insufficient to produce the secondary paralytic effects before alluded to. In other cases increased muscular action is due to an abnormally excitable condition of the nerves supplying the viscus, and is sometimes influenced by emotional causes which under such circumstances tend to give rise to an increased peristalsis of the whole canal.

Hypertrophy of the muscular coat may be believed to have a similar effect, though this is seldom an uncomplicated disorder; and our observations with regard to it are, therefore, wanting in exactness.

Under this head must also be mentioned the effects of destruction, by disease, of the pyloric muscular ring, which, when not complicated by the simultaneous obstruction of this

<sup>1</sup> Chomel, *Dyspepsies*, p. 25; Beau, *Gaz. des Hôp.* 1859, p. 390; Dr. King Chambers, *loc. cit.* p. 88.

<sup>2</sup> *Phys. Exp.* ii. 423, 424.

<sup>3</sup> Virchow, *Archiv*, vol. xiv. p. 140.

<sup>4</sup> *Loc. cit.* p. 83.

orifice by morbid growths, results in permitting food to pass unresisted by its normal contraction during the earlier periods of digestion.

Other perverted actions of the muscles produce either pain or vomiting, which, however, are rather results than causes of dyspepsia; and which, therefore, do not require to be further treated of under this head.

II. *Secretions*.—In considering the alterations in the secretions of the stomach which may be the immediate causes of indigestion, it must be remembered that these are of two kinds, and are elaborated by glands having different anatomical characters. The true acid gastric juice, which, as a rule, is only secreted under conditions of physiological stimulation, is furnished by those situated in the fundus and body of the organ, which are lined by a spheroidal epithelium; while that afforded by the glands of the pyloric region, which in the human subject occupy only a relatively small tract of tissue, and whose epithelium is columnar, is alkaline, and presents all the characters of ordinary mucus. It is, moreover, known that the amount of either of these secretions may preponderate considerably over the normal proportions; and that a deficient supply of the peptic fluid is often associated with the formation of an excessive amount of mucus which possesses little or no digestive powers, and which may give rise to fermentative changes in the food.

Diminution in the amount of the gastric juice secreted will, in relation to the ingesta, stand in a parallel condition to the effects produced by excess of the latter in proportion to the digestive fluid. An excessive secretion, on the other hand, will not only exhaust the powers of the patient, and possibly disturb the action of the liver, the pancreas, and the kidneys; but also, owing to the imperfect neutralization of the fluid thus poured out by the food presented to it, may, by imparting to the latter an unduly acid reaction, retard the normal conditions of digestion in the intestines. Finally, alterations of quality involving either a deficiency of pepsine or an excess of acid<sup>1</sup> will produce effects, according to the degree in which either preponderates, corresponding to those which have just been mentioned.

<sup>1</sup> See *Acidity*, note, p. 40.

Of the effects produced on the digestive properties of the gastric juice by its admixture with urea<sup>1</sup> and sugar which occur respectively in albuminuria and diabetes, we have no very accurate knowledge; in the former of these diseases, dyspeptic phenomena and vomiting are often present, but organic changes frequently co-exist with these which will require to be more fully dwelt upon hereafter.

Of the conditions capable of producing indigestion from abnormal conditions of the stomach, those which affect the secretion of gastric juice may be enumerated under the following heads:—

I. CAUSES TENDING TO PRODUCE DEFICIENCY.

- |                       |   |   |
|-----------------------|---|---|
| A. <i>Organic</i> .   | { | <ul style="list-style-type: none"> <li>(1) Inflammatory conditions, which reduce the amount of peptic fluids, but increase the mucus secreted.</li> <li>(2) Congestion.</li> <li>(3) Degeneration and atrophy of the secretory glands.</li> <li>(4) Pyrexial conditions of the system.</li> </ul>                 |
| B. <i>Inorganic</i> . | { | <ul style="list-style-type: none"> <li>(1) General weakness.</li> <li>(2) Disordered blood states.</li> <li>(3) Disorders of liver and pancreas (?).</li> <li>(4) Agencies operating through the nervous system—moral, intellectual, shock, exhaustion, invasion of acute diseases, narcotic remedies.</li> </ul> |

II. CAUSES TENDING TO PRODUCE EXCESSIVE OR PERVERTED SECRETIONS.

- (1) Ulcer and cancer.
- (2) Inorganic agencies operating through the nervous system, chiefly sympathetic, and depending on irritation of other organs, as the mouth, fauces, liver and gall-bladder, kidneys, and uterus.
- (3) Disordered blood states.

The consideration of the manner in which the secretions of the stomach are affected by its organic diseases can only be briefly alluded to here. In relation to these, however, Bamberger's<sup>2</sup> remark is well worthy of attention, that except in cases where ulcerations or the growth of tumours have severely implicated important nerve trunks, a slighter disease affecting a large surface produces more evident derangement of the digestive functions than a more severe affection occupying only a limited area of the organ—a proposition which is especially true of the minor degrees of the inflammatory or catarrhal affections.

<sup>1</sup> See ante, *Acidity*, p. 39.

<sup>2</sup> Loc. cit. p. 140.

Our knowledge of the effects on the gastric juice produced by alterations in the composition of the blood, is very imperfect. Nor have we attained to any greater precision in respect of those resulting from alterations in the liver, spleen, and pancreas, except through the intermediate agency of the secondary congestions which derangements of the circulation in the two former may cause in the mucous membrane of the stomach. The theories of Prout,<sup>1</sup> Schiff,<sup>2</sup> and Corvisart,<sup>3</sup> that the acid secretion from the stomach, and the alkaline secretions of the liver and pancreas, are possibly compensatory for, and "antipolar" to each other, may hereafter throw more light on this subject; but at present our knowledge points rather to the secondary affections of the latter secretions through imperfections in that of the stomach, than to any influence exercised in the converse direction.

The precise manner also in which the secretions of the stomach are affected through the agency of the nervous system, still requires further elucidation. The principal results of the various experiments which have tended to elucidate this problem, have already been quoted under the head of Acidity. In addition to the remarks there made, it appears only necessary to allude further to the influence of shocks to the nervous system,<sup>4</sup> or of emotional influences—such as fear, anxiety, grief, and similar agencies—the effects of which on the digestive process have been long known and described; and the analogy which exists between these derangements and the results of emotion as seen in external parts—coupled with the similarity of the latter to the phenomena induced by paralysis of the sympathetic or spinal nerves—renders the explanation of these functional disturbances, if not complete in all its details, a subject in which some degree of certainty may be at least approximatively attained.

To the same agency also are to be attributed the action of other cerebral influences, and especially of severe mental effort,

<sup>1</sup> Stomach and Urinary Diseases, p. 24.

<sup>2</sup> Wagner's Archiv für Heilk, 1861.

<sup>3</sup> Collection de Mém. sur le Pancreas, p. 189, *et seq.*

<sup>4</sup> Such as bathing after meals, practised by the Romans to procure vomiting; quoted by Chomel, *loc. cit.* p. 24.

the effects of which on the digestive process are much more injurious than those produced by mere muscular exertion; although the latter, when carried to excess, or if indulged in too soon after a meal, has very similar effects in arresting or retarding the digestion. Organic cerebral diseases are also not unfrequently associated with dyspeptic symptoms, which for a time may be sufficiently severe to draw away the attention of the observer from the more important malady.

It is to similar causes affecting the stomach by reflex agency that a large number of the disturbances in the digestion arising from affections of distant parts are probably attributable. Some of the most important of these are, as pointed out by Trousseau,<sup>1</sup> affections of the lower portions of the gastro-intestinal canal. Thus constipation is a frequent cause of dyspepsia; and a sudden impression made on the nerves of the rectum, as by an enema taken when the stomach is full, may immediately arrest the digestive process;<sup>2</sup> and with them may be enumerated the dyspepsia arising from worms in the intestines, which has been erected by some writers into a separate species.<sup>3</sup> In addition to these, many of the conditions enumerated as causes of vomiting, appear *à fortiori* capable of affecting the process of digestion.

<sup>1</sup> Union Médicale, 1857.

<sup>2</sup> Trousseau, *loc. cit.*

<sup>3</sup> Dyspepsie Vermineuse—Beau.



## CHAPTER IV.

### ATONIC DYSPEPSIA.

**A**TONIC dyspepsia, which corresponds to the *dyspepsie apyrétique* or *asthénique* of Broussais, may be defined as a disorder of the digestion, almost invariably chronic<sup>1</sup> in its course, unattended by fever, and rarely, when uncomplicated, by abdominal pain; whose existence is indicated by weight, uneasiness, and languor following the ingestion of food, together with a general depression of the vital powers; and whose causes are, in a great measure, identical with those which induce a general impairment of the nutrition and the powers of the whole body.

**ÆTIOLOGY.**—Among the predisposing causes of atonic dyspepsia, may be mentioned hereditary disposition, by which not only special diseases, but general constitutional conditions, are transmitted from parent to offspring, and the evidence of which, as affecting the stomach, though not resting on absolute numerical data, is so well attested by numerous observers, and, the author may mention, by numerous instances within his own knowledge, as to be, he believes, incontestable.

Age exercises an important influence also in determining this disorder, the diminution of the power of the stomach at

<sup>1</sup> Some writers, and especially the late Dr. J. Todd, describe an acute form of atonic indigestion, in which there is a sudden and total arrest of the digestion, attended with symptoms of irritation of the stomach. It may, indeed, be induced by sudden impressions made on the nervous system during the act of digestion; but unless under these circumstances the contents of the stomach are at once evacuated by vomiting, they prove a further source of irritation, and give rise to a condition of more or less acute inflammatory action, corresponding closely in character to the "Embarras Gastrique" of the French, and which will be more properly treated of among the "Inflammatory States of the Stomach."

advanced periods of life being, in many instances, as apparent as is that of the muscular or nervous system—a fact which it is of great importance to recollect in the hygienic treatment of elderly people. Nor should the relatively limited digestive powers of the opposite extreme, in early infancy, be forgotten, and where, in spite of its great assimilative and formative power, the capacity of the stomach for acting on other than a milk diet is extremely small. Aberrations in diet at this period are, however, more frequently the causes of acuter diseases of the gastro-intestinal canal than of simple failure in the metamorphoses of the food.

Impairment of the functions of the stomach may also be more directly produced by states of the system associated with more or less permanent conditions of depressed vitality, such as are sometimes observed from the effects of hot seasons and relaxing climates, unassociated with any appreciable condition of disease. Still more commonly they are found to result from other causes acting either through the nutritive fluids, or the nervous system, singly or conjointly. In some cases, alterations in the blood may be apparent, as in anæmia and chlorosis; but in others, even when nutrition evidently suffers, these are less evident. Similar effects on the digestion may be due to exhausting discharges, hæmorrhages, leucorrhœa, profuse suppuration, cancer in other organs than the stomach, indulgence in venereal excesses, loss of sleep, sedentary occupations, especially such as are associated with deficiency of light and air, long-continued and depressing moral emotions, and the *ennui* of insufficient occupation, mental or physical.<sup>1</sup>

Simple loss of functional power is also produced by causes immediately affecting the stomach, such as excess of fluids taken at meals, especially when drunk warm, or by the abuse of narcotics, and of tea and coffee, by prolonged fasting,<sup>2</sup> by the undue use of condiments which diminish the readiness with which the

<sup>1</sup> One digests with the legs almost as much as with the stomach.—Chomel, *loc. cit.* p. 58.

<sup>2</sup> The author has known severe and obstinate dyspepsia of the atonic kind induced by the habit of going without food from an early breakfast to a late dinner, and the cause appears explicable by the observations of Bidder and Schmidt, who found that the secretion of gastric juice was markedly diminished after long fasting. *Die Verdauung's-saeftte*, p. 41.

stomach is affected by its ordinary stimuli, by habitual constipation, and by undue exertion after meals.<sup>1</sup>

To these causes must also be added the indigestion which occurs in febrile conditions of the system by whatever cause excited, in which, as shown by Beaumont on Alexis St. Martin, "food taken in this condition of the stomach (see Pathology) remains undigested for twenty-four or forty-eight hours or more."<sup>2</sup>

THE SYMPTOMS of this form of disorder are:—

(a) In the alimentary canal. A sense of weight or uneasiness in the stomach after food, occasioned by the slowness of the digestive process—symptoms which are often protracted for some hours after eating, and are frequently continued up to the next meal. This may afford temporary relief, but is in its turn followed by the same train of discomfort. The weight or uneasiness is in some cases felt behind the sternum, giving rise to a sense of dyspnoea, and at others to a feeling as if some foreign body were present in the oesophagus. It rarely, if ever, amounts to pain, though the condition in some patients, especially in anæmic, chlorotic, or hysterical women, may be accompanied by the complication of intercurrent neuralgia, and in others by an excessive amount of flatulence, giving rise to various degrees of gastrodynia or colic. Tenderness of the abdomen is as a rule entirely absent, and pressure not unfrequently gives relief to such spontaneous pain as may be present, especially when this arises from flatulent distension.

The digestive powers are about equally impaired both for protein and amylaceous substances, but in many cases the former, when in any excess, aggravate this condition, and oily and fatty matters are very prone to disagree, as also do soups and broths.

Further disturbances appear in the form of flatulence and of eructation, both of gas and also of portions of undigested food, which are often rancid and offensive (probably from butyric acid fermentation). They usually occur some hours after eating—differing in this respect from the acidity following imme-

<sup>1</sup> This is not unfrequently a cause of more acute attacks, and will be referred to hereafter.

<sup>2</sup> Experiments and Observations on the Gastric Juice, Combe's edition, p. 29.

diately after the ingestion of food which is observed in some cases of nervous origin, where this symptom is a predominant feature. The flatulence affects the stomach and bowels in about equal degrees of frequency, sometimes appearing in one more than in the other. As a rule, evidences of this condition are more or less apparent throughout the whole intestinal tract: the food having been imperfectly elaborated in the stomach, is unfitted for undergoing its further changes in the lower portion of the canal; and as the functions of this part are generally simultaneously impaired, fermentative changes, accompanied by the production of gas, are continued in the bowels, and by causing distension they further increase the uneasiness and distress felt, and frequently give rise to secondary nervous phenomena in other and distant parts of the system.

Impairment of the appetite, though not invariably observed, is a very common feature of all the more marked forms of this complaint. There is frequently a disrelish for food of all kinds, even when exhaustion is felt for want of it.<sup>1</sup> Sometimes the appetite is capricious and irregular, especially in chlorotic and hysterical women; but this is much less frequent in simple atonic dyspepsia than in those conditions which are characterised by perversions of innervation, or in the slighter forms of chronic inflammatory disorder.

Thirst is generally almost entirely absent, at least to any abnormal degree. In many cases there is a positive dislike for fluids, which not unfrequently (especially when taken with meals, or when nutriment is presented in a fluid form) are found to aggravate the dyspeptic symptoms<sup>2</sup>—a fact easily explicable when we recollect that undue dilution greatly impairs the efficiency of the gastric juice, and that in the condition under consideration this secretion is naturally defective in power. The saliva is said in some cases to be increased (Todd); but this, as far as the author's observation extends, is not the rule in the state now being described.

The tongue is broad, pale, and flabby; pitted at the edges by

<sup>1</sup> A very marked effect of long fasting is familiar to all under the title of having "overstayed the appetite."

<sup>2</sup> "Dyspepsie des Liquides" of Chomel.

the teeth ; sometimes thinly furred, at others, under conditions of irritation, acquiring a thicker covering—when, however, the other leading characteristics are still frequently observed. The inner side of the lips and gums are pale, flabby, and sometimes spongy, the tonsils are sometimes large, and the uvula and throat relaxed, giving to the voice a thickness and huskiness which the patient sometimes attempts to relieve by hawking and spitting. The breath is not unfrequently heavy and offensive, but not nearly to so marked a degree as in some of the irritative forms.

Constipation forms another prominent symptom ; and though primarily resulting from the participation of the secretions and muscular actions of the intestinal canal in the general condition of atony, it aggravates the state of the stomach in the manner before described,<sup>1</sup> and frequently increases the anorexia. The delay of the fæcal matter in the intestines also gives rise to the liberation of gas, which, distending the weakened muscular coat, tends still further to diminish its propulsive powers ; hence various circumscribed swellings frequently appear in the abdomen, giving a mingled tympanitic and dull resonance on percussion, and borborygmi are heard when by pressure or the irregular contraction of the bowels the gas is moved from place to place. These distensions are particularly liable to occur in the course of the colon, especially at its flexures in the right and left hypochondriac regions, where they not unfrequently cause a sense of fulness, tightness, pain, and dragging, which are often, though improperly, referred to the stomach, liver, or spleen. They are also occasionally felt in other parts, especially in the left side, at the insertion of the diaphragm into the ribs, or in the scapular regions.

The evacuations may be sometimes solid, dry, and hard, and often scybalous, or frothy from fermentative action. They are usually paler than natural, and sometimes offensive ; but unless an excess of animal food has been taken, this latter character is not so common as in some forms of inflammatory dyspepsia.

Diarrhœa when irritation supervenes may occasionally alternate with the constipation, which is, however, the most prominent symptom.

<sup>1</sup> See pp. 70, 87.

(b) The circulation is depressed ; the pulse is weak, soft, and easily compressible—slow when the patient is in repose, but easily excited on the slightest exertion. To these conditions, which are common to the constitutional state, from whatever cause arising, and whether complicated with dyspepsia or not, are to be added others more directly associated with disorder of the digestive process. The most common of these is palpitation occurring irregularly and independently of organic disease of the heart, easily induced by slight exertion, but frequently arising spontaneously without previous physical or mental effort. Its appearance in many cases is directly traceable to flatulent distension, but occasionally it occurs without any distinct evidence of this state, though some history can usually be obtained of its presence at other times. Intermission of the cardiac action, though not so common as palpitation, is still not unfrequent under similar conditions.<sup>1</sup>

(c) Dyspnœa is a result not only of the cardiac state last described, but frequently occurs independently of it. The feeling is one of load or oppression in the upper part of the chest, and especially across the middle portions of the sternum, impelling the patients to sigh or draw a deep breath, in order to relieve the sensation, which, however, speedily returns. Cough occasionally is caused by the elongated uvula, but the irritative cough frequently described as caused by disorder of the stomach is not usual in this form of dyspepsia.<sup>2</sup>

(d) Except in cases where indigestion is directly due to a febrile state, the course of this affection is singularly free from pyrexial symptoms ; the skin is soft, flabby, clammy and moist, and the extremities are frequently cold, particularly after meals. The complexion is often pallid, sallow, and muddy.

(e) The nutrition suffers more by an aggravation of the anæmia or atony which may be present, than by any direct emaciation—a symptom which occurs more rapidly in the inflammatory and irritative forms.

(f) The urine, as a rule, is but little affected ; it is usually

<sup>1</sup> It may be noted here that a large number of patients who believe, from the symptoms here described, that they are suffering from disease of the heart, are only subject to this form of dyspeptic derangement.

<sup>2</sup> This cough will be more fully alluded to hereafter.

clear and copious, and contains but little urea, unless some direct causes of enfeeblement of the constitution, producing excessive waste, are present. Under the latter circumstances, the urea may be greatly in excess of the normal amount. If irritation supervenes, other changes may occur in this fluid, which will be again alluded to when these conditions are described.

(g) The nervous system indicates in many ways not only its affection by the general state of the system, but also by the special conditions of indigestion.

Languor and inaptitude for exertion, and a sense of weariness in the limbs, which are most evident after meals, are often the earliest, and sometimes during a long period the only symptoms of the disturbed functions of digestion. These sometimes pass into an almost unconquerable drowsiness after food, which, when yielded to, affords a heavy but unrefreshing sleep. There is frequently an impairment of the intellectual faculties,<sup>1</sup> which, though more marked during the period of digestion, also continues at other times, and which chiefly affects the memory and attention, and the temper is apathetic and timid.

The duration of this condition is very indefinite, depending as it does in a great measure on the persistence of the causes in which it has its origin. If these be removed, and a healthier state of general nutrition be restored, the stomach may in some cases easily regain its tone and functions, but in other instances a marked diminution of the digestive powers may persist long after the original cause of disturbance has been removed.<sup>2</sup>

Sometimes the combination of weakened nutrition and diminished functional power conduce directly to further changes, excited by the irritant action of the undigested food on the mucous membrane, and giving rise to phenomena of a more or less marked inflammatory character. These not only greatly aggravate the original symptoms, but tend materially to prolong the duration of the disorder; the progress of which is frequently

<sup>1</sup> Sir J. Clark lays great stress on this diminution of the intellectual powers. *Climate*, ed. 1830, p. 257.

<sup>2</sup> See a remarkable case of this kind recorded by Andral, of dyspepsia originating in the habit of masturbation. *Clin. Méd.* ii. 193.

varied by acute exacerbations attributable to this cause, and which it is important to remark may also be brought into operation by medicinal stimulants administered without sufficient caution.

PATHOLOGY.—The form of disorder of the digestion now under consideration rarely depends on conditions by which the stomach alone is affected. It is with so much greater frequency associated with general states of the system characterised by the terms ATONY or ASTHENIA, that its pathology, in the majority of instances, only forms a part of that of the constitutional states signified by these names, which, if not in all cases capable of precise logical definition, have nevertheless a tolerably distinct meaning. At present we understand by them a simple impairment of the functional powers of an organ or tissue unattended by appreciable anatomical alterations. In relation to these, however, it requires also to be stated, that as healthy function presupposes and absolutely requires for its performance a healthy condition of nutrition and innervation, so in most of the cases distinguished by simple diminution of power, unattended by other marked derangements of function, both the nutrition in a molecular sense and also the chemical constitution of the tissue are more or less impaired or perverted. In many instances, however, the nature of these finer alterations is at present unknown; and if in some cases the defect in the vital action is referred to disturbances in the innervation, we are only carried back a step further to an inquiry of the same character, concerning the condition of the nervous structures, and where the same as yet unsolved problem confronts us.

We have, therefore, in studying the pathology of atonic disorders, to consider the causes of the diminution of the vital activity of the organs affected, and to inquire into the relations existing between the derangements in their functions, and defects either in their innervation or in the mutual relations between the blood and their tissues. In many instances these defects are only to be represented by expressions in the concrete of those imperfections in healthy nutrition which are capable of producing this state in the body generally, and therefore the *pathology* of such cases is in great measure inseparably allied with their *ætiology*, and also with that of those general morbid



states in which such local affections form only a part of the whole disorder present.

These propositions will (as the author believes) be found specially applicable to the digestive organs, and it therefore appears unnecessary to dwell in detail on the *modus operandi* of the causes indicated in the ætiology as concerned in producing the condition of atonic dyspepsia.

It may further be observed in relation to those operating immediately on the organ, that these also are such as are capable of either impairing its nutrition, or, by acting through the nervous system, of checking or hindering the digestive process—the manner of their action having been already explained as far as our physiological knowledge renders this possible in the section devoted to the consideration of the causes of dyspepsia in general.

There is one cause, however, of this class which requires a passing allusion in this place, viz. congestion of the stomach arising from hindrances to the venous circulation in the liver, heart, and lungs; but as this rarely exists for any length of time without inducing other organic changes, the discussion of its effects will be reserved for a subsequent chapter.

**MORBID ANATOMY.**—Though in a certain number of cases of atony or asthenia the inference of mal-nutrition underlying this state is rather a matter of induction than of positive proof, there is yet a large class where it appears to depend directly on appreciable anatomical alterations of the nature of atrophy or degeneration, the vital phenomena exhibited by which are frequently clinically undistinguishable from those of the former order to which we have alluded. The author has therefore thought it best to collect the whole of these into one group under the title of atonic dyspepsia, as they form a well-marked class, having in common a very similar if not identical ætiology, and being within certain limits amenable to a similar plan of treatment.

In this class may therefore be first mentioned those forms of simple atrophy of the mucous membrane of the stomach, associated with marked thinness and transparency of its walls, which have been mentioned by earlier, and even by some modern writers, with very little reference to their clinical significance,

but which, as has been shown by the researches of Dr. H. Jones, Habershon, Rokitanski, Dr. Fenwick, and the author, are often combined with fatty degeneration and wasting of its tubular structures. These have been found in many instances to have been replaced by a greater or less amount of fibro-nucleated tissue, and this change has been observed by Dr. Handfield Jones, Habershon, and myself<sup>1</sup> to be in many cases associated with distinct loss of power in the digestive functions in life; while Dr. Fenwick has proved that in such cases the digestive powers of the mucous membrane after death are also markedly diminished.<sup>2</sup>

In the slighter forms of atrophy the epithelial cells are only seen to be more transparent and smaller, with wasted nuclei, often presenting mere "shadowy films of granulous substance. Sometimes the epithelium becomes so wasted that it forms a mere lining to the tube instead of filling its cavity."<sup>3</sup> In more marked cases of this kind the epithelium of the tubes has almost entirely disappeared, and the contents of these structures are only represented by granular *débris*, and refracting fat globules. The form of the tubes is in great measure retained, though they may be shrunken, smaller in size than natural, and often irregularly contorted. It is only in extremely advanced cases that they entirely disappear. (See Pl. I. fig. 4.)

Both Drs. H. Jones and Fenwick have shown that these conditions may occur independently of inflammatory action. My own researches have, however, convinced me that such degenerations are produced with great frequency in the stomach, as in other organs, through the destructive effects of this process upon its tissues, and that therefore in many instances simple atony may be regarded as the result of a pre-existent inflammation, though not necessarily indicating its continuance as a cause

<sup>1</sup> In a former paper of purely pathological investigation into this subject, before quoted, I stated that I had not then had the opportunity of tracing the clinical histories of the patients whose stomachs I had examined. Since that period I have, however, been able to trace in several instances the concurrence of anorexia and loss of digestive power with these conditions of degeneration.

<sup>2</sup> In Dr. Fenwick's cases the stomachs so altered showed scarcely any traces of self-digestion, and the mucous membrane, after the addition of hydrochloric acid, when digested with 10 grains of albumen dissolved only  $\frac{6}{10}$  of a grain, whereas 11 grains of albumen digested similarly with a healthy stomach lost 4 grains.

<sup>3</sup> Handfield Jones, *loc. cit.* p. 144.

of the state—a proposition which affords pathological evidence and support to clinical observations on diseases of the stomach, where irritative action has often been known to be followed by long-continued asthenia.

In several of Dr. H. Jones's<sup>1</sup> cases the changes in question were met with at advanced periods of life, and probably belong to the category of senile degenerations. Dr. Fenwick has also pointed out that in the cases of cancer occurring in other organs, in which he observed these alterations in the stomach, analogous degenerations had occurred in other tissues, especially in those of the vascular system, where they are indicative of that tendency to premature decay which is so common an accompaniment of impairment of the nutritive powers.<sup>2</sup>

Closely allied to these conditions of degeneration are those where the digestive power is weakened and sometimes almost completely abolished by inflammatory or febrile conditions of the system, and of which Beaumont's observations on Alexis St. Martin gave such very distinct evidence.<sup>3</sup> We have every reason to believe that the arrest of the secretions of the stomach and intestines, as also of those of the other glandular organs observed in fever, is the result of that impaired condition of nutrition which is the complex expression of diminished supply and rapid destruction characterising these states, and of which we have such distinct evidence in the wasting and softening of the muscular and fatty tissues. Histological investigation also reveals in the stomach changes similar to those discoverable under these circumstances in the heart and voluntary muscles. The epithelial cells are granular and disintegrate easily, evidencing a tendency to an unduly rapid retrograde metamorphosis, by which their functions are impaired or diminished. The condition is, indeed, one which it is not always easy to distinguish from the earlier or minor degrees of recent inflammatory change; but there can

<sup>1</sup> See especially pp. 96, 107, 113, 126.

<sup>2</sup> Dr. Fenwick's observations were chiefly made upon patients dying of cancerous disease of the breast. As catarrhal conditions of the stomach are very common in cancerous disease, even when this organ is not affected by the growth (see Lebert, *Traité des Malad. Canc.* 115), the degenerations found by this author may possibly have been the result of past inflammatory conditions.

<sup>3</sup> See also Bernard's confirmation of this evidence, *Arch. Gen. Suppl.* 1846, pp. 8 and 204.

be very little doubt that molecular softening and granular disintegration may occur, independently of this process. Tissues, thus weakened in their nutrition, are however liable to undergo, from the slightest causes, acuter destructive processes associated with vascular disturbance, to which the author believes that the name of "Inflammation" may still, in the present state of our knowledge, be applied; and therefore, while some of the forms of the so-called dyspepsia febrilis belong to simple atony from arrested nutrition, another, and a very large class, to which allusion will be made hereafter, require to be classed under those having an inflammatory origin.<sup>1</sup>

THE PROGNOSIS of atonic dyspepsia varies with its ætiology. Cases where the disorder is of purely functional origin, and induced by causes acting directly on the stomach, are usually amenable to treatment. When, however, it is only a part of a more general condition, the restoration of the powers of the stomach must depend on the possibility of improving the health of the patient, and of removing the conditions which have induced this disease.

Cases also where there is any suspicion of degenerative changes in the glands, as in obstinate atonic senile dyspepsia, or where symptoms of indigestion persist after long-continued evidences of inflammatory or catarrhal conditions of the mucous membrane, have necessarily much more unfavourable aspects than those where the state is one of mere functional inactivity.

When connected with or arising from anæmia, the result of organic disease in other organs, atonic dyspepsia, though seldom immediately fatal, not unfrequently proves a most serious complication of the original disorder, tending further, with a rapidity proportioned to its severity, to impair the strength and the

<sup>1</sup> Beaumont's description is so graphic, and possesses the so infinitely great advantage of being drawn from life instead of from more dubious *post-mortem* changes, that it appears well that it should be again quoted *in extenso*, especially as it affords convincing proof that two distinct conditions of the stomach may exist under these circumstances—the one irritative, the other atonic:—

"In febrile diathesis, or predisposition from whatever cause, . . . the villous coat becomes sometimes red and dry, at other times pale and moist, and loses its smooth and healthy appearance, the secretions become vitiated, greatly diminished or entirely suppressed, the mucous coat scarcely perceptible, the follicles flat and flaccid, with secretions insufficient to protect the vascular and nervous papillæ from irritation."—*Loc. cit.* p. 98.

general nutrition of the patient. When uncomplicated it rarely appears to act directly as a cause of secondary diseases, but it seldom continues long without passing into some of the irritative forms, and the effect of these is not only to maintain, but also to aggravate the original condition. The injury therefore which it causes to the general nutrition may predispose to disease of other organs, as the lungs, brain, heart, or kidneys, according to the several liabilities of each of these as a *locus minoris resistentiæ* to other injurious influences which may come into operation. I confess, however, that I am indisposed to entertain the opinion that simple functional impairment of the powers of the stomach has any tendency directly to induce the more serious organic diseases of this viscus, such as ulcer and cancer.<sup>1</sup> The liability of patients in this condition to suffer from minor, or in some cases from severe degrees of inflammatory action, has been largely insisted on; but cases where cancerous affections have supervened after a continuance of functional derangement are comparatively very uncommon, and appear to require for their development the proclivity conferred by constitutional predisposition, or some of the other exciting causes of this disease, with which we are as yet unacquainted. Nor is it improbable that the dyspepsia which sometimes precedes for a long period the more marked signs resulting from the enlargement or ulceration of the tumour, may have been due to the effects produced by the earlier stages of its growth in the sub-mucous tissue, either through its mechanical interference with the movements of the stomach, or through its effects on the secretions, by the implication of the muscular coats, or of the nerves supplying the mucous membrane.

THE TREATMENT of this form of dyspepsia is comprehended under the title of Tonic, and implies the use of all such agencies as are capable of increasing functional power by restoring the conditions of healthy nutrition; the indications for which are to be fulfilled by measures adapted—

1. To improve the quality of the blood, and to regulate its transmission, by means of suitable diet, by medicinal agents capable of altering its composition when this is defective, and by re-establishing the digestive and nervous powers.

<sup>1</sup> This opinion has been expressed by M. Beau.

2. To enable the system to appropriate and act upon the nutriment conveyed to the tissues, through methods calculated to favour healthy metamorphosis and the elimination of effete products. Our object is thus simultaneously to increase the vigour of the system and also of the stomach—since it must be remembered that, while the due performance of the functions of the latter is essential to the nutrition of the body, yet, on the other hand, that a permanent increase in the powers of any single part cannot take place without a healthy condition of the whole system.

The treatment directed to these objects may be conveniently divided into regiminal and dietetic, and medicinal.

(a) Regiminal and dietetic.

As regards diet, the primary necessity is to avoid taking more food than can be digested by the stomach or absorbed by it and the bowels. Hence in cases when the digestive function is in almost complete abeyance, as in febrile conditions, the utmost caution is requisite to avoid the aggravation of the already existing weakness, or setting up irritation by overloading the stomach; and in the pyrexia accompanying local inflammations of moderate intensity or short duration in otherwise healthy subjects, limitations of the ordinary diet may be insisted on with advantage to the patient.

In severer affections, or in the continued fevers, when it is absolutely necessary to support the strength of the patient, nutritious food of an easily assimilable kind must be given in very small quantities and at short intervals. Milk holds a high place in this class; and in cases where, from its amount of casein, cow's milk is digested with difficulty, it may be replaced with advantage by that of the ass. Next to milk may be ranked the more soluble parts and the extractives of meat, as beef-tea made by Liebig's process,<sup>1</sup> or the more recently introduced *Extractum Carnis* of that distinguished chemist. Nor, in spite of some prejudice on chemical grounds against the gelatinous tissues, can we exclude them from a place of some importance in the diet of this class of affections, since recent observations tend to show that they may at least prevent the destruction of some of the higher tissues;<sup>2</sup> while,

<sup>1</sup> This may often be advantageously thickened by the flour of meat, recently introduced by Dr. Hassall.

<sup>2</sup> Parkes on the Urine. p. 65.

owing to the facility with which they are digested and absorbed, they require but little elaborative powers on the part of the stomach. Starchy foods are objectionable in febrile cases, for, owing to the secretion of the saliva being greatly diminished by the pyrexia, the starch passes unchanged into the stomach, and thus is not only useless for purposes of nutrition, but also tends to undergo the acetous or lactic fermentations, or it sets up further irritation in the course of the intestinal canal, or, as is frequently the case, is evacuated unchanged in the *fæces*.<sup>1</sup> Solid food is also as a rule to be strictly avoided, as the prostration of the patient will be greatly aggravated by any indigestion arising from its use. It is in these cases also that alcohol plays such an important part, some share in which may with great probability be attributed both to its influence on the nervous system, and also to its effects in retarding the metamorphosis of the tissues, and thus diminishing the necessity for the supply of nutriment to replace the waste.

A similar plan, but less strictly followed, is to be pursued in cases of atonic dyspepsia arising from exhaustion. The absolute necessity of giving small meals to persons in a state of starvation has long been familiarly known, and serves as a type for the treatment of the whole of this class. In those whose features are extremely marked, the diet should approximate to that laid down for the treatment of febrile indigestion, and food should be given in the same form and with a frequency proportioned to the smallness of the amount which can be tolerated at once. In some cases of exhaustion after hæmorrhage, it may be necessary to give food every half-hour; but the amount thus administered should not exceed one, or at most two, tablespoonfuls of strong beef-tea or milk at each time, and it may be necessary to limit the amount to dessert or even teaspoonfuls, given every quarter of an hour. Brandy may be simultaneously administered, in doses varying from one to four drachms. The amount of food is to be increased with the strength of the patient, the intervals between the meals being also lengthened until solid food can be digested; but when this is taken, the quantity should at first be small, and an interval of three hours should then intervene between the meals, though stimulants

<sup>1</sup> Dr. King Chambers, "Lectures, chiefly Clinical," p. 542.

may occasionally, where there is great weakness, be taken at intermediate periods. It is, however, usually more desirable, under these circumstances, to give solid food only at intervals of from four to five hours, with some milk and wine, jelly and wine, or egg and brandy, between the meals.

For the less severe but more frequent forms which are of such constant occurrence in daily life, in the dyspepsias of the sedentary, or of those harassed by mental strain or anxiety, the same care is necessary with regard to the amount of food; but as each case usually presents individual peculiarities, it is scarcely possible to do more than shortly to sketch the general outlines of the plan to be pursued.

The diet should be nutritious in quality and easy of digestion. Animal food should be always fresh, neither preserved by salting nor by any other process, nor should it be eaten twice cooked. As regards the kind selected, it is found that mutton usually agrees the best for a continuance, but it may be occasionally varied by beef and game. Pork and veal, it is hardly necessary to state, are to be excluded; but some of the more gelatinous preparations, such as calves' feet or tripe well boiled, may be permitted. Chickens are more often the subject of idiosyncrasies than almost any other form of animal food; they generally, however, suit best when boiled.

Though soup, when properly prepared, is both nutritious and easily assimilable, and with some patients adds to the enjoyment of the dinner, its use at meals when other food is taken is to be restricted, as it often tends to cause flatulence,—a consequence still more likely to follow when onions are employed in its preparation.

It is of considerable importance that the diet should be varied within moderate limits, and hence fish may be occasionally allowed, though it is less nutritious and also less digestible<sup>1</sup> than other forms of animal food. Those which agree the best are boiled sole, whiting, trout, and haddock. Cod and salmon are less digestible. Oysters agree well with some persons, but this is by no means universally the case; and there are considerable differences in this respect in relation also to the form of their preparation.

There should, however, be a sufficient admixture with this

<sup>1</sup> Chambers, *loc. cit.* p. 69.



diet of saccharine and amylaceous foods. Sugar in excess should be avoided; but a certain quantity taken with other food is advisable, not only on account of its alimentary properties, but for its effects in stimulating the secretion of the gastric juice.<sup>1</sup> There is often some difficulty in the choice of vegetables, as these frequently prove the source of much flatulence. One essential feature to be attended to is that they should be young, fresh, and tender, and well boiled; and none should be taken in an uncooked state. Flatulence most commonly results from the whole class of the cruciferæ, of which spinach and young brocoli generally agree the best, and can sometimes be taken with impunity when cauliflowers disagree;<sup>2</sup> but I am not so disposed as some writers to exclude absolutely young peas and French beans, provided that the above precautions are attended to—though it is only when *very* young and tender and thoroughly well boiled that they can be permitted. Some French authors<sup>3</sup> consider that they agree better as *à purée*, or *au jus*, than *au naturel*. Turnips and parsnips are to be forbidden; but asparagus, beet-root, and young tender carrots may be admitted in small quantities.

Potatoes should be well boiled and mealy. I have frequently noticed that when mashed they agree less than when not thus prepared, and I believe that the reason depends on their being swallowed in this state after insufficient insalivation. If the teeth are defective, mashing may be permitted, but except at the period of the second dentition such an excuse is unnecessary, and a recourse to the mechanical appliances of the dentist is often an essential adjuvant to the treatment of many cases of atonic dyspepsia. In fact, sufficient mastication of all the food is a point that cannot be too strongly insisted on in the treatment of all forms of dyspepsia; and the necessity for this, especially in relation to starchy foods, has been already pointed out in the chapter on its causes.

There are, however, especially two conditions in which potatoes often disagree—one is at the close of the winter season,

<sup>1</sup> Blondlot, *loc. cit.* p. 223.

<sup>2</sup> Dr. Todd says that the ancients considered the cabbage tribe were rendered more digestible by boiling in two waters.

<sup>3</sup> See Guipon, *loc. cit.* p. 29.

when the starch in them has frequently undergone a saccharine change, rendering them liable to fermentation in the stomach; and the other is when they are young, solid, and waxy, and when perfect comminution in the mouth is therefore a matter of considerable difficulty. Under these circumstances, they should be as far as possible replaced by plain boiled rice, by maccaroni, or by bread. As regards the last-named article of diet, the use of the aërated bread may often be resorted to with advantage. There appears to be some part of the process in trade-baking which renders bread much less digestible than it should naturally be. Baker's bread can seldom be eaten either with comfort or advantage in a stale condition, in which either the aërated bread or good home-baked bread is generally very digestible. If bread in any form disagrees, toast or biscuit should be eaten at the principal meals in which it is employed.

Light farinaceous puddings are, in almost all cases, admissible and suit well. Milk may form with advantage a considerable ingredient in their manufacture, but heavy doughy puddings are especially to be avoided; and nearly all pastry is to be placed in the same category, though the lighter forms, known as *échaudé*, are spoken of favourably by some French writers.

Fresh uncooked butter may be used in moderation, but as little fat as possible in any shape should enter into the preparation of cooked dishes, especially in those which are fried; and fat meats, as bacon and pork, are also to be avoided.

Fruits require a certain amount of caution, and I have observed in several cases that even cooked apples and pears, which are often mentioned among the *permissa*, have been followed by severe dyspeptic symptoms and by alkalinity of the urine. Of fresh fruits, grapes, strawberries, and the juice of oranges agree the best; and a small amount of strawberry preserve or stewed prunes often suit well when eaten with farinaceous puddings. Gooseberries, currants, raisins, and even raspberries, are less desirable. Ripe peaches agree better than nectarines, apricots, or plums, though the larger and softer kind of the latter when stewed often prove digestible, and, like prunes, assist in maintaining the action of the bowels.

It is scarcely necessary to give a list of the *evitanda*, many

of which—as shell-fish and the crustacea, nuts of all kinds, chestnuts, pickles, onions, cheese, or highly-seasoned dishes—are but too well known for their indigestible qualities.

And with regard to the whole of the above list of articles permitted, it has only to be observed that, when acidity or flatulence is distinctly noticed to follow any special class, its employment should be restricted without, as far as possible, completely interdicting its use. This is particularly true of the saccharine and amylaceous forms of food, which as a rule tend to give rise to these symptoms, although they can often be greatly mitigated or avoided by simple limitation in quantity of the substances from which they result.

In the majority of cases the discomfort experienced is, however, to a greater degree than is generally believed by the public, the result of excesses, not only at single meals, but at all the meals collectively; and though the desirability of varying the diet, as has been sketched out, cannot be too strongly insisted upon, the necessity in meals consisting of several courses, of limiting the quantity of each taken requires much care on the part of the medical adviser.

Three moderate meals in the day are usually sufficient for patients of the class under consideration. If a fourth meal is permitted it should be a light one of gruel, or, when this is liable to turn acid, of beef-tea, or egg and wine, at night, in order to obviate any risk of exhaustion and consequent sleeplessness which is sometimes experienced on retiring to rest with the stomach empty. The proverb "*Qui dort dine*" may often, however, be remembered with advantage, and the repose of the stomach during sleep is often of considerable benefit in aiding its functions during the day.

The intervals between the meals should be sufficiently long to allow of the complete digestion of the food taken, and also to permit the stomach a certain period of rest before it is called upon for renewed exertion; while, on the other hand, too long periods of fasting should be carefully avoided. Experience has shown that the best hours as adapted to the habits of modern society are, for breakfast from eight to nine; a luncheon between one and two; and dinner between six and seven P.M. For the class of patients now under consideration these meals should

be pretty equally proportioned; and unless the principal meal is made in the middle of the day—a plan often best suited to elderly people—it should in all cases be a moderate one.<sup>1</sup>

Much fluid should be avoided at meals, though digestion is promoted, and the absorption of peptones favoured, by water taken at a later period of the digestive process.

Coffee in many cases of simple atonic dyspepsia appears to agree better than tea, though the reverse is the case when any symptoms of irritation exist, under which circumstances it may be better to exclude both these beverages, and to substitute chocolate, cocoa made from the nibs, or a little light wine, as claret or hock, with Seltzer water, which may be taken with advantage even at breakfast.

The digestion in most of these cases is also directly favoured by the use of wine, and experience in this respect is supported by physiological experiment, as Bernard has shown that alcohol<sup>2</sup> is among the most effective stimulants of the secretion of the gastric juice. With regard to the form selected, it may be stated that hock, claret, or dry sherry diluted with water, or small quantities of brandy and water, are usually best adapted for these conditions, but a considerable diversity exists in this respect, and some patients are more benefited by port or a generous Burgundy, and in others champagne agrees particularly well. The quantity taken at one time should however be moderate, and should rarely exceed one, or at the most two glasses with lunch and dinner. Tea in the evening is usually to be avoided, and a glass of water or of Seltzer water is much more beneficial. In very weakly habits a small quantity of milk or cream with brandy or rum may often be taken with advantage before rising in the morning, and will be found to obviate the exhaustion from

<sup>1</sup> A certain latitude is, however, necessary in respect to the distribution of the meals. When the morning is occupied with sedentary occupations, and when the lunch is immediately followed by much physical or mental effort, without an intervening period of repose, it should as a rule be light, and the principal meal should then be taken when the labours of the day are ended, and when a longer rest can be permitted during the digestive process. Still, a sufficient quantity should be taken in the middle of the day to prevent the risk of exhaustion before dinner. Ladies frequently suffer from the habit of eating too large a luncheon.

<sup>2</sup> Lec. Phys. Exp. ii. 420.

dressing, which frequently renders such patients unable to eat a sufficient breakfast.

The circumstances under which condiments may be given have been already alluded to. In persons accustomed to their use and in elderly people, they sometimes are necessary as an addition to the food. In other cases they are not to be recommended, except in great moderation, as a means of improving digestion; for, as will be stated in the remarks on medicinal treatment, this cannot be permanently accomplished by stimulants of this class applied to the mucous membrane, and the danger from consequent irritation appears in the majority of cases to be greater than the possible benefits which can result from their use.

The *general regimen* must also be tonic, including under this head sufficient rest<sup>1</sup> both at night and also after meals; the avoidance of hot, ill-ventilated apartments, both in the day and at night; and the spending as much time as possible, consistently with the avoidance of undue fatigue, in the open air. Travelling, especially in open carriages, yachting, or sea-voyages, frequently prove highly beneficial in cases marked by much weakness, while for those of less severity horse exercise<sup>2</sup> is as a rule more advantageous than mere walking. Exercise, especially in the open air, pushed to a degree short of producing exhaustion, has probably a greater influence in increasing the digestive powers of the stomach than any other single measure: hence for those who of necessity lead sedentary lives in large cities the use of gymnasia often proves of great service by bringing into play a larger proportion of the muscular system than is exerted in mere walking. It must, however, be remembered that exhaustion is to be most carefully avoided, and that after any

<sup>1</sup> The importance of perfect rest is shown by a case of Andral's (Clin. Méd. ii. 191), when a condition of atony supervening upon irritative dyspepsia was only finally cured by retaining the patient for more than two months in bed.

<sup>2</sup> "At vero nihil ex omnibus quæ mihi hæcenus innotuere, adeo impense sanguinem spiritusque fovet firmatque, ac diù multumque singulis fere diebus equo vehi. Cum enim in hac gymnasticæ specie impetus firme omnis in ventrem inferiorum fiat, in quo vasa excretoria . . . sita sint; quæ tanta functionem perversio aliave organorum naturalis impotentia vel fingi potest, cui tot succussionum millia eodem die ingeminata, idque sub dio, opem non attulerint? . . . . Quid quod sanguis perpetuo hoc motu indesinentur exagitatus ac permistus quasi renovatur ac vigescit?"—Sydenham, Opera, p. 390, Syd. Soc. Ed.

active exercise a sufficient amount of time should be allowed to elapse to allow the body to cool and the nervous system to repose before food is taken.<sup>1</sup>

The influence of the intellectual and moral functions on the digestive powers is so marked that it cannot escape notice in this place; and though in patients harassed by care or anxiety the removal of the cause may lie beyond the power of the physician, it should always be recommended to them, as well as to those engaged in absorbing intellectual pursuits, to take their meals in cheerful society. In many such cases, however, a cure is unattainable, except by a complete change of thought and scene.

The effects of cold bathing will, as a rule, be beneficial or not according to the powers of reaction of the patient. It is decidedly injurious when this is not speedy and complete and lasting, and even in some of the latter class the exhaustion following the bath more than compensates for the temporary pleasure derived from its use. A healthy state of the skin being however a great object, a tepid bath taken daily, together with the use of the hair-glove or flesh-brush, should be strongly recommended. A residence even temporarily in a dry and bracing climate is frequently of the highest value. The air of Brighton often proves of great service where there is no irritability of the mucous membrane; and next in order may be placed Scarborough, Dover, Folkestone, Margate, Eastbourne, Malvern, Tunbridge Wells, and the Surrey Downs; Ilfracombe, on the western coast, also possesses many advantages. A high situation, on a gravelly or chalk soil, is that which in general is best suited to patients of this class.

As a prelude to all discussion of the effects of medicinal treatment for this disorder, it is not unimportant to state that, although often proving of great value as adjuvants of the general hygienic measures which have now been indicated, the employment of drugs independently of these is of comparatively little service. Even under any circumstances, no little caution is necessary in the selection, doses, and mode of administration of medicinal agents, in order to avoid the causation under their influence of irritative conditions, which are peculiarly liable to supervene in tissues whose vitality and power of resisting ex-

<sup>1</sup> If exhaustion is felt after exercise, it is often advantageous to take a small quantity of an alcoholic stimulant a short time before the food.

ternal impressions is already below the healthy standard. This is particularly true of those forms of atony resulting from organic degenerations, and especially in such as may remain as *sequelæ* of inflammatory processes, to which further allusion will be made when these are treated of. It is also not unimportant to recall to the reader's attention the remark previously made, that although the dyspepsia associated with the atonic condition of the system frequently forms one of the most marked symptoms of this state, yet that it is not in the majority of cases the primary disorder, and that the cure of the latter and the removal of its causes form an essential preliminary of all treatment; standing in point of importance before any therapeutic measures which can be directed exclusively towards the relief of the symptoms presented by the stomach.

The objects to be fulfilled by therapeutic measures may be conveniently summarized under the following heads:—

Tonics to permanently increase the powers of the organ and of the system generally.

Stimulants or stomachics to increase the secretory powers of the stomach, and which, by thus accelerating the digestive process, act indirectly as tonics, by favouring the assimilation of nutritive materials.

(3) Adjuvants to supply materials in which the gastric juice may be presumed to be deficient.

(4) Certain remedies for special symptoms or conditions, which may not only hinder the digestive process, but interfere with the comfort of the patient.

Among the tonic remedies suited to many of the conditions under which this form of dyspepsia arises, iron holds a prominent place. It is particularly indicated when evidences of anæmia are present, and indeed when these are observable it is seldom that a permanent cure can be attained without its administration. In cases however of functional debility, when this condition is less marked, the value of iron proportionately diminishes, and it is of less comparative efficacy in cases occurring in the male sex, and when the dyspepsia is the result of insufficient exercise, or of mental overwork or anxiety.

As regards the method of administration, it is usually advisable to select the more neutral preparations, as the ammonio-

citrate, the potassio-tartrate, or the ferrum redactum, as these are more easily tolerated, and can be taken for a longer period than the perchloride. This salt may, however, sometimes be used with advantage when there is great relaxation of the tissues, indicated by a pale and broad, but clean, and deeply-indented tongue, flabby lips and gums, and a tendency to perspire on slight exertion. Both it and also the sulphate should be taken immediately after meals, whereas the others are best given when the stomach is comparatively empty, or even shortly before meals, as their neutral or alkaline reaction usually excites a sufficient flow of gastric juice to effect their solution.<sup>1</sup>

The doses should not be larger than from fifteen to twenty minims of the tincture of the perchloride, while of the ammonio-citrate and potassio-tartrate five grains, and of the ferrum redactum two grains, may be given twice daily.

It is rarely that one or other of the above-named preparations is found to disagree, but in a few instances cases occur in which it is desirable to try others. Among these the granulated effervescing citrate, or the syrup of the phosphate, or Parish's acid syrup of the phosphates of iron and lime (the latter of which is peculiarly suited to children), may be resorted to with advantage; and I have occasionally known these to be tolerated when other preparations have been ill borne.

In other instances the natural mineral waters of Tunbridge Wells, of Spa in Belgium, or of Homburg, Kissengen, or Schwalbach, prove of greater efficiency than any pharmaceutical preparations, though it is probable that a part of the benefit in these cases is attributable to the adaptation of the climate of these places to the wants of the system, as well as to the advantages resulting from change of scene and of the mode of living which those experience who visit these places from distant parts.

The effects of iron in relieving the gastrodynia which frequently complicates these affections, will be more fully treated of hereafter.

It should be mentioned as a caution, that in conditions of gastric irritability iron is usually tolerated with difficulty; and that some preliminary treatment is often necessary before even

<sup>1</sup> Bernard, *Liq. de l'Org.* ii. 404.



in atonic dyspepsia its administration can be pursued with advantage. It may often be advantageously combined with mild aperients, of which the aloetic class are generally the best, and particularly in the case of chlorotic females, whose menstruation is scanty or infrequent.

As regards the other so-called tonics, the indiscriminate application of this term to the whole class of vegetable bitters seems of somewhat dubious utility, since few of them can be proved to possess any special action of this character. The influence of the majority of these substances appears to be rather referable to their direct stimulant effects on the mucous membranes than to any properties possessed by them of permanently augmenting either the secretion of the gastric juice or the contractility of the muscular fibres, though it is possible that they may in some degree increase peristalsis through reflex contraction excited by their stimulant effect on the mucous membrane.

Buchheim and Engel's researches have shown that they create a feeling of hunger which arises in all probability from a special sensation produced in the nerves of the stomach by their stimulant effect. This, however, is only an effect common to them, and to a large number of other remedies of the class of irritants—including arsenic and antimony; and the feeling thus created often leads to food being taken in excess of the digestive powers. It also, as is known of nearly the whole class of the vegetable bitters, is very liable to pass into pain, and to be followed by other signs of abnormal irritation, as nausea and vomiting, when the dose is too large, or the remedies are continued during too long a period, or are administered in unsuitable cases, as in the presence of pre-existing irritation.<sup>1</sup> Further, Buchheim and Engel have shown that these substances check fermentative processes, but that they also tend to retard the digestion of protein matters; and that although their bitter taste causes an increased secretion of saliva, and therefore may in some degree aid in the digestion of amylaceous food, yet that they possess no inherent power in favouring the saccharine transformation of starch.

<sup>1</sup> See on this subject Buchheim's "Arzneimittellehre," p. 42; Shrenk, "De Vi et Effectû quorundum Medicaminum in Digestionem;" Diss. Inaug. Dorpat. 1849; Clarus, "Arzneimittellehre," p. 1041.

Two remedies of this class have, however, a more distinct general, and a more persistent local effect, and therefore appear to deserve a place among the tonics, viz. nux vomica, or its alkaloid strychnia, and quinine. The former of these often proves a most valuable tonic remedy, improving apparently the nervous energy of the stomach, as well as that of the system at large. Thus in many cases, by increasing the muscular contractility of the stomach and intestines, it aids (in addition to the antiseptic effects common to all bitters, but largely possessed by strychnia) in preventing the distension by flatus, which is so common and distressing a symptom in the cases now under consideration.

The most convenient mode of administering it is in the form of the tincture, in doses of five or ten drops, with infusion of orange-peel and syrup; and it may be advantageously combined with the mineral acids, in cases which appear to require the administration of these remedies. Its use in many of the painful neuroses will be further alluded to when they are treated of.

Quinine is a more doubtful remedy in stomach affections, though in some of this class it undoubtedly at times does good service. Its tendency to cause headache, and also to set up nausea and irritation of the stomach, is practically greater than that evinced by almost any remedy of the class of bitters; and it should therefore be carefully avoided in all cases where any signs of the latter condition exist. Still, in cases of convalescence from severe diseases, when there is great nervous prostration, muscular weakness, and anorexia, and when the tongue is clean, but pale, broad, and flabby, and there is little tendency to constipation or to congestive headache, and also in persons of lymphatic constitution with relaxed conditions of the system, this remedy often proves of value. It may be given in pill or powder, in doses of one or two grains, taken daily before meals, or in the form of the Tinct. Cinchonæ Composita, or Battley's Liquor Cinchonæ, both of which preparations often appear to agree better than the pure alkaloid. In other cases, where iron is simultaneously indicated, the Ferri et Quinæ Citras may be resorted to.<sup>1</sup>

<sup>1</sup> Quinine more frequently disagrees when given in solution in conjunction with sulphuric acid: a combination rarely indicated, but which, as it appears to me, is too frequently employed.

The other remedies of the class of bitters appear to rank rather among the stimulants and stomachics than with the tonics as above described. They may therefore be conveniently subdivided into four sub-classes, viz. simple bitters, aromatic bitters, aromatics, and stimulants to the gastric secretion of a more general character.

It is not however unimportant to refer again briefly in this place to the different effects produced by various stimulants in promoting the flow of gastric juice (see Acidity, p. 38), and to point out that the agents possessing the most marked properties of this nature have been shown by the researches of Blondlot, Frerichs, Bernard, and Corvisart, to be alkalies,<sup>1</sup> cold water, diluted alcohol, ether, sugar, absinthe, chicory, ipecacuanha, nitrate of bismuth, and diluted solutions of common salt;<sup>2</sup> and Buchheim and Engel have stated (confirming some of Beaumont's observations on Alexis St. Martin) that this property is only possessed in a much less degree, if at all, by condiments, as pepper, mustard, &c. Our knowledge however on this point cannot be said as yet to be very precise; but the observations above alluded to, point to various therapeutic facts of considerable value in the class of affections now under consideration.

The simple and aromatic bitters have the greatest influence in increasing the appetite, and when this is defective their administration is especially indicated, but with the caution that loss of appetite is not always to be relied on as a diagnostic symptom of atonic dyspepsia, but is common to it and to many other inflammatory diseases of the stomach, in which latter the use of these remedies is prejudicial. The effects of many of these are familiar enough to the profession, and also to the public, especially in the use of infusion of quassia before meals; and chiretta appears to have a very similar action.

Of gentian it should be observed, that though possessing the advantages of a laxative in addition to those of a bitter, its

<sup>1</sup> And in this respect the effects of the alkaline saliva must not be overlooked.

<sup>2</sup> To these Corvisart adds black coffee, the effects of which must appear, however, somewhat doubtful to those who are acquainted with the almost total arrest of digestion which sometimes follows its use. The effect, however, appears to be of an opposite character in different classes of patients, suiting well the lymphatic temperament, but injurious to persons of nervous excitability. See Trousseau et Pidoux, *Traité de Thérap.* ii. 533.

characters as an irritant are more marked, and that additional caution is therefore requisite in its use.

Judging from the researches of Corvisart, it would appear that the aromatic bitters, in addition to their powers of increasing appetite, have a greater influence in promoting gastric secretion than those last-named, and among the principal remedies of this nature may be enumerated absinthe, hop, chamomile, cascarilla, and calumba.

Of these calumba holds the chief place in point of therapeutic value, as a remedy which can be safely employed when others of the class would be too irritating.<sup>1</sup> It may be used as an infusion or tincture, and the former may often be advantageously administered in conjunction with other aromatics, or with acids, alkalies, or ferruginous preparations; but when a more active effect of the same character is required, other remedies of this class may be resorted to with benefit.

As regards the more direct stimulants, their administration is indicated before or with food, though the necessity for the dilution of alcoholic fluids is shown by the opposite effects produced by them when given in a concentrated state. The effects of a moderate quantity of wine in promoting weak digestion, has been already alluded to; and bitter beer, combining the aromatic and bitter qualities of the hop, proves often of great service in milder cases, and when flatulence is not one of the symptoms complained of. Where, however, there is a tendency to fermentation of the food, the latter beverage is distinctly contra-indicated, as under these circumstances it often proves a source of distressing flatulence and of other derangements resulting from this cause, which can only be avoided by the abandonment of its use.

Another remedy of the same class, ipecacuanha, originally prescribed by Daubenton, has of late been brought into more common use, by the advocacy of Dr. Budd. It should be given in pills, in doses of half a grain to one grain before meals, and may often be combined with advantage with three or four grains of rhubarb.

<sup>1</sup> Calumba appears to possess some direct "sedative" properties; thus it is sometimes useful in the vomiting of pregnancy and in sea-sickness, and even in minor degrees of subacute inflammatory action, and has been known to check the vomiting caused by tartar emetic (Pereira).

Other combinations of the same kind occasionally prove useful, such as chamomile<sup>1</sup> together with rhubarb and ginger. Cayenne pepper is sometimes employed in the same manner, but its use is less advisable than that of some of the other remedies which have been mentioned. The value of alkalies when taken with meals, in the form of Vichy water, liquor potassæ, or the carbonates of potash and soda in combination with wine or malt liquors, is probably in some degree attributable to their physiological effects on the secretions of the gastric juice. They have also been employed for the same object by my friend and colleague, Dr. Harley, in small doses, properly diluted, before meals, with good effects in promoting digestion.<sup>2</sup>

As *adjuvants* to the process of digestion, two series of agents deserve especial mention, viz. the mineral acids and pepsine.

The efficacy of the former of these has been long known; nor is their use limited to cases of simple atony, but they sometimes prove serviceable in many cases of irritative dyspepsia when from inflammatory causes the secretion of gastric juice is defective, and to which fuller reference will hereafter be made.

Of these acids the hydrochloric stands undoubtedly the first in point of utility, a fact which is easily comprehensible from its being probably the most active agent in the normal process of digestion. It should be taken in doses of from fifteen to twenty drops of the dilute acid of the British Pharmacopœia, suitably diluted with water immediately before, or during, or directly after a meal. It may be rendered more palatable by the addition of syrupus aurantii; and may often be very advantageously combined with some of the bitter remedies before mentioned, especially with the tincture of nux vomica, the liquor cinchonæ, or the infusion of calumba. Employed in this manner it will often, in the less severe cases, be found to relieve the sense of weight and distension ensuing after food, and it frequently prevents the acidity and flatulence arising from the fermentation

<sup>1</sup> Chamomile possesses the advantage of possessing slightly laxative properties, and is said by Trousseau (*Traité de Thérap.*) to be very beneficial in the atonic and flatulent forms of gouty dyspepsia.

<sup>2</sup> The effect, as Blondlot and Bernard have shown, of the administration of a small amount of diluted alkali on an empty stomach is to cause a secretion of gastric juice, much greater than is sufficient to neutralize the alkali.

which results from the imperfect action of the gastric juice ; though it may be considered problematical whether in these doses it has any intrinsic power of checking this action, which Liebig<sup>1</sup> asserts the stronger mineral acids to possess, and to which Pemberton<sup>2</sup> attributed their influence in this direction.

The phosphoric and nitric acids have been recommended for the same purposes by other writers (Todd, Pemberton), but their influence in aiding digestion is much less marked than that of the hydrochloric, while nitric acid not unfrequently produces irritating effects on the stomach, and may give rise to pain or nausea.

Dr. Handfield Jones<sup>3</sup> has for similar purposes found the use of lactic acid, as recommended by Magendie,<sup>4</sup> to be productive of good results : he administers it in doses of fifteen to twenty drops, suitably diluted, at meal-times, and in some cases of irritative dyspepsia, considers it decidedly preferable to the hydrochloric.<sup>5</sup>

Though the efficacy of pepsine has occasionally been called in question by some recent writers, my own experience would induce me to bear a strong testimony in its favour—not only in the form of dyspepsia now under consideration, but also in some conditions when the digestive process is impaired by irritative states of the mucous membrane. It may often be very advantageously taken simultaneously with hydrochloric acid at meal-times. There are two preparations principally in use—the “Poudre Nutrimentive” of Boudault, and the “Pepsina Porci,” introduced into English practice by Dr. Lionel Beale. The latter is apparently efficacious in smaller quantities than the former, which requires to be given in doses of ten or fifteen

<sup>1</sup> Animal Chemistry, 386.

<sup>2</sup> Diseases of the Abdominal Viscera, 122.

<sup>3</sup> Functional Nervous Disorders, 420.

<sup>4</sup> Formulaire pour la Préparation et l'Emploi de plusieurs nouveaux Médicaments. 1835.

<sup>5</sup> Hünefeld's experiments under Budge, “De Albuminis Succo Gastrico factitio Solubilitate,” showed that hydrochloric acid gave the greatest digestive powers, lactic acid less, and acetic acid the least. Canstatt, 1859, i. 30. Trousseau's clinical experience of the relative value of the mineral acids indicates a decided superiority on the part of hydrochloric. Clin. Méd. ii. 377. Meissner also has found that in artificial digestion it is necessary to use ten times more lactic than hydrochloric acid to produce a digestive mixture of the same strength. Heule and Pfeuffer's Zeit. 3d Ser. vol. vii. p. 16.

grains, while five or six of the Pepsina Porci usually produce good effects in suitable cases. I have found both very useful in the atonic dyspepsia of childhood, especially in the form supervening after more distinctly inflammatory symptoms have subsided; but when food still continues to produce acidity and flatulence. I have also employed it with marked advantage even in infancy.

The complications of this state which most call for medicinal relief are Constipation, Flatulence, and Acidity.

The first-named of these often gives the most discomfort, and appears to favour the development of the second, at least in the intestines. It also hinders the digestion, and frequently impairs the appetite. It results both from muscular weakness and from defective secretion; and it is probably from the latter cause, and owing to retention of effete matter in the system, that much of the malaise and despondency which mark this condition arise.<sup>1</sup>

In remedying this affection much care is required to avoid irritation, and only the gentlest and least irritating laxatives are desirable. When possible, even these should be dispensed with, and the action of the bowels, when not occurring spontaneously, should be daily solicited by the use of enemata of cold water.

Friction—or the wet compress worn at night, protected by a piece of mackintosh—or the use of the cold douche to the abdomen, are all at times useful adjuvants in this respect.

When medicines are used, rhubarb and aloes are to be preferred to all others. Either may be given with food, a method which diminishes to some degree the danger of irritation resulting from their use, and they frequently may, with great advantage, be combined with small doses, as a quarter of a grain, of the extract of nux vomica.

Recourse should however be had as little as possible to purgative remedies, for it may become difficult afterwards to shake off the habit of requiring their aid. In many cases of atonic dyspepsia, when there is any marked degree of weakness, there is very little occasion for a *daily* action from the bowels, though care to prevent marked degrees of constipation occurring should always be exercised. Patients of this character should be induced

<sup>1</sup> Chambers' "Lectures, chiefly Clinical."

to dwell as little as possible upon this symptom, for by doing so many not only keep their minds in a continual anxiety and worry, but often injure themselves considerably by the habitual use of aperients or by those of too strong a nature, which exhaust the nerves and muscles of the gastro-intestinal canal, and are often followed by an increased constipation and greater degrees of flatulent distension than those for which they are employed.

When acidity and flatulent spasm exist together with the constipation, antacids, and especially the *magnesia usta*, or *magnesiae carbonas*, in combination with *tinct. rhei* and aromatics, may be employed with advantage for the same objects. In severer cases, especially in the gouty flatulence of elderly people or of females at the climateric period, *assafœtida*, either in combination with aloes or in the form of the compound galbanum pill, is frequently of considerable service. If the flatus exists in the stomach, large draughts of warm water may sometimes prove efficacious in promoting its expulsion by eructation;—while tympanitic distension of the bowels may be relieved by enemata containing turpentine, *assafœtida*, *oleum rutæ*, or sometimes by infusion of chamomile.

Other remedies for flatulence may at times be employed, though they only act as very temporary palliatives, such as the more cordial aromatics, the *spiritus ammoniæ aromaticus*, the *aqua anethi*, or peppermint water. In some cases the absorbent powers of charcoal are of service, though to possess any efficacy of this kind, it is necessary that it should be recently prepared. Belloc, who first introduced it, recommended that it should be made from the young shoots of the poplar, and stated that given in doses of from 30 grains to 3 drachms in the twenty-four hours, it acted slightly as a laxative. Dr. Leared<sup>1</sup> has of late praised the efficacy of the charcoal made from vegetable ivory for this purpose.

It must be remarked, however, that all palliative treatment can only be of very secondary importance to the main object of curing the primary affection, and that the symptoms which have been last mentioned, and which are often the source of the greatest distress and discomfort, are best alleviated by means adapted for the improvement of the digestion. Flatulence,

<sup>1</sup> "Imperfect Digestion."



especially, is often markedly relieved by the use of the mineral acids, to whose beneficial action in the attendant condition of acidity allusion has been already made. Many also of the stimulant or adjuvant plans of treatment which have here been sketched out, are only temporary and transient in their effects, and will fail unless supported by other measures of the hygienic class, though they are, in many cases, most valuable additions by aiding the stomach to supply suitable material to the system.<sup>1</sup>

One very important fact to be borne in mind is, that no single plan of medicinal treatment should be too continuously protracted, and that a change of remedies within the limits of those above indicated is often productive of good effects. Many that seem at first beneficial, appear after a time to lose their effects, and may be advantageously replaced by others of a different class according to the predominance of individual symptoms.

Even the ferruginous preparation on which so much stress has been laid, should not be persisted in without intermission. Sydenham<sup>2</sup> recommended their employment in hysterical or ataxic cases for a period of thirty days, and it is seldom that they can be taken with advantage for a longer period, though they may be resumed after an interval of ten days or a fortnight.

The period during which bitter remedies prove efficacious is equally limited. Preparations of *nux vomica* or *calumba* are tolerated longer than most of the others, but the prolonged administration of the former may entail nervous accidents and dangers of over-excitability of the spinal cord, which may sometimes persist to an unsafe degree after the discontinuance of the drug, and even when its use is beneficial it should seldom be persisted in longer than a month or six weeks. If the favourable effects of bitter remedies do not become apparent after a few days it is better to discontinue them, and under all circumstances to watch very closely for signs of gastric irritation, which, if present, they seldom fail to aggravate.

<sup>1</sup> Andral, with his habitual profound observation, remarks of these cases :—  
“*Chez ces individus l'appétit revient à mesure que l'estomac absorbe des matières réparatrices.*”—*Path. Interne*, iii. 333.

<sup>2</sup> *Op. Omnia*, Syd. Soc. Ed. p. 347.

## CHAPTER V.

### NEUROSES OF THE STOMACH.

THE disorders in the functions of the stomach resulting from perverted innervation, differ widely in many of the phenomena which they exhibit from those which have been described as characterising atonic dyspepsia. In spite, however, of their apparent dissimilarity, a full consideration of the ætiological and pathological relationships of these two classes will, the author believes, tend to shew that a closer analogy exists between them than might otherwise be supposed. It is true that the nervous disturbances which are now to be discussed frequently present symptoms of much greater severity, yet their leading features—which may be described as consisting in an unnatural excitability, manifested either by extreme degrees of perversion of the functions of the stomach, or by an excessive exaltation of its sensibility—are found in the majority of cases to coexist with an impairment of its physiological powers. In exceptional instances, indeed, the signs of local weakness may be absent; but even in these, indications of a more general asthenic constitutional state can usually be found, which serve to establish the essential pathological identity of the whole class: the evidence in favour of which is further corroborated by the similarity of the conditions which, in both, have an almost equal influence on their causation, progress, aggravation, or cure.

The symptoms of these disturbances consist for the most part of pain, vomiting, or perversions of secretion and of the appetite and digestion, and some explanation has been already furnished in the chapter devoted to these subjects, of the relation borne by them to the special states now under consideration.

The immediate mechanism of their production appears to depend in some cases on nervous disturbance, which may be designated as primary, while in other instances they are found to take their origin in disorders of other, and sometimes of distant parts, by which the functions of the stomach are affected in the manner before described as reflex.

THEIR *ÆTIOLOGY*, therefore, while embracing those general conditions which have been before enumerated as capable of inducing the atonic state, further includes the special causes which are capable, in addition to weakness, of giving rise to extreme nervous excitability. We thus find that they are predominant in the female sex,<sup>1</sup> and occur with much less frequency among men. With regard to the influences of age, it may be stated that these affections are not frequent before puberty; for with the exception of cases of vomiting from cerebral disease, and the rarer instances of simple uncomplicated reflex disturbance of the stomach arising during dentition, the periods of infancy and childhood;<sup>2</sup> are comparatively free from the severer forms of gastric disorder of a nervous character. The immunity thus enjoyed in the earlier ages of life is probably, in part at least, due to the absence of those profounder impressions made by moral emotions, which, as will be presently mentioned, serve in a great number of instances as their determining causes. At more advanced periods they are also (as is observable of the whole class of functional nervous disorders) less common than in that included between the ages of fifteen and forty. A special proclivity at two different ages is, however, in the female sex determined by sexual conditions, the epochs of the appearance and cessation of the menstrual function being in them peculiarly liable to be marked by these disturbances; while in the male sex the only extraneous influences determined through age, are such as result from the increasing anxieties and severer intel-

<sup>1</sup> Georget, art. "Gastralgie," *Diet. de Méd.* x. 81, says that these nervous disorders are ten times more frequent in the female than in the male sex.

<sup>2</sup> Some cases are, however, recorded by Dr. Handfield Jones (*Functional Nervous Disorders*, pp. 412, *et seq.*), where neurotic abdominal pain was observed in boys before and at the period of puberty (see especially one by Dr. Martin, of Rochester, *Brit. Med. Journ.* July 16, 1859). In some, however, of these cases the pain appears to have been seated in the abdominal muscles rather than in the stomach.

lectual efforts which are often called for between those of thirty and fifty.

Hereditary disposition is by some writers<sup>1</sup> mentioned among these predisposing causes, and there seems no reason to doubt its occasional possible influence in this direction.

Of the special determining causes, *exhaustion* plays the most prominent part, and when combined with other depressing influences, and particularly with those of a moral character and operating through the nervous system, as grief, fear, anxiety, or severe intellectual effort, it is an almost unfailing source of perversion of the functions of the stomach, which can only be referred to disturbed innervation. These, however, may originate under almost any circumstances by which the vitality of the system is lowered, and the simple loss of blood is not only capable as before stated (see p. 58) of producing vomiting, but also of giving rise to other severe forms of gastric derangement. Thus, Whytt<sup>2</sup> mentions a case of a young man who was bled largely for a pain in the side, arising from a fall from a horse. After some days he was attacked by a sense of intense cold in the stomach, and this was followed by intense pain recurring in a paroxysmal form two or three times in the twenty-four hours. The attacks continued for some weeks, but he gradually recovered under the use of "stomachics;" but having on another occasion experienced a similar, though smaller, loss of blood,<sup>3</sup> the attacks of pain returned, but in a less severe degree.

The states also of anæmia and chlorosis, which, in respect to the composition of the blood, bear so close a resemblance to the effects of hæmorrhage, are very frequent causes of these disorders; and though this cause, and the effects in question, are most common in the female sex, yet the same connexion has also been observed in cases of anæmia occurring in men.

There is much concurrent testimony to show that venereal

<sup>1</sup> Schmidtman, Summ. Obs. Med. iii. 205.

<sup>2</sup> Works, p. 568.

<sup>3</sup> See also a case where pain and acid vomiting occurred after attacks of hæmorrhage from piles—Budd, p. 198. It is possible, that some of the symptoms in this case may have been due to reflex irritation of a nature to be more fully described, but from this view the case illustrates the fact that these attacks are more prone to occur when such causes of irritation are present in patients whose general strength is impaired, than in those of more robust constitution.

excesses, and particularly the habit of masturbation, operate frequently in the same manner.<sup>1</sup>

To these causes must be added the exhaustion arising from privation of food, which appears to act not merely by its general depressing effect on the system, but probably in some degree directly on the stomach through the privation of one of its natural stimuli,<sup>2</sup> tending to give rise to a state of erethism, or undue excitability.

Diseased states of the nervous centres may also act as causes of these perversions. The chief facts which are known with respect to these relations have been already alluded to (see Pain, Vomiting, Acidity, and Causes of Dyspepsia), and they do not thus far appear to require further description in this place.<sup>3</sup>

By far the most frequent, however, of all the causes assignable as the starting-point of these disturbances, is the complex state expressed under the term *Hysteria*. It includes so large a proportion of the cases in which they are known to occur, that it may almost be stated that independently of this condition, or of some closely allied to it, purely nervous disturbances of the stomach of any considerable intensity and duration are comparatively rare events in the history of its disorders.<sup>4</sup> Their frequency in this affection may be estimated by the statement

<sup>1</sup> Georget, Dict. De Méd. x. 84. Andral, Clin. Méd. ii. 193. Schmidtman, "De Cardialgia," Summ. Obs. &c. vol. iii. p. 191, says—"Raro infantes puerosque invadit, crebrius juvenes et juvenecas, atque eos in primis quando fædæ deleteriæque sese addixere masturbationi, inde cardialgia in juvenibus obvia mihi semper suspicionem movet eos masturbari, atque disquisitione institutâ rarerent à vero aberravi."

<sup>2</sup> Trousseau, Traité de Thérap. i. 99.

<sup>3</sup> A case recorded by Krukenberg, and quoted by Hensch, ii. 205, deserves mention here in comparison with a similar case quoted from my own experience (see Vomiting, p. 60), where suspicions of poisoning were excited, owing to the supervention, in a young man, of severe gastric pain and vomiting, associated with pain in the head on the right side. He died suddenly from apoplexy. There was hæmorrhage and softening of the right cerebral hemisphere, but no disease of the stomach. In the case before cited there was also complaint of *pain* in the stomach.

<sup>4</sup> Though this statement is, the author believes, undoubtedly true, and though when these disorders in nervous and hysterical women are excluded, the majority of the remaining disturbances of digestion are referable either to atony or to some modification of the catarrhal conditions; yet, as similar nervous disorders do at times undoubtedly occur in the male sex, it behoves the practitioner to be on his guard in forming his diagnosis (upon which much of his success in treatment will depend), lest this condition should be overlooked.

of Bricquet,<sup>1</sup> that of 358 cases of hysteria, only 30 had no sign of "gastralgia," or "epigastralgia;" 130 had pain only at the epigastric region, while 187 had both pain and derangement of the digestive function; and this author relates that the latter are among the first symptoms in females in whom hysteria is slowly developed.

Very closely allied to the effects of hysteria are those induced by the parallel condition of hypochondriasis, the symptoms of which, however, refer rather to perverted forms of sensation than to others of the class of phenomena before alluded to. The frequency with which the perversions of the moral and intellectual functions which are included under this title are found associated with all forms of dyspepsia, may very properly give rise to the question, how far in all cases it can be regarded as standing to them in the relation of a cause, or whether in an almost equal number it is not either a direct consequence of the derangements of the digestion, or whether both these and the hypochondriasis are not together the expressions of a more general nervous disorder. There is, however, little doubt that, in whatever manner originating, the peculiar mental state accompanying this condition serves in no small measure to intensify the gastric disturbance already existing, through the exclusive direction of the mind to the sensations experienced in the stomach, the influence of which, as pointed out by Dr. Carpenter,<sup>2</sup> in describing the effects of "expectant attention" on the organic functions, is by no means inconsiderable.<sup>3</sup>

Among other causes operating probably on the general or local nervous centres through changes in the composition of blood, may be mentioned malarial conditions, which may give to neuroses of the stomach a specifically intermitting character.<sup>4</sup> From the present state of our knowledge of the pathology of gout, it would almost follow that this affection should be placed

<sup>1</sup> *Traité de l'Hystérie*, 251.

<sup>2</sup> *Physiology*, 1864, p. 735.

<sup>3</sup> See a case of this kind often quoted from Pinel, *Nosograph. Philosoph.* iii. p. 126: "Le principe de tous mes maux, dit la malade, est dans mon ventre; il est tellement sensible que peine, douleur, plaisir, en un mot toute espèce d'affection morale, ont là leur principe; un simple regard désobligeant me blesse dans cette partie si sensiblement que toute la machine en est ébranlé. Je pense par le ventre, si je puis en exprimer ainsi."

<sup>4</sup> Niemeyer, *loc. cit.* p. 546.

in the same category, though, as before remarked, the dyspeptic disturbances occurring in patients of this class may be referable to widely different causes, among which organic conditions probably play no inconsiderable part.

With them also may be included, but with a certain degree of reservation, the effects of long-continued alcoholic poisoning, which, as Dr. Budd<sup>1</sup> remarks, greatly resemble those produced by exhaustion.

Of the immediate exciting causes, sudden emotions, especially of a depressing kind, are among those most frequently cited as having given rise to these disorders; but a similar effect may be produced by moral affections of the same character acting through a longer period.<sup>2</sup> The influence exerted by painful emotions not only in arresting digestion, but in producing painful sensations in the epigastric region, is well known, and these symptoms are greatly heightened in the case of patients whose nervous susceptibility is more than usually prominent. The effect of even a single emotional access is often much more permanent than its cause, and when they are frequently repeated, the resulting condition of gastric disturbance is perpetuated, and aggravated, until it becomes both severe and persistent; and the same sequence and tendency to continuity has been noticed by Bricquet in the convulsive affections of hysterical patients.

As special conditions, acting locally, may be mentioned the abuse of stimulants and condiments, and in particular the habit of taking large quantities of tea and coffee;<sup>3</sup> and it is well known that in persons of an excitable and nervous habit, a cup of either taken after dinner will greatly disturb the digestion, giving rise to epigastric uneasiness, acidity and flatulence, which

<sup>1</sup> This is hardly, however, to be spoken of as a simple state, inasmuch as these cases are usually complicated by catarrh of the stomach, attributable, probably, to the immediate effects of the alcohol on the mucous membrane.

<sup>2</sup> See cases by Barras, Bricquet, Andral.

<sup>3</sup> The latter agent is very commonly admitted to be an exceedingly frequent cause of gastrodynia, and of dyspepsia associated with much nervous disturbance. See Clarus, "Arzeneimittellehre," p. 666; also Wood, "Therapeutics and Pharmacology," i. 628. I have seen it stated, though I cannot find the original, that girls employed in needlework, and in the Manchester factories, have not unfrequently a habit of chewing tea, with results evidencing a greatly disturbed condition of innervation both of the general system and of the stomach. The habit does not, however, appear common in London.

often may continue for many hours. These effects are more striking after the use of coffee than of tea.

Finally, in some of these cases the effects of idiosyncrasy must be considered. Some of these have been already alluded to, and reference may be made to two cases by Andral,<sup>1</sup> in one of which the use of milk always caused violent pain, while in another honey invariably gave rise to vomiting.

The causes capable of acting on the stomach by reflex irritation conducted from other parts have also been somewhat fully dwelt upon in previous sections, and it is only necessary therefore briefly to recapitulate them in this place.

They are, as has been seen, very numerous, and include sympathies with parts whose apparent connexion with the stomach is very obscure, and some of which can only act, in all probability, through the general influence which *pain* exerts both on the appetite and on the digestive functions. Certain of them do indeed scarcely come under the category of atonic affections, but the exceptional cases, in which they appear independently of such conditions, are so rare, that they seem scarcely capable of being erected into a separate class, especially as the majority only occur with any degree of prominence in states of asthenia of the general system. Such are diseases of the external ear and of the teeth;<sup>2</sup> painful affections of the kidneys, testicles, and ovaries; disordered conditions of the lower portions of the alimentary canal, among which must be mentioned piles, worms, constipation, herniæ, including the omental and epiploic; diseases of the pancreas<sup>3</sup> and of the liver, and especially gall-stones and abscess of the latter organ; and with a frequency far exceeding that of all those now enumerated must be mentioned diseases of the uterus, including tumours, polypi, ulcerations, prolapsus, retro-<sup>4</sup> and anteversions, and yet more commonly disturbances of menstruation, leucorrhœa, and the state of pregnancy. With the exception of the last-named state—which is, however, far more frequently associated with disorders of the

<sup>1</sup> Pathologie Interne, i. 153.

<sup>2</sup> See a case by Liederer of a young lady in whom a false tooth fixed to the socket of a diseased one caused regularly returning attacks of pain and vomiting, which ceased immediately on removal of the pressure from the dental nerve. Allg. Wiener Med. Zeit. No. 24, 1861.

<sup>3</sup> Claessen, quoted by Bamberger.

<sup>4</sup> Hensch, ii. 131.



stomach in weakly than in strong and healthy patients—there are few of the uterine derangements here enumerated which are not more or less associated with an impairment of the general nutrition. The majority also appear to be more truly connected either as cause or effect with the primary disorder, than to arise through the disordered digestion, which is frequently the last in the series;<sup>1</sup> while, with respect to frequency, though not perhaps to severity, leucorrhœa and disordered menstruation hold the foremost rank among this class of ætiological conditions.

The class of symptoms by which nervous affections of the stomach are especially characterised have been already alluded to as consisting chiefly of pain, vomiting, and certain forms of hypersecretion. These may, however, occur in every possible variety of combination with each other, and with other symptoms of indigestion, as well as in very varying degrees of severity. In many cases no direct relationship can be constantly traced between any of them and the different ætiological circumstances just described under which they may occur; and causes apparently identical may, in different subjects, give rise to dissimilar symptoms; while, on the other hand, the most diverse perversions of function may occasionally be met with in cases whose mode of origin is to all appearance perfectly alike. Certain special features do, however, as a rule, mark some of the forms assumed by them in connexion either with particular states of the system or with special causes of nervous irritation; and in the description about to follow, the disorders that occur in the course of hysteria, chlorosis, amenorrhœa, hypochondriasis, exhaustion, gout, and certain uterine disturbances, will be more specially considered; those originating from other reflex

<sup>1</sup> A correct generalization on this point is a matter of no little difficulty, and the symptoms observed may follow in one or other of the following sequences, arranged according to the author's experience in the relative frequency with which they occur:—

*a.* (1) General asthenia without special symptoms, followed by (2) disturbed menstruation or leucorrhœa. (3) Sympathetic disorder of stomach (pain, &c.).

*b.* (1) Dyspeptic symptoms. (2) General asthenia. (3) Disorder of uterus. (4) Aggravation of stomach symptoms.

*c.* (1) Disorder of uterus. (2) General asthenia and disorder of stomach, proceeding *pari passû*.

*d.* In rarer instances—(1) Disorder of uterus. (2) Derangement of stomach, which apparently induces a depressed condition of the general system.

conditions, or from organic and even functional diseases of the cerebral centres, being comparatively so rare and exceptional, that though their causation is occasionally of diagnostic importance, they can hardly be included in a categorical description of the symptoms of the more usual forms.

The modes of invasion of these symptoms of nervous "erethism"<sup>1</sup> may be either gradual or sudden, standing in this respect in an almost direct relationship to similar conditions in point of time or intensity of the exciting cause.

In the class of hysterical cases, loss or depravation of appetite is sometimes an early symptom, proceeding in many cases either to an absolute anorexia, which may even involve the nutrition of the patient in considerable danger;<sup>2</sup> or to some of the extraordinary perversions which have been before alluded to under the heads of Pica or Boulimia. In others of the same character the last-named symptom becomes predominant, and the patients are affected with a ravenous and almost insatiable desire for food, compelling them to eat at all hours of the day and night, and the origin of which in perverted sensation is evidenced by the feelings of sickness, pain, and faintness which ensue if the gratification of this desire is withheld.<sup>3</sup> "The psychological relations of the sense of hunger are altered; there is no appetite, and taking food affords no enjoyment."<sup>4</sup> Severer symptoms, however, often speedily ensue, and among the most prominent of these are pain, which, however, varies greatly in duration and intensity.

Commencing ordinarily with a sense of constriction or oppression, or sometimes with a feeling of distension or weight, it is followed by sensations of an agonizing character, which are vari-

<sup>1</sup> This term, very appropriately used by M. Trousseau to express this state (Tr. de Thérap. i. 98) was previously employed by Barras, but, as stated in the Introduction, in too wide a sense.

<sup>2</sup> Bricquet, p. 254.

<sup>3</sup> This condition, though generally occurring in the female sex, may sometimes be met with in males, as is shown by an extremely marked case recorded by Chomel, Des Dyspepsies, p. 94.

<sup>4</sup> Romberg, *loc. cit.* p. 107. Romberg remarks that this hyperæsthesia rarely occurs in an isolated or idiopathic form, and that it is found in a variety of morbid states—sometimes appearing as reflex or sympathetic, sometimes associated with other hyperæsthesiæ, and is observed during convalescence from severe diseases, in hysteria, helminthiasis, ergotism, or as the precursor of other diseases, and especially of gout.

ously described by the patients as consisting of heat, cold, tearing, gnawing, rending, or twisting. In the severer attacks the heart's action is interfered with, becoming fluttering and irregular; the extremities are cold, and there is a tendency to syncope: in some cases convulsions are said to have ensued from the severity of the pain (Schmidtman). Pain of this nature, though often aggravated by slight pressure upon the abdominal muscles (epigastralgia, of Bricquet) is usually relieved when this is made more firmly and persistently, and this is especially true of those forms that are associated with cramp or flatulence, but the conditions observed are in this respect too uncertain, to allow any positive criteria to be drawn for diagnostic purposes.

The pain is sometimes associated with distension of the abdomen, at others this is sunk and retracted (Romberg). It is essentially paroxysmal in its character, returning sometimes at irregular, in others at regular periods on successive days in cases where the attacks are not attributable to malarious influences. In other cases, it returns only at the menstrual periods, and there is comparative immunity in the intervals.<sup>1</sup>

The duration of the attacks is variable. They may last only for a few minutes, or may continue for hours. They frequently terminate in gaseous eructation, or with the ejection of a watery fluid, which is sometimes acid, and at others alkaline (pyrosis), or of mucous of an alkaline character, and of variable degrees of tenacity; and they are commonly followed by a sense of soreness at the epigastrium, and by great exhaustion.

The relation of the effects of the ingestion of food to the pain is subject to some variations. There is one distinct class, before alluded to, where this gives distinct relief,<sup>2</sup> and these cases form not only the larger number, but are those in which there is least suspicion of the accuracy of the diagnosis. This effect is certainly

<sup>1</sup> Barras gives two cases where gastrodynia was associated with suppression of the menses: in one of these the pain was less violent when the discharge became more abundant. In this latter case there was also flatulence, and the pain was relieved by food. *Loc. cit.* i. 587. Niemeyer, *loc. cit.* p. 545, also gives a case of this character where the pain only occurred at the menstrual period, but in which the applications of leeches to the cervix uteri instantly caused its return. It must be remembered, however, that an increase in the severity of the pain at the period of menstruation has been observed in some cases of gastric ulcer.

<sup>2</sup> See Budd, *loc. cit.* pp. 282-3.

that most commonly met with in cases where the symptoms of gastrodynia are associated with depressed vitality arising from exhaustion, or with nervous irritability dependent on moral or emotional causes. It is observed not only where the pain is of some severity, but in a condition which is even more common under these circumstances, and also in some cases of hypochondriasis associated with the gouty diathesis, where the sensations complained of are a vague sense of wearing uneasiness, not inaptly defined by the term "anxiété épigastrique," used by Trousseau, and which is frequently associated with flatulence and eructation.<sup>1</sup> Another remarkable feature in these cases is, that insipid food and demulcents often cause much more pain than substances which are not only less digestible, but are even irritating in their character; and this peculiarity, which has been observed by numerous writers,<sup>2</sup> is not without value in diagnosis. In other and rarer instances, which especially occur in aggravated forms of hysteria, and in some where the pain in the stomach is of reflex origin, and more particularly where it is due to uterine disturbance, the ingestion of food is immediately followed by severe pain, which is only relieved by vomiting, and though in some cases the appetite may be preserved, the fear of the agony caused by the food entering the stomach prevents the patient from eating.<sup>3</sup> In other instances, pain of this character is only felt some hours after food, but here the conditions are more complex, and pyrosis or great distension of the stomach from flatus are often present; in which latter case, though much of the pain felt may be due to the spasmodic contraction of its

<sup>1</sup> See also Whytt, Works, 556.

<sup>2</sup> "An uncommon delicacy of the nerves of the stomach, which may be either in a great measure natural or brought on by disease, . . . excessive grief, or other causes, is to be distinguished from that . . . increased sensibility, which is the consequence of an inflammation, or of an aphthous state of those parts, since in these last cases every acid substance gives them pain, whereas in the former many insipid and seemingly innocent substances produce great uneasiness in the stomach and bowels, while volatile spirits, strong wines, brandy, and spiceries, are not only inoffensive, but often necessary for allaying those disorders which are produced in the first passages by such causes as would scarcely produce any disturbance in the second state."—Whytt, *loc. cit.* p. 544. See also the same author, *loc. cit.* p. 566; see also Barras, *loc. cit.* i. 35, 414, 440.

<sup>3</sup> Bricquet, p. 256. These cases are, however, those in which the accuracy of the diagnosis from ulcer must often be held in doubt, even when made by the most competent observer.

coats, some is also, in all probability, to be attributed to the cramp-like action of the abdominal muscles.

The state of the digestion sometimes affords a valuable criterion of the nervous origin of these affections; in many cases it is entirely unaffected in the intervals of the attacks,<sup>1</sup> while in others the ordinary symptoms of atonic dyspepsia are present. The tongue is, as a rule, clean, though often pale, broad, and flabby;<sup>2</sup> the bowels are generally confined, but the fæces are not otherwise altered. In cases, however, to be hereafter alluded to, when nervous excitability co-exists with various degrees of inflammatory irritation of the stomach, these signs are lost. One remarkable feature with regard to these attacks is, that in a person predisposed, they may be brought on by painful moral emotions.<sup>3</sup>

It has just been stated that pain, in the severer forms in which it occurs, in what may be probably truly termed a neuralgia of the stomach, is frequently associated with vomiting, but that in other instances it may be unattended with this disturbance. Vomiting may, however, occur as an independent condition, unaccompanied by pain. This is more common in cases where it originates in reflex disturbances, or in certain disorders of the central nervous system, but it may also ensue in states characterised by simple perversion of function, and especially in hysteria. Its isolated appearance, independently of other disturbances of sensation, is, however, rather the exception than the rule, though in some instances the pain with which the vomiting is associated, is rather of the kind which Bricquet has termed "épigastralgia," than truly referable to the stomach.<sup>4</sup>

<sup>1</sup> This can only be said to be relatively true in regard to the diagnosis of these affections from those of an inflammatory nature. The same fact is often observed in the progress of cancer, and sometimes of ulcer, when associated with epigastric pain.

<sup>2</sup> The varieties of appearance of the tongue described by Dr. Todd, *loc. cit.* p. 632, as indicating this state, viz. "a thin white gauze," "a milky appearance," or "a covering of frothy mucus," belong, I believe, to catarrhal conditions.

<sup>3</sup> Whytt, *loc. cit.* p. 560.

<sup>4</sup> See a case related by Bricquet, *loc. cit.* p. 218, of a girl who, after severe moral emotion, was brought to the hospital with violent pain at the epigastrium, together with vomiting, which excited the suspicion of poisoning. The pain was relieved in ten minutes by Faradisation.

Nausea usually precedes to some degree the expulsive act ; but its duration and intensity are shorter and less marked than in the vomiting which attends inflammatory or organic diseases of the stomach—approximating in this respect to the conditions observed in the vomiting from cerebral causes, to which special allusion has been already made (see p. 59).

In many cases intervals of several hours, or even days, may elapse between the recurrences of this symptom, and during them the digestion may be good, or there may be (as in pregnancy) some degree of acidity, apparently from hypersecretion, after each meal ; but in others, and apparently in proportion to the severity of the exciting cause, though most commonly met with in pregnancy and hysteria, it tends to become continuous. Under these circumstances all food is rejected either as soon as taken or within a few hours after eating, being often returned completely undigested, and rarely associated with bile or mucus (Bricquet). Even when vomiting is severe, the appetite may in some hysterical cases continue, and even present an apparent increase of intensity, so that the patient's time may be passed in alternate vomiting and eating ;<sup>1</sup> but in other instances, when the disorder has commenced after moral depression, and when pain is also present, there may be a more or less absolute anorexia.<sup>2</sup>

In many cases of hysterical vomiting it has been a matter of repeated observation that the general nutrition and strength remain but little affected ; but when the vomiting is severe and constant, emaciation may rapidly ensue from the loss of food thus occasioned. The occasional dangerous effects of this symptom in pregnancy are well known, and have been already alluded to, and others of a similar character are detailed by Andral<sup>3</sup> and Budd,<sup>4</sup> where, although vomiting had continued long, the stomach was found healthy after death. In some of the cases of the latter class, though fever was absent in their earlier periods (thus conforming to the rule generally observed) it

<sup>1</sup> Bricquet, *loc. cit.* p. 255.

<sup>2</sup> Andral, *loc. cit.*

<sup>3</sup> *Clin. Méd.* ii. 175—179.

<sup>4</sup> *Loc. cit.* p. 261. With regard to Andral's cases, however, the conclusions drawn from the apparently healthy state of the stomach should be received, in the author's opinion, with some caution, on the grounds stated in the chapter on the post-mortem appearances presented by the stomach.

appeared, associated with delirium, towards their close, and in some instances assumed a distinctly hectic character.

The effects of varieties of food in promoting or retarding the occurrence of vomiting, are almost as variable as are their relations to the symptom of pain. In the severer forms just alluded to, solids and meat have been known to increase both the pain and the vomiting (Budd); but when hysterical symptoms are well marked, there are not a few instances recorded in which indigestible and apparently unsuitable food has been tolerated after ordinary aliments had been rejected as soon as taken.<sup>1</sup>

There is another form of dyspepsia occurring under nervous influences, of which I have seen some examples, but which, as far as I am aware, has been fully described only by M. Trousseau.<sup>2</sup> It occurs both in males and females, under conditions usually preceded by some cause of exhaustion, especially affecting the nervous system, and my friend and colleague Dr. Ringer informs me that he has also observed it in children. It is attended with an excessive appetite (boulimia), and by a sense of want following too speedily after food has been taken. The characteristic symptom is, however, that diarrhoea is present, and the evacuations, which are usually preceded by borborygmi and colicky pains, are induced with great facility by slight causes of an emotional character, and contain considerable quantities of food which has passed undigested through the intestinal canal. Frequently an evacuation occurs immediately on rising in the morning, and is followed by a great sense of exhaustion; and I have observed in some cases that this can be delayed until the usual hour after breakfast, by simply taking a small quantity of food before rising. Trousseau ascribes these symptoms to an undue irritability of the muscular coat of the stomach and intestines, hurrying the food taken too rapidly through the whole

<sup>1</sup> See a case by Barras, *loc. cit.* i. 496, where the first food retained was a salad made with hard-boiled eggs. A precisely similar one is recorded by Bricquet, *loc. cit.* p. 307; another by Guipon, *loc. cit.* p. 349, when the acid vomiting of pregnancy was immediately arrested by the use of beer. Valleix, *Bull. Thérap.* Oct. 1849, has noticed that meat and champagne were retained when milk was rejected, and that a kind of food which was retained in one day was vomited on the next, and *vice versa*.

<sup>2</sup> *Clin. Médicale*, ed. 1862, pp. 354, 365, 428, 429. This is probably also allied to the affection alluded to by Abercrombie, "Diseases of Stomach and Intestines," 3d edition, p. 71; and by Whytt, as *quick digestion*, *loc. cit.* p. 530.

canal, without permitting time for its due elaboration, and the influence of appropriate treatment strongly corroborates his opinion.

The affections of the general system frequently associated with the conditions which have now been described are nearly all such as point to their relation to a common cause. Many of them belong to the category of neuralgias, which occur either in distant or in proximate parts, and their appearance often alternates with remissions in the gastric disturbances. Some of these have been already alluded to, especially those of the dorsal, thoracic, abdominal, and intercostal muscles; but the occurrence of intercurrent painful affections is not limited to these, and they may assume the forms of toothache,<sup>1</sup> hemicrania, lumbago,<sup>2</sup> or sciatica.<sup>3</sup> Instead of pain, some one or more of the proteiform symptoms of nervous excitability may be present, such as attacks of cardiac palpitation,<sup>4</sup> or of strong pulsations of the abdominal aorta,<sup>5</sup> which often occur both during and in the intervals between the attacks of abdominal pain, and are distinguished by their sudden invasion and cessation, and by their rapid exacerbations. Dyspnœa,<sup>6</sup> globus, hiccough, paralytic,<sup>7</sup> syncopal,<sup>8</sup> or convulsive affections, salivation, and a copious discharge of pale urine<sup>9</sup> have all been observed, with greater or less frequency, as concomitants of these affections of the stomach, and indicate very clearly the condition of perverted innervation from which its disorders arise, and which can be traced to the states of

<sup>1</sup> Common in pregnancy.

<sup>2</sup> See a case of lumbago alternating with gastrodynia. Andral, Clin. Méd. ii. 297.

<sup>3</sup> Abercrombie, *loc. cit.* p. 86. Barras, i. 440, gives a case where a patient who had been subject to periodical headache became attacked with intermitting gastrodynia accompanied by the vomiting of mucus, but not of food, and which ceased on the supervention of sciatica. Two or three such attacks, with a similar order of sequence, were repeated at considerable intervals.

<sup>4</sup> This, however, is a symptom common to all forms of dyspepsia.

<sup>5</sup> Barras, *loc. cit.* p. 411. Walshe, Dis. of Heart, 3d ed. 438. Lebert, Virchow's Handbüch, V. ii. 53.

<sup>6</sup> Whytt, *loc. cit.* p. 560.

<sup>7</sup> A very interesting case of this nature, by Dr. Perceval, is to be found in the Med.-Chir. Trans. iv. p. 17.

<sup>8</sup> Guipon, *loc. cit.* p. 118.

<sup>9</sup> For a case of this kind occurring in a *male* patient, see Whytt, *loc. cit.* p. 557.



chlorosis, hysteria, melancholia,<sup>1</sup> or hypochondriasis, in which they take their origin.

The sleep also is affected in the majority of cases, and particularly in hysterical patients, who not only experience a difficulty in going to sleep, but are liable to awake during the night, with a great sense of exhaustion and hunger. Insomnolence is also commonly observed in patients of both sexes in whom disorder of the stomach has been caused by anxiety or over-fatigue, though in them the feeling of hunger on waking is usually wanting. In other instances, however, of the latter class the sleep may be heavy, but it is often unrefreshing and disturbed by dreams.

Many of the disturbances of the functions of other organs of the body have been already spoken of in connexion with the description of special symptoms, and it is unnecessary again to repeat the remarks made on the subject of the appetite, the digestion, or the constipation and flatulence which, with some exceptions, mark these cases, nor on the irregular and scanty menstruation, or the leucorrhœa attendant on anæmia or chlorosis, whose influence has been already largely insisted upon. It has been observed that in many cases where hypochondriasis is most marked, oxaluria has been present; but as this symptom is common to a great number of diseases, and probably depends more or less directly either on an excess of animal food (Niemeyer)<sup>2</sup> or on imperfect assimilation, its occurrence is rather to be associated with dyspeptic disturbances of another class, where the hypochondriasis, instead of being primary, is secondary to the disorder of the digestion, than with the more purely nervous disturbances now under consideration.

One very important class, to which Whytt first called attention, and instances of which are occasionally met with, is that where severe disorder of the stomach occurs in connexion with the gouty diathesis, and ceases with the appearance of the disease in one of the joints.<sup>3</sup> These attacks, however, as Whytt further remarked, are less liable to affect robust and strong individuals in whom the gouty affection is regularly developed, than in those of "weak fibres and very sensible nerves," who

<sup>1</sup> See Marshall Hall, On the Mimoses.

<sup>2</sup> *Loc. cit.* i. 544.

<sup>3</sup> Works, pp. 556, 559.

have "rarely any disorder like true gout," but who are liable to "craving or faintness, nausea or vomiting, flatulent swellings, borborygmi, low spirits, cramps, convulsive and violent pains in the stomach and bowels, and an increased secretion of saliva."<sup>1</sup> In other cases severe spasmodic affections of the stomach occur in the course of gouty attacks, and are characterised by violent abdominal pain, intense distension from flatus, and severe sinking, followed in some instances, when wine has been drunk, by acid vomiting, which has given relief.<sup>2</sup> The nature of these disorders is, however, a matter of some doubt, and though evidence regarding them is still wanting, there is considerable probability that many of them are not simple neuroses, but are rather to be classed under the category of acute indigestions, complicated by a predominance of nervous excitability together with prostration.<sup>3</sup>

PROGNOSIS.—The course of these affections is, as may be inferred from their history, very variable. Their duration depends in a large measure on the persistence of the exciting cause, ceasing with its cure, as is often observed in cases originating in anæmia or chlorosis, or in those arising from reflected irritation, especially when the cause is seated in the uterus.<sup>4</sup> The rapidity of their disappearance on the supervention of some other nervous phenomena affecting other parts, or of an attack of gout in cases when this diathesis is present, has already been a subject of remark. Barras<sup>5</sup> has observed that in some cases they disappear on the supervention of acute diseases, as fevers,<sup>6</sup> pneumonia, abscess, or variola, but are liable to reappear during or after convalescence.

The majority may continue for years with but little danger to life, and this is true not only of the minor degrees of hypochondriacal uneasiness, but even of some of the severer cases of

<sup>1</sup> Works, 560.

<sup>2</sup> See a case by Sir C. Scudamore, quoted by Dr. Garrod, p. 503.

<sup>3</sup> See pp. 39, 165.

<sup>4</sup> An interesting case of this kind is quoted by Hensch, from the third edition of Romberg's work. Hensch says that in some cases of cardialgia the pain has been known to occur only at the menstrual periods, *to cease with pregnancy, and to return after delivery.*

<sup>5</sup> Loc. cit. i. 539.

<sup>6</sup> τὰ σπασμώδεα καὶ τετανώδεα πυρετὸς ἐπιγεγόμενος λυεῖ.—Hippoc. Prænotiones, Works, Kühn's Ed. i. 289.

hysterical pain and vomiting. The hysterical forms, like all the other phases of this malady, are liable to diminish in severity and even to disappear with advancing life.<sup>1</sup>

Bricquet remarks that the vomiting of hysteria, though sometimes very obstinate, is the least dangerous of these affections. That it may, however, be attended with fatal consequences, and especially when constantly ensuing after everything eaten, and when associated with severe pain, is evident not only from his, but also from observations recorded by Andral, and Barras, and Budd. The danger resulting to the general nutrition from the more absolute forms of anorexia<sup>2</sup> has been already remarked upon.

The uncontrollable vomiting of pregnancy may also at times assume a very dangerous character. Thus, of fifty-eight cases collected by Cartaya,<sup>3</sup> thirty were fatal, twenty-eight were cured after abortion or the death of the foetus—fourteen of the latter having had premature delivery induced with success, while one recovered after the application of leeches to the os uteri, and two through the use of champagne.

THE PATHOLOGY of the functional disturbances of the stomach of which the description has here been given, is involved in the obscurity which attends that of a large class of nervous affections, and of which, indeed, it may be said, that our knowledge consists rather of isolated facts than of comprehensive inductions. Many of the leading phenomena attesting the influence of the nervous system in the production of the symptoms here alluded to, have been already considered, and the author has but little to add to what has been before stated, except to pass briefly in review some of the better known conditions of nervous disturbance which are applicable (in many cases, however, only inductively) to these affections.

It is well known that excessive excitability of the nervous system stands in an almost inverse relationship both to the due co-ordination and to the efficiency of the functions under its

<sup>1</sup> "Progređiente ætate cardialgia crebro sponte evanescit, multas novi mulieres quæ tempore juventutis et ætate florente frequentissime hoc malo macerabantur, ad senium perventas ab eo omnino immunes viventes."—Schmidtman, *loc. cit.* iii. 207.

<sup>2</sup> Of course this must not be confounded with those simulated forms of anorexia where the patient eats by stealth.

<sup>3</sup> Schmidt's Jahrbücher, 1855, iv. 60.

control, and that conditions of weakness or mal-nutrition of the nervous centres are evidenced by perversions in the harmony of their action characterised by an apparent excess of activity in one direction, but attended by deficiency in another. Thus (to cite familiar instances) a muscle in violent convulsion is unable to execute voluntary movement—a weak eye is conscious to a morbid degree of the impression of light, while its power of distinguishing objects is diminished—mental excitement, attended with rapid thought and vivid imagination, is generally deficient either in perspicacity of ideas or in the power of sustained attention or of logical precision.

The sensory nerves, and also those supplying both the voluntary and involuntary muscles (including among the latter the contractile coats of the blood-vessels), are subject to similar perversions of action. Thus it has often been noticed that when any part is the seat of severe pain, its power of distinguishing sensations is proportionably impaired; and in muscular parts, hyperæsthesia is not unfrequently combined either with paralysis or with convulsive movements, as may be often seen in neuralgias of the fifth pair.

The experiments of Lister and others have shown that the actions of the visceral and vasomotor nerves are exalted by impressions of moderate intensity made on the nervous centres, but are paralysed when these are carried to extreme degrees of stimulation. It is further highly probable that these impressions can be equally produced by peripheral stimulation of the sensory nerves as by direct excitation of the central roots of the motor fibres; and, therefore, the reflex effect resulting from the former will depend not only on the sensibility of the peripheral branches, but also on the degree of excitability of the nervous centres. Hence when this excitability is excessive, the effects of a moderate peripheral stimulus will resemble those produced artificially by excessive direct stimulation in the healthy state, and will give rise to paralysis or convulsion according to the proportion borne between the amount of stimulus and of the excitability present. Dr. Handfield Jones has also adduced some reasons for believing that vasomotor paralysis, determining excessive secretion, may coexist with undue irritability of other muscular tissues, as excessive secre-

tion from the eye and nose are known to be frequently attended with hyperæsthesia of the sensory nerve of these parts. If this view be correct, it is comparatively easy on the data above given to frame an hypothesis, with relation to these affections of the stomach, explanatory of the phenomena of hyperæsthesia associated with secretions either excessive in amount or perverted in quality, and also with spasmodic movements indicated by vomiting, and occurring in conditions signalized by morbid excitability of the nervous centres. The cases also in which reflected nervous action is observed to proceed in unusual, and probably in abnormal directions, appear to be explicable by the same data, and are further illustrated by some striking examples of such occurrences in parts more directly accessible to observation.<sup>1</sup>

The effects of anæmia as a cause of local pain, to which allusion has been made by many recent writers, and especially by Dr. Anstie, may possibly serve in some cases to explain the sensation of pain felt when the stomach is empty, and also its relief by food, which causes an increased afflux of blood to the part; and it is not without its parallel in the neuralgias of other parts, which are cured by a blister placed on the course of the nerve, or directly on the seat of pain.<sup>2</sup>

Of any special anatomical conditions discoverable in these cases we are as yet in ignorance; in fact, the absence of these constitutes their distinguishing feature, as contrasted with those cases where such lesions are found to explain the phenomena observed during life.

The question regarding the possibility of organic disease resulting as a consequence from long-continued disturbances of function, excited through the nervous system, is of very considerable importance, and though more properly belonging to the history of the anatomical lesions of the stomach, may yet be appropriately alluded to in this place, although its general pathological bearings are too extended to permit of more than a brief consideration of its leading features of interest.

<sup>1</sup> See an interesting case cited by Dr. H. Jones, "Functional Nervous Disorders," p. 11, of paralysis of the muscles of the eye, attended with circumorbital pain, resulting from necrosis of one of the phalangeal bones of the hand.

<sup>2</sup> Anstie, Stimulants and Narcotics, 214.

It is, however, associated with more than one fallacy, which render any positively accurate conclusions a matter of great difficulty, for it must be admitted that organic disease and disturbed innervation may in some cases exist simultaneously, having their origin from different and independent causes, and that in other cases the former may be the cause of the latter, which, again, may occasionally form its only symptoms or manifestation. This is very frequently observed in cases of ulcer and cancer,<sup>1</sup> where the "idiopathic" dyspepsia, or the pain, or the loss of appetite, said by some writers to precede the severer disease, are really the result of latent anatomical alterations, the existence of which, in their early stages, is only betrayed by the presence of these symptoms. The influence of perverted innervation in causing inflammatory, or sometimes even still severer morbid changes, is yet debated among pathologists. Samuel's experiments<sup>2</sup> have been shown by Weber<sup>3</sup> to be so associated with fallacies as to be but little reliable, but there yet remain numerous clinical records which seem unmistakably to establish this point.<sup>4</sup> These show that though the conditions attending inflammatory action consequent on impaired innervation are as yet only imperfectly understood, and though the explanation has yet to be found to account for the connexion between them in one series of cases and its absence in another, yet that the possibility of the fact of such connexion can hardly be doubted, while its importance in its clinical rela-

<sup>1</sup> See Abercrombie and Chomel, for cases of cancer only revealed by loss appetite, or of flesh and strength.

<sup>2</sup> For a summary of these, see Virchow's Archiv, xvi.

<sup>3</sup> Pitha and Billroth's Handbüch der Chirurgie, i. 402.

<sup>4</sup> For some well-marked instances of which, see Handfield Jones, *loc. cit.* p. 11, one of purulent discharge from the nostril, excited by a diseased tooth; a parallel instance to which has come under my own observation, of phlyctenular conjunctivitis, arising from the same cause. See also Paget's "Surgical Pathology," 257. Also the correspondence of the distribution of herpes to the branches of nerves, a very interesting case of which, preceded by unilateral neuralgia of the 5th, and followed by necrosis of the maxilla on the same side, is given by the same author. *Brit. Med. Journ.* 1866, p. 402. Also a case, recently published by Dr. Anstie (*Lancet*, 1866, ii. 548), of erysipelas, and corneal ulceration, consequent on neuralgia of the fifth nerve. See also Mr. Simon's article, "On Inflammation," Holmes's System of Surgery, vol. i. Also Bernard's "Experiments on Division of the Sympathetic," showing that parts thus affected became liable to inflammation when the general health of the animal was impaired. *Lec. Phys. Path. Syst. Nerv.* ii. 519.

tions to the class of disorders now under consideration is such as can scarcely be over-estimated.

THE TREATMENT of the various forms of nervous disturbance of the stomach may be briefly summarised as consisting in modifications of the tonic and stimulant plan already recommended for atonic dyspepsia; and their cure under this system affords further and valuable evidence of their true nature.

The discovery and cure of any source of peripheric irritation from which the symptoms may originate, is of the very first importance. It does not, however, seem necessary to do more than to remind the reader that unless this be accomplished, all treatment directed solely to the stomach will be frequently unavailing, and to recall the frequency with which in the female sex these diseases have their starting-point in uterine disorders. It will, however, conduce somewhat to perspicacity if the remedies which may be more particularly directed to the condition of the stomach, are mentioned in relation to the symptoms for which they have been found most efficacious.

In the relief of neuralgic pain iron holds a prominent place, and numerous cases are recorded in which its administration has been followed by cure after many other remedies had been unsuccessfully employed.<sup>1</sup> There is little doubt but that in the majority of instances the neutral preparations, and especially the carbonate, are both the most serviceable and also the safest. The dose should not exceed five grains, since larger ones often provoke colic and intestinal disturbance (Trousseau). Some writers, however, as Abercrombie, Dr. Handfield Jones, and Hensch, recommend the sulphate in doses of one to two grains. Hensch advises that it should be used in combination with morphia, and Abercrombie with aloes and pulv. aromat. taken twice daily, and the latter formula will at times be found serviceable when constipation is present.

Preparations of *nux vomica* have been greatly praised in these affections by Linnæus, Schmidtman, and Barras,<sup>2</sup> and I can also add my testimony to the value of this remedy in the relief of gastrodynia, and especially of some forms which occur

<sup>1</sup> See especially Andral, Clin. Méd. ii. 223, and Dr. Martin's case, before alluded to.

<sup>2</sup> See Barras, *loc. cit.* pp. 617, 643.

in men subject to anxiety, and where the starting-point has been in an acute attack of indigestion or "biliousness." Clarus,<sup>1</sup> who also attributes to it a "sedative" action in painful affections of the stomach, makes the further remark that it frequently prepares and enables the organ to bear ferruginous preparations, which had been previously ill tolerated. Its efficacy in pyrosis was observed by Linnæus;<sup>2</sup> and its curative effect in this disorder, which is not produced to at all an equal degree by other bitters, affords further evidence of the essentially nervous character of the derangement under which this hypersecretion occurs.

The nitrate and oxide of silver are also remedies of great repute for the cure of nervous pain. They should be given in doses of from half a grain to one grain<sup>3</sup> twice or three times daily before meals. When the nitrate is administered, it is best given in the form of pill, as in solution it is more likely to disagree, and to irritate the stomach.

The utility of opium in painful affections of the stomach can scarcely be overrated, though the usual caution is necessary with respect to its habitual use. A single dose will often permanently relieve pain of many days' standing, and its value has been strongly insisted upon by most writers on these disorders.<sup>4</sup> It is also a most valuable remedy in vomiting associated with pain, when it may often be administered with advantage as advised by Whytt, an hour before meals, or in the form of

<sup>1</sup> *Arzneimittellehre*, p. 649.

<sup>2</sup> This appears to rest on the authority of Cullen, *loc. cit.* ii. 467. I cannot find the statement in the writings of Linnæus, though in the "*Materia Medica*," ed. 1772, p. 67, it is said to be good for cardialgia. Schmidtman makes the same remark.

<sup>3</sup> The caution against the blackening of the skin which may, though rarely, result from their use, should, however, always be repeated when these remedies are recommended, and it appears safer to limit the period of their employment to a month or six weeks. In the Anatomical Museum at Berlin, there is a preparation of the kidney, the glomeruli of which are filled with the oxide of silver; and another case of the same kind has been recorded by Dr. Frommann, in *Virchow's Archiv*, xvii. 135, when the deposits were found in the villi of the intestines, and in the vessels of the spleen, liver, and kidneys.

<sup>4</sup> Barras (i. 531), who insists strongly on its use in contradistinction to the antiphlogistic treatment then in vogue for all stomach affections, narrates a case from Briou, of a patient who was ordered a *tisane*, and also some laudanum to put on a poultice. More fortunate than some victims of similar mistakes, he drank the laudanum, of which he took six drachms in eight days, and was cured.



enemata—a method which, in these circumstances, both he and Cullen concur in recommending. It is of special use in gastrodynia arising from anxiety and exhaustion, but its value is not inconsiderable in many hysterical cases; and it has been remarked that when it agrees, its effects in producing constipation are scarcely perceptible.

When pain is associated with hypersecretion or acidity, bismuth and magnesia, singly or in combination, are most useful. Either the carbonate or the tris-nitrate of bismuth may be employed in doses of from ten to fifteen grains; the former has the advantage of being more easily suspended, and also of being less likely to constipate,<sup>1</sup> a tendency which is further obviated by combination with magnesia. They should be suspended in mucilage, or in water with the compound tragacanth powder. When a large quantity of insipid fluid is ejected, as in pyrosis, bismuth combined with opium seldom fails to relieve; though, in order to complete a cure, a more direct astringent is sometimes necessary, and for this purpose the compound kino powder is the best remedy that can be employed. Pain from flatulence is in these cases best treated by ether or aromatic spirit of ammonia, and the former agent is sometimes useful in checking hysterical vomiting. Trousseau<sup>2</sup> speaks highly of the use of valerian and assafoetida in the wearing uneasiness which he terms “*anxiété épigastrique*.”

In the general irritability of the nervous system, associated with dyspeptic symptoms and oxaluria, which occur among the effects of anxiety or exhaustion, the sulphate of zinc, first recommended by Dr. Golding Bird,<sup>3</sup> and the oxide subsequently used by Dr. Marcet<sup>4</sup> in cases where the same symptoms have followed the use of alcohol, and even in some where the latter cause has not existed, often prove of considerable service. They both seem to act as “tonics” in this condition, and the oxide has the additional advantage, if given at bedtime in doses of from two to three grains, of procuring sleep.

<sup>1</sup> I question whether the action of this remedy is other than local, and hence see no special advantage in using the soluble forms. The benefit derived from the nitrate, which is very insoluble, is, as far as my experience has extended, as great as from any other preparation.

<sup>2</sup> *Traité de Thérap.* ii. 307.

<sup>3</sup> *Loc. cit.* p. 256.

<sup>4</sup> *Chronic Alcoholic Intoxication*, p. 100.

Hydrocyanic acid, which is the active ingredient in the aqua lauro-cerasi, is a remedy concerning the efficacy of which there is much difference of opinion among authors on the diseases of the stomach. My own experience would induce me to believe that it is less efficacious in the severer than in the milder cases of gastrodynia, and that it is more peculiarly useful when there is some degree of inflammatory action present than in the purer forms of neurosis. It has frequently failed, in my experience, to check even the slighter forms of vomiting in pregnancy, and I have more than once known a considerable amount of nausea caused by its use in cases where this symptom had not previously existed. It sometimes appears to act more favourably in combination with bismuth than when given alone.

When the pain is very severe, relief has sometimes been experienced from the application of plasters of belladonna or of opium to the epigastrium, or from counter-irritation in this region by means of croton oil, or blisters, and the latter may be followed by the endermic application of morphia; but it is probable that in many of the cases where the efficacy of such remedies has been recorded, the pain so relieved has more truly been seated in the abdominal muscles, where, as before remarked, its presence may complicate the gastric pain. In some of these cases the hypodermic injection of one-sixth of a grain of morphia over the seat of tenderness has afforded relief, and I have known this plan to be most efficacious in the severe pain associated with a cancer of the stomach which had formed adhesions to the anterior abdominal wall.

In obstinate cases it may be well to try Bricquet's recommendation of Faradisation.

Vomiting is sometimes a very difficult symptom to overcome, and the possibility of its fatal termination has been already alluded to. When very severe it is important to give the stomach rest by the employment, during a certain period, of nutritive enemata, a plan which should never be omitted when vomiting, from whatever cause, is severe and obstinate. The value of rest is further illustrated by a case quoted by Sir T. Watson and other writers from William Hunter,<sup>1</sup> where a boy reduced to an extreme degree of emaciation by constant vomit-

<sup>1</sup> Med. Obs. and Enquiries, vol. v.

ing, attended by severe pain, was fed by spoonfuls only of milk frequently repeated, with the effect of completely arresting the vomiting, and enabling the stomach to bear more substantial food, the result being that the patient was completely cured; and numerous cases since recorded have confirmed the advantages of this method. In nervous cases the use of opium by the mouth is often of considerable value, and I have known a few doses of three or four drops of laudanum speedily check vomiting resulting from disease of the uterus, which had persisted for some weeks previously. In severe cases the administration of this remedy by enemata may often be resorted to with great advantage.

Iced effervescent drinks, combining the effects of cold with the sedative<sup>1</sup> effects of the carbonic acid, also prove useful; and great benefit is sometimes experienced from the use of champagne, and also from effervescent draughts containing hydrocyanic acid.

Bismuth, as has been remarked by other writers, is of comparatively little service when vomiting is purely sympathetic, and particularly when it arises from disorder of the uterus; but when any inflammatory state is present and complicates the nervous disturbance, it may often be employed with advantage combined with hydrocyanic acid.

The oxalate of cerium (first introduced into practice by Sir J. Simpson,<sup>2</sup> of Edinburgh) has been found very efficacious in some cases of vomiting in pregnancy. It should be given in pills in doses of one or two grains.

In many of the milder cases of acid vomiting or troublesome heartburn of pregnancy, hydrochloric acid combined with tincture of *nux vomica*, given before meals, often proves of great service. I have seen less benefit result from the use of the acid alone; and part of the efficaciousness of the remedy is in my opinion due to the influence of the *nux vomica*.

*Pepsin* is also occasionally of considerable value in these affections, though the mode of its operation is not very intelligible; but the administration of one or two doses is sometimes sufficient to enable the food to be retained, and the habit of

<sup>1</sup> Sir J. Simpson's *Obstetric Works*, vol. ii. 769.

<sup>2</sup> *Ibid.* i. 313.

rejecting it, being once broken, seems in some cases to be the essential feature of the cure.<sup>1</sup>

Among other remedies that have been found efficacious in hysterical vomiting, are the douche, shower-bath, or cold affusion to the body and abdomen.<sup>2</sup>

In the vomiting of pregnancy, Bretonneau reports that he has found great service from frictions of belladonna over the hypogastric region;<sup>3</sup> and the applications of the extract to the cervix uteri has been made with the same intention by Cayeaux<sup>4</sup> with good effect.

Acupuncture has also in some cases been efficacious,<sup>5</sup> and in others Faradisation<sup>6</sup> has been found of value.

The internal administration of tincture of iodine has been known to check the vomiting of pregnancy,<sup>7</sup> but it does not appear to have been tried in this country, and I have no experience of its efficacy.

Finally, it must be recollected that troublesome vomiting apparently of the same kind may sometimes be caused by constipation, and that the use of aperients may be absolutely necessary to overcome it. In these cases the mixture of carbonate and sulphate of magnesia in doses of a scruple of the former to two drachms of the latter in some aromatic infusion should be administered repeatedly every four or six hours, until the bowels have acted freely.

The foregoing list, though affording a great variety of choice, indicates also that there are probably concealed differences in the nature of the affections for which they are found useful, which are not as yet fully elucidated. The more ordinary kinds of neuralgic pain, when independent of causes of reflex origin, are as a rule easily controlled by iron, nux vomica, opium, ether, nitrate or oxide of silver, hydrocyanic acid, or bismuth; but it

<sup>1</sup> This point has been ably insisted upon by Dr. Chambers.

<sup>2</sup> Andral, Clin. Méd. ii. 196. Barras, i. 480, quotes a case from L. Frank, where a lady, who had vomited her food for eight years, retained it when taken in a bath.

<sup>3</sup> Trousseau and Pedoux, *Traité de Thérap.* ii. 76.

<sup>4</sup> Ibid.

<sup>5</sup> Ibid. i. 190.

<sup>6</sup> Bricquet, before quoted, p. 218. Bicheteau, Bull. Gén. Thérap. lxi. 417. Debout, Bull. Thérap. Aug. 30, 1863.

<sup>7</sup> Clarus, p. 840.

is in the cases of severe hysterical pain and vomiting, or where these symptoms originate from causes of irritation in distant organs, that the greatest difficulty is experienced, and in these there is a considerable degree of uncertainty in the effects of treatment.

In the nervous disorder of the digestion which has been described as associated with diarrhœa, opium before meals, or administered in a clyster at bedtime, often affords relief; but I have known cases in which the health was only finally re-established after the use of nux vomica and hydrochloric acid. Patients suffering in this manner should avoid hot fluids at meals, and abstain from tea in the evening. In fact, in most of the nervous affections which have been here described, the use of tea and coffee, and especially of the latter, is injurious, and often serves to excite pain even after it has been allayed by treatment.

The majority of cases of spasmodic pain supervening in the course of gouty attacks are to be treated with large draughts of warm water, and with ether, musk, or camphor. The sense of distension and load at the stomach, and the relief often experienced from vomiting, are not, however, to be taken as indications for the administration of stimulant emetics; for in such cases inflammation of the stomach, if not already present in some degree, is very liable to be excited by any undue irritation of the mucous membrane. It is desirable in all cases to promote by hot pediluvia or by mustard cataplasms the return of the disorder to the feet, and cases are recorded where this has been followed by immediate relief to the stomach symptoms.<sup>1</sup>

<sup>1</sup> See Dr. Copland's Med. Dict. vol. ii. p. 39; also Dr. Garrod, before quoted.

## CHAPTER VI.

### ACUTE GASTRIC CATARRH, OR INFLAMMATORY DYSPEPSIA.

THIS affection, which occurs in very variable degrees of severity, has been known under many different names, such as the gastritis erythematica of Cullen; the gastritis of Hoffmann, Van Swieten, and Broussais; the febris gastrica and febris mucosa of some of the French and German writers of the end of the last and beginning of the present century—terms which are still retained for some of its forms, in this country, under the title of gastric fever; while in milder cases it corresponds to the “*embarras gastrique*” of the French, and to the acute indigestion or biliousness of English authors.

Its terminology and real nature have also been involved in much obscurity from the variety of the affections confounded under this title, including the specific fevers on the one hand, and on the other post-mortem softenings, ulcer, and cancer of the stomach, to which allusion has already been made in the Introduction.

There is no question but that acute typical gastritis, unless when caused by acrid poisons, is a comparatively rare affection, and equally so is the disease corresponding to Cullen's *G. Phlegmonodea*, when suppurative action takes place in the submucous tissue. Its milder forms, corresponding to the catarrhal affections of other mucous membranes, are, however, exceedingly common, and constitute the cause of the majority of the acute attacks of indigestion which occur either spontaneously or in the course of other diseases. The distinction, however, between the acute and chronic stages of inflammatory affections of the stomach is not always capable of being drawn

with great accuracy, since, as remarked by Chomel, many persons liable to the disease may often suffer from a succession of subacute attacks, which being excited by slight causes, may imperceptibly pass into one another, and thus acquire the character of a continuous disorder.

**ÆTIOLOGY.**—Though common at all ages, and said to have been observed in the fœtus,<sup>1</sup> the periods of infancy and childhood evince the greatest proclivity to inflammatory affections of the stomach, owing to its greater liability at these ages to derangement by food unsuited to its physiological functions;<sup>2</sup> while at later periods the powers of digesting a mixed diet becoming increased, the effects of indigestible substances are less apparent. They are, however, prone to occur during dentition, and although some influence in their production may be ascribed to the reflex irritation and constitutional disturbance which frequently attends the eruption of the teeth, they are more commonly in the first dentition to be traced to a too sudden change of food, as in weaning, and in the second to excessive and rapid eating, combined with imperfect mastication. Persons in advanced life are also very liable to suffer in a similar manner, unless due care be exercised in their diet; for, as their powers of digestion partake of the general enfeeblement of the system, the proclivity of the more chronic forms of atonic dyspepsia, which are so common at this period, to pass into acute affections, is easily understood when we remember the tendency of any tissue whose nutrition is impaired to undergo asthenic inflammatory changes.<sup>3</sup>

<sup>1</sup> Andral, *Path. Interne*, i. 17. Rayer, *Diët. de Méd.* x. 134.

<sup>2</sup> It is important that the junior practitioner should remember, what is seldom mentioned in systematic treatises, that certain causes may affect the milk given to infants, through which it often proves a source of severe gastro-enteric catarrh. Menstruation occurring during lactation is one of these; and in infants brought up by hand on cow's milk, vomiting and purging are frequently excited when the animals are fed on turnips or mangold.

<sup>3</sup> These remarks apply to the acuter forms alone. The only two authors, Dr. H. Jones (*Dis. Stomach*, p. 74) and Willigk (*Prag. Viertel Jahresch.* li. p. 28), who have made observations on this head, have included both recent and chronic catarrh in their statistics; and in these taken collectively, the tendency to increased frequency of occurrence with advancing age, is very striking. Willigk's observations, however, only begin with ages from thirty upwards; and of twenty-three cases, by Dr. H. Jones, "eleven were past fifty years, and fifteen past forty years of life." I believe, from my own observations, that the increased frequency

There are no certain data enabling an accurate comparison to be made of the frequency of these diseases in either sex. Many of the causes tending to excite inflammatory affections of the stomach, especially excesses of various kinds, are more common in the male sex, but independently of these they appear to be equally common in both.

The most frequent predisposing causes are, however, those which in this respect form a common starting-point for the majority of all inflammatory processes—viz. weakened states of the system or of the organ; and especially those by which in especial relation to the stomach its functional power is impaired, and the secretion of gastric juice diminished. Under these circumstances, the food which remains undigested, unless got rid of by vomiting, or expelled by the bowel, becomes a source of irritation, and tends to cause inflammatory changes, varying in degree according to the amount of irritation or the proclivity of the tissue to suffer from its effects.

Hence, among the predisposing causes must be reckoned the greater number of those already enumerated under the ætiology of atonic dyspepsia, as capable of impairing the digestive powers of the stomach. Among the most frequent of these are the presence of chronic exhausting diseases of other organs, and the period of convalescence from acute affections, in which the appetite is frequently disproportioned to the digestive powers: and food excessively indulged in tends to act in the manner just described.

The effect, however, of inanition or starvation, to which some writers have attributed the power of causing inflammation of the stomach, deserves some especial attention. Setting aside the observation of Hunter,<sup>1</sup> and the parallel one of Blundell,<sup>2</sup> who found the stomach softened after death from starvation, as probably belonging to the category of cases where this change was not due to inflammatory action, we find some cases by Andral,<sup>3</sup> where in dogs that had been starved, the mucous membrane of gastric catarrh in the later periods of life will be found rather to affect the chronic than the acuter forms.

<sup>1</sup> Phil. Trans. 1772, "Observations on certain Parts of the Animal Economy."

<sup>2</sup> Quoted by Dr. Hodgkin, "Morbid Anatomy of the Mucous and Serous Membranes," ii. 309.

<sup>3</sup> Path. Interne, i. 15. Essai d'Hématologie Pathologique, p. 82.



brane of the stomach was found red, and swollen, and ulcerated; and instances are recorded where individuals, who had been fed long on insufficient diet, have suffered from nausea and vomiting.<sup>1</sup> On the other hand, in many cases after death from inanition no such phenomena have been seen, as in the majority of Chossat's observations,<sup>2</sup> and in several quoted by Barras,<sup>3</sup> of persons who have died from starvation, where none of the appearances of inflammatory action were found.<sup>4</sup> It is not impossible that aphthous and ulcerative changes, similar to those which have been observed to occur in other tissues from the effects of inanition, may result from the same cause in the mucous membrane of the stomach, but it is evident that the effect is not a constant one. Two facts, observed by Bidder and Schmidt, deserve, however, to be borne in mind in relation to this question, viz. that after a moderate period of fasting the secretion of the gastric juice is increased, but that after longer abstinence it is diminished. It is not impossible that the disturbance of functional energy caused by the accumulation of materials for secretion in the gland-cells for which the appropriate secretory stimulus of food is withheld, may in some cases set up further inflammatory changes, as described by Andral; but in the cases where an imperfect supply of food is provided, or when this is unduly administered after long fasting, it is more probable that they are due to the food imperfectly digested through deficiency of gastric juice causing irritation in the manner before described.<sup>5</sup>

As the exciting causes of inflammation of the stomach must be mentioned irritants of all kinds, including those whose action is purely mechanical, but more particularly the mineral

<sup>1</sup> See especially a letter from Mr. Malcolmson to Lord Hardinge, on the effects of a diet of bread and water on prisoners in causing total loss of appetite, constipation or diarrhœa with slimy discharges, with fever, swollen, red tongue, and great prostration. Quoted by Budd, *loc. cit.* p. 96, who gives other cases.

<sup>2</sup> Recherches Expérimentales sur l'Inanition.

<sup>3</sup> *Loc. cit.* i. 522.

<sup>4</sup> See also some cases of the same kind in Taylor's "Medical Jurisprudence."

<sup>5</sup> Chossat found that pigeons in a state of starvation could not digest the food given them, and that under these circumstances they suffered from diarrhœa; and other illustrations of the same fact occur in the histories of persons who have suffered from starvation. Barras, ii. 168, says that after the season of Lent, many persons suffer from indigestion.

and vegetable acrid poisons ; and emetic substances taken medicinally, especially tartar emetic<sup>1</sup> and mustard, have been known to act in this manner. Arsenic taken medicinally is sometimes followed by similar effects in a degree proportioned to the persistence of the treatment, the amount administered, and the susceptibility of the patient. The injurious effects of this substance are also sometimes seen in trades exposing the workers to its fumes or powder. The use of arsenical paper-hangings has also caused the same condition, an instance of which has come under my knowledge, where a previously healthy child was seized with violent vomiting, in which blood was brought up, while sleeping in a room so papered.<sup>2</sup>

In the same category must be placed substances of an unsuitable character taken as food, such as decomposing meat or vegetables, or shell-fish in some special conditions—which latter seem to have a peculiar efficacy in this direction. The same effect may, however, be due to alimentary substances which are not directly injurious, when taken in excess of the digestive powers of the gastric juice, though their influence in this respect must to some degree depend upon their relative digestibility. Similar consequences may ensue from causes operating through the nervous system, and suddenly arresting the process of digestion, and thus reducing the food which has been taken to the position of a foreign body, and consequently an irritant to the stomach.

Drinking largely of cold water when the body has been heated is also mentioned as a cause of catarrh of the stomach. Sudden changes of temperature have had a similar influence attributed to them ;<sup>3</sup> and climatic conditions appear sometimes to act in the same direction, for catarrhal affections of the stomach are most common in changeable weather, with cold and high winds, as in the spring and later autumn,<sup>4</sup> and also during the severe heats of summer and early autumn.

<sup>1</sup> Andral, Clin. Méd. i. 246.

<sup>2</sup> Dr. King Chambers has narrated a similar case—"Indigestions," p. 217.

<sup>3</sup> Guipon, *loc. cit.* Obs. 21, p. 329, has recorded a case of a workman who, after exposure to the heat of a furnace, was seized with acute vomiting and pain at the stomach, and this accident was repeated several times.

<sup>4</sup> Broussais, Hist. des Phleg. ii. 456, ed. 1822, says that inflammatory affections of the gastro-intestinal mucous membrane were very common in the Venetian

There appears to be a certain amount of evidence to show that epidemic influences have some share in producing this disorder. Thus Sydenham describes in the years 1669, 70, 71, 72, as coincident with dysentery, and following an epidemic of "cholera," a fever setting in with gripes, headache, a moist tongue with a thick fur and aphthæ, *cured in six days by purging and low diet.*<sup>1</sup> Barras<sup>2</sup> remarked, that during the cholera epidemic of 1832, affections of the stomach were very common. P. Frank<sup>3</sup> ascribed them to a *constitutio annua*, and Schmidt-mann<sup>4</sup> to a *constitutio gastrica*, independent of any special kind of weather. Chomel has remarked the coincidence with cholera of the cases of vomiting which he terms "*dyspepsie acide grave.*" During the height of the late epidemic in August 1866, I was much struck with the frequency of subacute inflammatory affections, corresponding in their symptoms to the state known by the French as "*embarras gastrique ;*"<sup>5</sup> and Barthez and Rilliet<sup>6</sup> consider the probability of this affection and of other forms of gastro-intestinal catarrh taking place under epidemic influences, as very strong. It has also been stated that there is a special proclivity to gastro-intestinal catarrh during some epidemics of typhoid fever.<sup>7</sup>

Friuli, but many of his cases can hardly be considered as examples of simple gastritis, and would now be considered as pneumonia, typhoid fever, or acute tuberculosis. Brighton has universally the reputation of making many "bilious" during early periods of their residence there ; and Dr. J. Todd, Cyc. Pract. Med. art. "Indigestion," says that these disorders are common in Turkey, Greece, Italy, Spain, Nice, Genoa, and Marseilles ; and that they often follow the *bise* in Switzerland, the *mistral* in Provence, and the *tramontana* in Italy. Willigk, "Prager Viertel Jahreschrift," li. p. 28, gives for 327 cases of acute and chronic catarrh combined, observed in five years, the following relative frequency for the seasons :—Spring, 6·2 per cent. ; summer, 3·4 ; autumn, 2·9 ; winter, 2·5.

<sup>1</sup> Syd. Soc. Trans. i. 177, 181.

<sup>2</sup> Loc. cit. ii. 161, 162.

<sup>3</sup> De Curandis Hominum Morbis, i. pp. 73—75.

<sup>4</sup> Summa Obs. Med. iii. 300.

There is no doubt that some of the epidemics spoken of by older writers, as by Elsaesser, Sarcom, Roederer and Wagler, "De Morbo Mucoso," P. Frank and Reil, included many cases of typhoid fever, as there was swelling of the agminated glands of the intestines. See J. Frank, Prax. Med. Univ. Præcept. 1811, vol. i. pars i. p. 244.

<sup>5</sup> See also the report in the *Medical Times and Gazette*, July, 1866, of the frequency of "*embarras gastrique*" during the outbreak of cholera at Amiens.

<sup>6</sup> *Traité des Malad. des Enfants*, i. 717, 732, 739, &c.

<sup>7</sup> Schmidt's *Jahrbücher*, 1863, pp. 123, 243. Bericht über die Krankenhäuser Wieden.

There are several other diseases with which inflammatory conditions of the stomach so frequently concur, that they may almost be considered as part of the general disorder. Many belong to the acute febrile affections, though the impairment of the functions of the stomach in them is not always due to changes of an inflammatory character—nor is it easy to explain why these should be prominent in some cases and absent in others—yet the influence of some is so well marked, that they deserve to be mentioned as almost constant exciting causes of gastric disorder. Among the first of these is cholera,<sup>1</sup> in which disease I have seldom or never found important changes in the mucous membranes to be absent.<sup>2</sup> Scarlatina has been shown by the researches of Drs. Brinton<sup>3</sup> and Fenwick<sup>4</sup> to be associated almost constantly with inflammatory changes of the mucous membrane of the stomach,<sup>5</sup> and I have observed the same conditions in diphtheria,<sup>6</sup> variola,<sup>7</sup> puerperal fever,<sup>8</sup> phlebitis, pneumonia and pyæmia, and, with a less frequency, in typhoid fever. Erysipelas is mentioned by Bamberger as a disease with which they are frequently associated, and P. Frank says, that he has known inflammation of the stomach follow its retrocession. It is also a common complication of pulmonary tuberculosis, this condition having been met with in 28 per cent. of a series of cases of acute and chronic catarrh tabulated.<sup>9</sup>

<sup>1</sup> I would remark, that as far as my comparatively few observations on the changes of the mucous membranes in the cattle plague extended, I have noticed an extraordinary resemblance between the changes observed in this affection and in cholera.

<sup>2</sup> Several observations on the effects of cholera in causing acute gastritis are also to be found in Andral, *Clin. Méd.* ii.

<sup>3</sup> *Diseases of Stomach*, p. 57.

<sup>4</sup> *Med.-Chir. Trans.* xlvii.

<sup>5</sup> In measles, as far as my observations have extended, these changes do not, as a rule, occur so frequently or in so marked a degree, though they have been observed by Barthez and Rilliet in the intestines. *Malad. des Enfants*, iii. 271.

<sup>6</sup> Dr. Jenner has also seen diphtheria of the fauces associated with false membranes in the stomach ("Diphtheria," 1861, p. 4). This does not appear to be common, and from Dr. Jenner's observations, it is probable that its occurrence is somewhat influenced by epidemic character. See also Squire, art. "Diphtheria," Reynolds' *Syst. Med.* i. p. 401.

<sup>7</sup> See also Andral, *Prec. Path. Anat.* ii. 226.

<sup>8</sup> In a series of observations where my attention was specially directed to this point, I only observed catarrhal affections of the stomach in four out of nine cases of this disease.

<sup>9</sup> See chapter on Chronic Catarrh.

Observations have also been made by Dr. Stokes, in Dublin, as to the frequency with which acute inflammatory affections of the stomach have been found to complicate those of the lungs.<sup>1</sup> Some of his cases might possibly be more appropriately considered in the present day as being examples either of typhoid fever or of acute tubercular pneumonia, yet my own experience is confirmatory of Dr. Stokes' observations, as I have lately seen a case of acute gangrenous pneumonia (the putrid pneumonia to which he refers) associated with diphtheritic inflammation of the stomach. Nor will instances be wanting in the experience of almost every practitioner, in which ordinary catarrhal affections of the nose, throat, or bronchi are either complicated with or followed by the symptoms of acute indigestion or diarrhoea; in fact, it is almost within popular knowledge, that a "cold" often "passes off" in this manner.

It may also be considered a question deserving further elucidation, whether some of the cases of vomiting in pregnancy, hitherto set down to reflex irritation, may not depend on alterations of a similar kind.<sup>2</sup>

The liability of the stomach to suffer from other causes inducing constitutional irritation and febrile action, is illustrated by Abernethy's observations,<sup>3</sup> who was well acquainted with this effect of general disturbance of the system.

Retrocession of gout and of acute rheumatism have also been occasionally observed as causes of this affection. The connexion

<sup>1</sup> Cyc. Pract. Med. iii. art. "Gastritis."

<sup>2</sup> The majority of cases where examinations after death from this cause have been recorded, speak of the stomach as showing little or no sign of disease. Virchow, however (Ges. Abhand. 778), has shown that in pregnancy the liver shows the same alterations as have been commonly noticed in the kidney, and which, under the title "Cloudy Swelling," are recognised as indicative of an inflammatory condition. This state will be described in the account to be given of the pathological changes found in catarrhal inflammation of the stomach, as frequently forming the most characteristic appearance present. In the Dict. Sciences Méd. vol. xvii. art. "Gastrite," p. 382, is recorded, by Guersant, a case of a woman dying from vomiting in pregnancy, in whom the stomach was found "*très blanche, un peu plus épaisse que dans l'état naturel, et recouverte d'une mucosité abondante.*"

<sup>3</sup> Rayer, Dict. de Méd. x. 136, says that he has observed that inflammations of the joints, the kidneys, bladder, and serous membranes had an important influence in determining gastro-enteric inflammation, which was acute or chronic according to the severity and duration of its cause.

of the former with inflammatory conditions of the stomach has not been supported by direct anatomical evidence, but of the latter a case ending fatally has been recorded by Andral,<sup>1</sup> and I have myself lately witnessed one of very similar characters, where violent epigastric pain and vomiting followed by diarrhoea, supervened on the diminution of the pains in the joints, and gradually disappeared as the latter again became worse.<sup>2</sup> Gastric symptoms, it should however be noticed, are not as a rule a prominent feature in this disease.

The question of the possibility of nervous disturbance chiefly arising from moral emotions, acting as exciting causes of the disease, has been already alluded to. There are, however, as has been before remarked, but few authentic or uncomplicated instances of this nature recorded. That they may act as indirect causes by arresting digestion, is very probable; but further proof appears to be required before their direct influence can be regarded as fully established.<sup>3</sup>

THE SYMPTOMS of recent or acute catarrhal affections vary considerably in intensity according to the degree of severity of the attack. They may be generally comprehended under the following category: uneasiness, distress or pain at the epigastrium—the latter symptom being however occasionally wanting, or at least not present to any marked degree, even in some of the severer forms of the disease; anorexia more or less complete, vomiting, thirst, general malaise or prostration, headache, febrile reaction of variable intensity, thirst, constipation in some cases, diarrhoea in others. It must be considered as proved from Beaumont's observations that in slighter cases of this nature, where however undoubted evidence of an inflammatory state has existed, its presence may be entirely unmarked by any local uneasiness, and only may be felt by general malaise accompanied with slight headache. There are also differences observable in the character of the attacks, and

<sup>1</sup> Clin. Méd. ii. p. 11.

<sup>2</sup> M. Chomel has also observed similar cases (*Des Dyspepsies*, p. 137).

<sup>3</sup> With the exception of the case previously quoted from Andral, the recorded observations of this nature are chiefly in older writers. Hoffmann, *De Inflamm. Ventris Frequentiss.* Op. vol. vi. 223–227. Blasius, *Obs. Med. Anat. Rariores.* Barry, *Acta Reg. Soc. Med. Hannov.* vol. iii., all cited in Copland's Dictionary.

the disorder may be described as existing in certain typical forms, between which, however, every shade of variety or resemblance may in different cases be found to exist. The principal of these are :—

(a) Acute indigestion and the “*embarras gastrique*” of the French authors.<sup>1</sup>

(b) Febrile forms in which the fever is secondary to the disorder of the stomach.

(c) Catarrhal affections of the stomach, complicating the exanthemata and other acute diseases.

(d) Acute catarrh of the stomach arising from alcoholic excess.

(e) Acute catarrh in infants.

(f) Gouty inflammatory affections of the stomach.

(g) Severe inflammation resulting from irritant poisons.

(a) Acute indigestion may assume various degrees of severity, according to its cause or the previous health of the patient. In some cases it may present only the phenomena of a trifling bilious attack ; in others it may last many days or weeks.

Its origin will ordinarily be found in some of the causes temporarily disturbing the digestion ; a moral emotion, or severe exercise after a meal, indigestible food taken in excessive quantity, or food against which an idiosyncrasy exists on the part of the patient, are, however, among its most frequent causes. The first symptoms generally are a sense of fatigue, with malaise, aching in the back or limbs, and depression of spirits ; these are soon followed by epigastric uneasiness and distension, and sometimes by severe pain in the stomach. During these attacks there is often a sense of faintness, the extremities are cold, and the pulse weak, fluttering, and depressed, and the patient is often bathed in cold perspiration. Headache soon supervenes, generally frontal in position, sometimes of considerable severity, and not unfrequently associated with intolerance of light and sound. Nausea with increased flow of saliva follows, and the offending meal is rejected,

<sup>1</sup> Many of these authors consider “*embarras gastrique*” as a distinct disorder, having nothing in common with the inflammatory processes. I cannot but regard this question as set at rest by Beaumont’s observations, and think that the difference between these and severer affections is only one of degree—an opinion which is confirmed not only by their ætiology, but also by the effects of treatment.

accompanied by a great quantity of acid fluid, and with its expulsion the symptoms may cease. In other cases, which last some hours longer, the stomach does not expel its contents, but they pass into the intestines. Griping and colicky pains then ensue; in some cases a spontaneous diarrhœa is set up, which carries off the peccant material, but in others constipation, associated with flatulence and spasmodic contractions of the intestines, continue until the bowel is evacuated by a purgative. In the latter cases, however, and when the food is not returned by vomiting, it speedily becomes the source of further irritation. Pain, sometimes acute, is felt at the epigastrium; or there may be only an excessive sense of uneasiness, and weight or load at the præcordial region. There is complete anorexia and loathing of food, and nausea continues, attended with ineffectual attempts to vomit. The tongue becomes loaded with a thick creamy fur; and though the amount of this varies in different cases, being sometimes thin enough to allow the enlarged papillæ to appear through, it always retains its soft, moist appearance; the breath is offensive, and thirst is generally a marked symptom. In other and severer cases the circulatory and nervous systems may participate in the general disorder; palpitation, dyspnœa, faintness, vertigo, or a confusion of ideas may supervene; and when in the case of elderly people an excessive amount of flatus is generated, cerebral congestion may occur to an extent sufficient to simulate an apoplectiform attack; while in children, and sometimes also in females, the implication of the nervous system may induce convulsive affections of the epileptiform character.

Anorexia, pain, and thirst, with a loaded tongue and great general depression, may sometimes continue for days, owing to undigested food being retained in the stomach, and may disappear after this has been evacuated by an emetic, but in other cases the irritation remains long after its cause has been removed. The persistence of the symptoms above indicated, with certain others superadded, then form the "*status gastricus*," "*saburral condition*," or "*embarras gastrique*" of the French, which may in most cases be traceable to some of the causes above indicated, but in others it occurs apparently spontaneously, or it may result from fatigue, over-anxiety, or probably from some



of the epidemic influences before alluded to. There is then tenderness, load, and uneasiness at the epigastrium, together with great disgust for food, which, when taken, increases the distress, or causes nausea, and sometimes vomiting; if this occurs, mucus, or bile, or watery fluid, is ejected, and if the food is returned it is usually acid from fermentation. Thirst is a marked symptom, and there is sometimes a craving for acid drinks; the tongue is more or less thickly covered with a moist white or brown fur; there is a bitter, nauseous, and sometimes metallic taste in the mouth, and an increased flow of saliva has been occasionally noticed. Fetid and acrid eructations and heartburn are often complained of, and the breath is heavy and offensive. There is great physical and intellectual oppression, and a sense of fatigue and weakness, which may be the sole symptoms felt by the patient, or for which relief is sought; or there may be dull, confused headache, becoming sharper at intervals and not relieved by sleep. Sleep is unrefreshing, and disturbed by dreams or nightmare. There are often rigors and slight horripilation of the skin, especially towards evening, with a certain amount of febrile reaction, ending sometimes in acid perspiration during sleep; an icteric tint of the conjunctivæ is very common. The pulse, except during febrile accessions, is generally depressed and weak, and slower than natural, though easily accelerated on slight exertion. If fever supervenes, it becomes quick, and full, but easily compressible. Urticaria and herpes sometimes complicate these attacks: the former is often caused by shell-fish, or by substances against which the patient has a special idiosyncrasy;<sup>1</sup> the latter, when appearing in connexion with acute attacks of indigestion, mostly affects the *alæ nasi*, the lips, and chin,<sup>2</sup> and more frequently results from the use of malt liquors in persons with whom these habitually disagree, than from any other single cause with which I am acquainted.

The urine is usually scanty, acid, high-coloured, and loaded

<sup>1</sup> Mushrooms, cucumbers, almonds, oatmeal, pork pie, and mackarel. Budd, *loc. cit.* 266. Cubebs also has been known to cause it. Wood, "Pharmacologia," i. 331. In some of these cases the invasion of the nettlerash is not always accompanied with the signs of gastric disorder here mentioned.

<sup>2</sup> Herpes Zoster, though preceded often by severe constitutional disturbance, is not so common a phenomenon of these attacks.

with lithates on standing; it may in some forms of acute indigestion occasionally present traces of albumen. The bowels are, as a rule, confined. In some cases diarrhœa may have been present at the outset, with colic and griping, but on ceasing it is followed by constipation; in rarer instances, in which catarrh of the intestinal canal is also present, it persists throughout, and is then attended with griping, and with pale watery stools, which often irritate the anus and rectum when passed.

The duration of such an attack is uncertain: when appropriately treated, it usually terminates in a few days, though a certain irritability and weakness of digestion may continue for some time after; but when neglected, or when food is indulged in as usual, or if alcoholic stimulants are taken in excess to relieve the flatulence or feelings of prostration accompanying the attack, it may be prolonged almost indefinitely in a subacute form.

(*b*) There are, however, severe forms of the disorder, marked by considerable febrile reaction, which are very difficult to distinguish from febricula, or sometimes from early stages of typhoid, but in which, I believe, the febrile reaction is in reality attributable to the stomach. One class of these cases is marked by epigastric pain of some severity, which is generally central, but which sometimes radiates into the hypochondria and extends to the back. The sensation is sometimes one of heat or burning, at others of load or constriction; but as a rule it does not present the same degrees of intensity as are observed in nervous gastrodynia or in the pain from ulcer and cancer. Vomiting also occurs, and may be almost constant after everything taken, and be brought on even by the smallest amount of liquid: the matters rejected being mucus, sometimes tinged with blood; or bile in considerable quantities; and retching may continue even after the stomach has been emptied. The tongue in these cases may present the loaded saburral state before described, but it tends in a day or two to become red, raw-looking, and sometimes fissured; the papillæ are large and red, and the lips dry and cracked. Sordes sometimes appear on the teeth.

Thirst is usually considerable, and the appetite is completely lost.

Constipation generally persists, and sometimes with considerable obstinacy; but diarrhœa may occur, though this is comparatively unfrequent.

Rigors, to a mild degree, usually continue throughout the whole course of the affection. The skin is often hot to the hand, but except in cases of children the elevation of the temperature is rarely considerable, and seldom above 100° Fahr. There is generally a considerable exacerbation of fever in the evening, and the diurnal remissions may be almost complete. The pulse is frequent, but weak and compressible.

Prostration with restlessness, and pains, though only of moderate severity, in the back and limbs, usually continue throughout the attack; and the headache, which is ordinarily frontal, is frequently severe. Sleep is generally disturbed; and in children delirium may supervene, or a semi-comatose condition may be observed, and strabismus occasionally occurs. I have never seen alteration of the pupils. The urine is scanty and high-coloured, and deposits lithates.

Cough is spoken of as a common complication. I have not observed this unless when from a common exciting cause, such as cold, a bronchitis has been set up simultaneously with the gastric catarrh. Cough, associated with pyrexia, should always be regarded as a symptom requiring a careful and suspicious investigation of the lungs, for the condition which has now been described is often the accompaniment of early stages of phthisis.

The duration of this complaint, in its acute form and under proper treatment, is seldom longer than a week or ten days; but if treated at the outset with tonics and alcoholic stimulants, it is liable to become almost indefinitely protracted, and to pass into some of the more obstinate forms of chronic catarrhal inflammation.

(c) The symptoms of inflammatory disorder of the stomach, complicating other acute diseases, are often considerably modified, or even masked, by the course of the disorders in which they occur. Anorexia and thirst are common to those in which we have no evidence to show that the affection of the stomach is of an inflammatory nature. I am inclined, however, to believe that in the majority of cases where, in addition to these, we find

a loaded tongue and nausea after food, and even a slight degree of epigastric tenderness, this condition of the stomach is the cause of these symptoms much more frequently than is generally supposed to be the case, and I have had repeated opportunities of verifying this opinion by post-mortem examinations. In some, however—and this is particularly true of variola and scarlatina, and very frequently also of pneumonia—other and more distinct symptoms appear, in the form of vomiting. Spontaneous pain is not, however, usually present. Though these evidences of gastric inflammation are often more distinct in the disorders last mentioned than in some other of the acute diseases, yet, with regard to the whole class, the liability to this complication should be always recollected in considering the measures of treatment to be adopted.

(*d*) In the inflammation of the stomach that follows from drink the symptoms are often very obscure. Vomiting, except in the morning, is comparatively rare, and signs of tenderness can with difficulty be elicited on pressure. The loaded tongue, the absolute anorexia and the thirst, serve however as signs of an inflammatory condition of the stomach, of which confirmation is afforded in some cases of fatal delirium tremens, by post-mortem evidence, and in others whose termination is more favourable, by the successful results of treatment directed towards this complication.

(*e*) In young children, especially in infants under six months, or at the period of weaning, improper or excessive food sometimes causes a general catarrh of the whole gastro-intestinal canal. This may find its chief expression in diarrhoea, which frequently precedes the vomiting; but in many cases the latter is often an important, and even a dangerous symptom. There may be but little fever, and even when the skin over the abdomen is hotter than natural, the extremities and lips may be cold and bluish; and though the abdomen is sometimes tender, this is not constantly observed. Pain is, however, frequently evinced by cries, especially before the evacuations. These are liquid, watery, offensive, acid, and often grass-green in colour; they generally contain masses of coagulated casein, and are often attended with straining or tenesmus, but when the attack is severe and the child much prostrated; they may

be passed apparently unconsciously. The vomited matters consist of the coagulated milk, returned in an intensely acid condition, and accompanied with much acid watery fluid. Thirst is frequently excessive, but fluids taken are often rejected almost as soon as swallowed. The patient rapidly loses flesh, and great prostration sets in early, so that the infant may have difficulty in sucking, though it drinks with avidity. The pulse becomes weak and fluttering, the fontanelles are depressed, the countenance is pale, the eyes are sunken, and the features have a peculiar pinched, sharpened appearance. Somnolence, passing into coma or convulsions, may at times complicate the other symptoms, but the latter phenomena are not frequent. The course of this form is acute, and, if not early checked, it tends towards a fatal issue.

I have occasionally observed affections of this nature, though of somewhat less severity, and occurring at the period of the first dentition, alternate in a remarkable manner with eczematous affections of the skin. In one case, in a strong and otherwise healthy child, the eruption of each tooth was either attended with an attack of acute eczema, or by an attack of vomiting with diarrhoea; and during one of the latter, the gastro-intestinal symptoms suddenly ceased on the supervention of the eczematous rash. It appears difficult to explain these phenomena, except on the theory of some *materies morbi* in the blood finding an excretory outlet by the skin or mucous membranes.

It may be remarked that the symptoms of the choleric diarrhoea of children correspond to a great degree, as far as regards the stomach, with those observed in true cholera in the adult. In the majority of the cases of this disease which have come under my observation, the stomach participated markedly in the catarrhal condition of the intestines, and the thickly-furred tongue in many corresponded most closely with that of the "saburral" conditions which have been before described.

It appears, however, unnecessary to enter into fuller details of the symptoms of this affection, though it is not unimportant to bear in mind its pathological relationship to the class of diseases which we are now considering; and to remember that the diseased conditions excited by cholera may persist in the stomach long after the other leading features of the disorder have sub-

sided. This has been observed by numerous writers, especially by Andral, Budd, and Chomel; and their experience can, I have very little doubt from my own observations, be confirmed by any who have had opportunities of following the history of patients who have been subjects of the latter disease. Chomel's<sup>1</sup> "dyspepsie acide grave," with its acid vomitings, is the counterpart of that observed in children; but, as I have before stated,<sup>2</sup> I have great doubts whether such acidity is the result of hypersecretion, and not rather the consequence of rapid catalytic changes in the food taking place under the influence of the unhealthy secretions of the stomach, especially as in some cases recorded by other observers it was found to be greatly increased by farinaceous food.<sup>3</sup>

(f) Gouty attacks of inflammation of the stomach usually occur under two forms. The outbreak of the disorder is frequently complicated with all the symptoms before described as those constituting an acute attack of indigestion, which are sometimes relieved, but at others persist when one or more joints have become the seat of the characteristic inflammation. The more severe and dangerous forms, however, are those attended by a sudden disappearance of the inflammation of the joints and by a simultaneous accession of epigastric pain and tenderness, together with vomiting, and accompanied by severe prostration, and these symptoms may proceed to a dangerous extent unless relieved by a return of the disease to its previous seat. Nor does the predominance of nervous symptoms in some cases at all preclude the possibility of even these being due to the suddenness and severity of the affection of the stomach, though the extreme degrees of flatulence and spasm which accompany them are in themselves almost sufficient to account for these phenomena.<sup>4</sup>

(g) The symptoms of the typical acute form of gastritis, though passing in severity beyond those of ordinary dyspepsia, may yet with advantage be briefly described, as showing by contrast the nature of the milder forms of the disorder, of which they are only exaggerations in point of degree; but the more marked

<sup>1</sup> Loc. cit. p. 144.

<sup>3</sup> See Guipon, Obs. 91, p. 436.

<sup>2</sup> See Acidity, p. 43.

<sup>4</sup> See Garrod, On Gout, p. 505.

characters of the disease are rarely met with, except when the more violent irritants have been swallowed.

There is usually acute epigastric pain, though some remarkable exceptions have been observed in this respect by Dr. Habershon, even in cases where corrosive poisons have been taken.<sup>1</sup> Its characters are burning and lancinating; it often extends into the back, and when the affection is severe, it is not relieved by vomiting, and is increased by pressure. It is often accompanied by spasm and rigidity of the abdominal muscles, and is aggravated by each descent of the diaphragm, so that the respiration frequently becomes wholly thoracic.

Vomiting is a constant symptom: it is frequent, and is brought on by the smallest quantity even of cold fluids. There also is violent retching, which continues when the stomach is empty. The matters brought up are mucus, often tinged with blood, or blood blackened by the fluids of the stomach, together with bile and watery fluids. Diarrhœa is present in some cases, with colic, tenesmus, and bloody stools, especially after arsenic, antimony, or corrosive sublimate, have been taken;—absent, or not so commonly met with, after the mineral acids, and caustic alkalies. There is complete anorexia, but great thirst. Prostration is marked, but often combined with agitation and restlessness. The face is pale and sunken, the voice weak or extinguished.<sup>2</sup> The skin is cold, and often covered with clammy perspiration, and the pulse is frequent and small.

Hiccup is sometimes a very painful symptom, and may continue after the vomiting has ceased.

The duration of these symptoms is variable. Death may ensue with great rapidity by complete collapse; or the patient may linger for days and die from exhaustion; or long-continued irritability may persist for weeks, and subsequent dangers may ensue from hæmorrhage, or from the contraction of cicatrices resulting from ulcerations in the pyloric region.

THE PATHOLOGY of the symptoms here described involves the consideration of the *nature* of the condition in which they

<sup>1</sup> Oxalic acid, sulphuric acid, arsenic, and chloride of zinc. *Med. Times and Gazette*, Nov. 20, 1859; and *Dis. of Stomach*, 1866, p. 41.

<sup>2</sup> It may be in some cases affected by the action of the irritant upon the epiglottis.

originate, and of the *anatomical alterations* by which they are accompanied, and upon which they in all probability depend. The evidence that these changes are of an inflammatory kind is in part directly demonstrable, and in part is the result of induction. In the milder forms we have seldom, if ever, an opportunity of experimentally verifying this opinion by post-mortem examination; but the observations of Beaumont, which, as will be shortly seen, give a better support to this view than can be obtained even by this method, although too often forgotten in actual practice, seem to set the question conclusively at rest.

Having been conducted on a living subject, they possess the advantage of being records not only of changes affecting the glandular tissues, but also of conditions of perverted vascularity, which in the stomach, as in external parts, are only apparent while the circulation is still maintained, and which speedily become indistinct after life has ceased.

An attention to these would moreover dispel much of the confusion that arises from the view that the so-called irritative dyspepsia is (as said by Chomel of some forms of vomiting and diarrhœa) "only a passing disturbance in the intestinal action, and not an inflammation," which this author argues must have a duration and periods of commencement and decline. His argument will not however withstand the analogy of instances observed in other tissues, for it must be remembered that there are degrees of intensity in the inflammatory process, which may often stop short at its earlier stages, as we see is the case when an irritant is applied to the web of the frog's foot; or when from a similar action on the nasal or conjunctival mucous membranes, phenomena are produced, which, though temporary in their duration, are precisely similar to those witnessed in a catarrh induced by cold, and where we cannot but admit that the process is identical in character, though varying in its duration and severity with the degree of irritation or with the vitality of the tissue.

It is very probable that there may be different characters of inflammatory processes in the mucous membranes, as there are in the skin, and that these differences may be determined by specific causes, special irritants, or constitutional predisposition. We are as yet, however, unable in the majority of instances to



distinguish them after death, and therefore are compelled to classify them all under one common head, when we regard them from the anatomical side; though clinically, varieties can be distinguished, and other differences may be hereafter discovered by careful observation. It is, however, to be remarked of these forms, that unless corresponding anatomical distinctions can be established (which does not at present seem very probable), it is undesirable to classify them as separate diseases, since their differences from a clinical point of view, as far as we can *yet* judge of them, are rather in degree than in kind; and the milder forms are capable of assuming all the symptoms of the severer affections, and *vice versâ*, according to ætiological circumstances, and especially according to the results of treatment.

The appearances observed by Beaumont cannot be better described than in his own words:—"There are sometimes found, in the internal coat of the stomach, eruptions or deep red pimples, not numerous, but distributed here and there upon the villous membrane, rising above the surface of the mucous coat. These are at first sharp-pointed and red, but frequently become filled with white purulent matter. At other times, irregular, circumscribed red patches, varying in size and extent from half an inch to an inch and a half in circumference, are found on the internal coat. These appear to be the effect of congestion of the minute blood-vessels of the stomach. There are also seen at times small aphthous crusts in connexion with these red patches. Abrasion of the lining membrane, like the rolling up of the mucous coat into small shreds or strings, leaving the papillæ bare for an indefinite space, is not an uncommon appearance. These diseased appearances, when very slight, do not always affect essentially the gastric apparatus; when considerable, and particularly when there are corresponding symptoms of disease, as dryness of the mouth, thirst, accelerated pulse, &c. *no gastric juice can be extracted.*"<sup>1</sup> "Complained of headache, lassitude, dull pains in left side and across the breast, tongue furred into a thin yellowish coat and inclined to dryness. Eyes heavy and countenance sallow. The villous membrane of the protruded portions of the stomach very much resembled the

<sup>1</sup> *Loc. cit.* p. 99.

appearance of the tongue, with small aphthous patches, in many places quite irritable and tender.”<sup>1</sup>

“The gastric fluids extracted were mixed with a large proportion of thick ropy mucus, and considerable muco-purulent matter slightly tinged with blood, resembling the discharge from the bowels in some cases of chronic dysentery.” . . . “Flavour peculiarly fetid and disagreeable, alkalescent, and insipid.”

In other places he mentions the phenomenon of minor degrees of hæmorrhage as not uncommon,—“grumous blood exuding from several small points of the membrane.”

It is remarkable that in many instances when these appearances were well marked, the symptoms experienced by the patient were but slight; and hence, *à fortiori*, we may conclude that when the latter are more severe, the anatomical changes are more considerable, though direct evidence of this is often unattainable.

Seldom, however, are the appearances so graphically described by Beaumont seen with the vividness with which he has depicted them,<sup>2</sup> in post-mortem investigations; and in these great difficulties await us, from the liability of the stomach to a series of changes from self-digestion to which no other organ in the body is exposed; and the difficulty also of appreciating such evidences as are derived from the apparent vascularity of the organ, are often very considerable.

As regards the phenomena of the latter class two propositions, the converse of one another, may be laid down as true with certain limitations to be immediately explained. Firstly, that considerable vascularity is not necessarily evidence of inflammatory action; and secondly, that an almost entire absence of this appearance by no means excludes the pre-existence of this process.

Evidence in favour of the first statement has been abundantly accumulated since the time of Morgagni,<sup>3</sup> and more fully by

<sup>1</sup> Loc. cit. p. 171.

<sup>2</sup> Pustular appearances of the glands have, however, been described by Rayer as occurring in the stomach (Dict. de Méd. x. 120), and also by Wahl (Virchow's Archiv, xxi. p. 579). In the latter case mucedines were found in the glands. The appearance is, however, rare, and must not be confounded with enlargement of the solitary glands hereafter to be noticed.

<sup>3</sup> De Caus. et Sed. Epist. xxix.

Dr. Yellowly in 1813,<sup>1</sup> who was shortly followed by Billard,<sup>2</sup> by Trousseau and Rigot,<sup>3</sup> and by Andral.<sup>4</sup> These authors have shown that partial hyperæmias and also general staining of the stomach may be determined by the position of the body, by the fluidity of the blood, and also by obstructions to its return from the abdominal organs existing in the vena portæ, the heart, or the lungs, as is seen in the extreme congestion of the stomach which results from death by asphyxia.

Andral adds the observation, that when death takes place during the act of digestion, hyperæmia of the stomach is generally found; but I can recall, from my own observations, very numerous exceptions to this rule, when the examination has been made some hours after death.

Hyperæmia, of inflammatory origin, is almost invariably purely capilliform and punctiform. The latter appearance is due to small extravasations in the mucous membrane, and may arise from mechanical congestion as well as from inflammatory hyperæmia; and frequently the punctiform redness persists when the general injection, which may reasonably be presumed to have been present, has disappeared. Venous congestion and general imbibition can never, taken alone, be considered as signs of pre-existing inflammatory action. Nor is it always easy to distinguish, apart from other phenomena, the redness of congestion due to impeded return, from that which arises from inflammatory hyperæmia. This subject will be further alluded to under the head of congestion, when some of the effects of this condition in causing chronic inflammatory changes will be more fully dwelt upon.

It appears, however, equally important to insist on the fact that pallor of the mucous membrane is no sign of the absence of previous inflammatory action; but that in the stomach, as in other mucous surfaces,<sup>5</sup> the blood after death leaves the small

<sup>1</sup> Med.-Chir. Trans. iv. "Observations on the Vascular Appearance in the Human Stomach which is frequently mistaken for Inflammation of that Organ."

<sup>2</sup> De la Membrane Muqueuse Gastro-Intestinale. 1825.      <sup>3</sup> Arch. Gen. xii.

<sup>4</sup> Various places in "Clinique Médicale," and in "Prec. Anat. Path." 1829.

<sup>5</sup> The bronchi are almost the only exceptions to this rule; but then it should be remembered that extensive bronchitis is almost always attended with congestion of the lungs, which prevents the blood escaping by the pulmonary veins, into which those of the bronchi open.

superficial vessels. This may be well seen in the eye when conjunctivitis has existed during life, and yet after a few hours all trace of the distended vessels has disappeared. It is seen also in the mouth and lips, and attention was long ago drawn to the same fact by Andral in the case of erysipelalous affections of the skin.<sup>1</sup> The contractile tissue which accompanies the capillaries almost to the surface of the mucous membrane of the stomach, has probably a great influence in aiding the expulsion of the blood from the vessels; and the facility with which this takes place, even where congestion has existed before death, to a degree sufficient to induce hæmatemesis, is shown by numerous cases where, after this event, and even when grumous blood is found in the stomach, the general surface has presented hardly any evidence of vascularity.<sup>2</sup>

I believe that there is a second cause for this fading of colour, to which but little allusion has been made, viz. the results of cadaveric change. I have frequently noticed that in cases where there had been symptoms of stomach disturbance during life, and especially in a series of cholera cases (though my observation by no means refers to these exclusively), the evidences of hyperæmia found *post mortem* were distinct in a direct ratio to the rapidity after death with which the examination has been made. Very dilute acids, as anyone can easily convince himself by placing a section of naturally injected mucous membrane under the microscope, destroy or diminish the effect of the colouring matter of the hæmatin with great rapidity; and even in stomachs that shortly after death are highly injected, the colour becomes not only less distinctly traceable to the vessels (from imbibition), but also decidedly fainter<sup>3</sup> after the lapse of a few hours.

<sup>1</sup> See Clin. Méd. ii. 177. This case is interesting as one in which the patient died of continued vomiting after cholera, and both the skin which had been the seat of the erysipelas, and also the stomach, were pale after death.

<sup>2</sup> Andral, Clin. Méd. ii. 156. Path. Interne, i. 76. Handfield Jones, The Stomach, 59. This event is a very common one.

<sup>3</sup> Thinking that the importance of the subject in relation to diagnosis deserved a full investigation, I have made experiments on dogs, to verify the opinion here stated. I placed ten grains of tartar emetic under the skin of the neck of each of two dogs, which had previously fasted twelve hours. Both commenced vomiting after an hour, but one continued to show the effects of the poison to a more marked degree than the other. They were killed after twelve hours by pithing. The one

It is only when stasis has existed to an extreme degree, or when punctiform extravasation has taken place from the capillaries, that the signs of inflammatory hyperæmia persist long after death;<sup>1</sup> and even when present they seldom, except in cases of extensive inflammation from irritant poisons,<sup>2</sup> occupy more than patches of the surface.

It should also be remembered that in other glandular organs, as in the kidney and liver, and also in the muscles, acute inflammatory action is revealed *post mortem*, rather by pallor than by hyperæmia. In the two former, indeed, the loss of colour is partially explained by the swelling of the tissue, but it is in an even greater degree produced by a change in the molecular constitution of the histological elements of the parts, which are swollen, granular, and more or less degenerated: and changes of the same kind which are found in the stomach furnish, I believe, safer criteria for the diagnosis of inflammation, than can be derived from the absence or presence of vascularity alone. In the slighter forms they are, it must be confessed, somewhat difficult to distinguish, differing, as they do, only by a question of degree from those which occur in the physiological process of digestion, in which not only the vascularity, but also the colour and consistence of the membrane are affected.

These changes consist in an increased opacity,<sup>3</sup> together with that had vomited least was opened immediately after death, and the mucous membrane of the stomach was found swollen, opaque, softer than natural, and delicately injected throughout. The other, which had been much the most affected, was not opened for thirty-six hours: swelling and opacity, and softening of the membrane, were here very marked, but the traces of injection had almost entirely disappeared, there being only a little uniform staining from imbibition. Very similar results were obtained in a parallel experiment made with arsenic. I believe that from the causes which I have mentioned, changes that would attract attention in the kidney, or in almost any other organ, are frequently passed unnoticed in the stomach, even by careful pathologists.

<sup>1</sup> I do not feel sure that this perfectly explains the whole of the conditions under which the persistence of hyperæmia occurs, but if combined with rupture of small vessels, so as to prevent further flow either through the veins by obstruction, or by arrest of the *vis à tergo* of the smaller arteries, the blood in the capillaries corresponding to such arrest must then necessarily stagnate.

<sup>2</sup> From many of these, as in the cases of arsenic, tartar emetic, and cyanide of potassium taken in large doses, hyperæmia is almost constantly present; but from others, as from phosphorus (Virchow, "Der Zustand der Magen bei Phosphor Vergiftung," Archiv, xxxi. p. 399), it may be absent, and yet other signs of inflammatory action, presently to be noticed, may exist to a marked degree.

<sup>3</sup> This, it is true, is often associated with hyperæmia of the cortex, and some-

swelling and with varying degrees of diminution of consistence of the mucous tissue. The two first of these are distinctly described by Beaumont; and the increased opacity gives to the mucous membrane (apart from the colour produced by hyperæmia) a dead white appearance, corresponding precisely to the "cloudy swelling" of Virchow which is observed in the kidneys in acute Bright's disease.<sup>1</sup>

If a section of the mucous membrane in this condition be examined with the microscope, it will be found that the secreting cells, and also the nuclei, are swollen, irregularly distending the tubules, and are filled with granular matter soluble in liquor potassæ and dilute acids, which gives them, by reflected light, and as seen with a low power, the appearance of white lines, while by transmitted light they appear unnaturally dark and opaque. The cells also often contain fat globules in variable quantity, showing the tendency to rapid regressive metamorphosis characteristic of the inflammatory condition. In severe cases the cells often break down without undergoing fatty degeneration, and the tubes become more or less filled with granular débris and detritus. (See Pl. I. figs. 1, 2, and 3.)

It is to this distension of the glands, by an abnormal accumulation of protein matters in their interior, that the swelling of the mucous membrane and the pustular appearance observed by Beaumont are chiefly due. The normal secretion of gastric juice is arrested by this state, as that of urea is checked by the presence of a similar one in the kidney. Corresponding to the albumen, which in the latter organ is separated from the blood, we find that there is secreted from the stomach a considerable

times of the Malpighian bodies, beneath the capsule, arising from obstruction to the return of the venous blood; but it must be remembered that in this organ these conditions of the circulation are much more complex than in the stomach.

<sup>1</sup> A case of this kind is recorded by Guersant, art. "Gastrite," Dict. Sciences Méd. xvii. 576, where a young lady died after long-continued vomiting, together with fever and abdominal pain. The mucous membrane was covered with a tenacious mucus, the glands were prominent, and the membrane thickened and moist. The membrane was *whiter than in the natural state, and of the colour of lard*. The vessels on the external surface were gorged with blood. The other organs were healthy. Guersant, not recognising the inflammatory characters of this affection of the stomach, speaks of the disease as one *incertæ sedis*. Carswell, Illust. Elem. Forms of Disease, recognised the occasional *pallor* of inflammatory softening of the stomach. (See note, p. 156.)

amount of tenacious alkaline mucus, containing large quantities of the morphological elements of the interior of the glands, which are generally separate, but sometimes adhere in masses, and then resemble the casts of the tubes excreted in similar conditions from the kidney.<sup>1</sup>

The softening of the mucous membrane which accompanies these changes is one totally distinct from the post-mortem softenings, which are distinguished by the transparency of the tissue. It rarely exists to any marked degree, except in extreme cases, but there is always a certain diminution of resistance to the finger-nail or to the scalpel, the value of which can be only estimated by experience, but which materially assists, when conjoined with opacity and thickening, in distinguishing this condition; for ordinarily a healthy mucous membrane does not yield readily to pressure thus applied, while one that has undergone inflammatory softening, breaks down with a facility proportioned to the degree of severity of this process. Louis' test of the extent to which it can be torn from the submucous tissue, is a less available one, and applies rather to states of post-mortem solution than to this condition.

Other changes in the interstitial tissue and in the solitary or lenticular glands often accompany those which have now been described. The latter, which usually are indistinct, and in the adult are only found with great difficulty, become, under influences of inflammatory irritation, both enlarged and prominent. They are met with both in the interstitial tissue between the glands, and also immediately below the basement membrane, as well as in the deeper submucous tissue. In the second only of these positions are they well defined. (See Pl. II. figs. 13, 14.) They may attain occasionally the size of a poppy- or millet-seed; and I have seen in cholera the pyloric half of the stomach and the first part of the duodenum so thickly studded with them, as to present the appearance of a cutis anserina. In addition to these

<sup>1</sup> Described by Dr. Fenwick in scarlatina. I have seen them in the catarrhal affection of the stomach in diphtheria, and also in catarrhal affections of the intestines. They are less frequent either in the stomach or intestines in cholera.

For a full description of these appearances see a paper by the author, *Med.-Chir. Trans.* vol. xli.; also Dr. Schlaepfer, in *Virchow's Archiv*, vol. viii.; also Dr. Fenwick, *Med.-Chir. Trans.* xlvii.; also *Virchow*, in his *Archiv*, vol. xxxi., and *Grohé*, *ib.* xxxiii.

isolated formations, large tracts of the intertubular and sub-mucous tissues frequently become infiltrated with cell elements, precisely corresponding to the lymphatic structures described as existing throughout the intestine by His<sup>1</sup> and Frey,<sup>2</sup> which greatly increase both the swelling and opacity, and also the whitened appearance of the membrane. The cells so seen are identical in character with those composing the "solitary glands," and, like them, are imbedded in the meshes of an alveolar network, forming a tissue of the same character as that of the solitary glands, but not separated from the intertubular structures around by any distinct line of demarcation, the cells and network becoming less dense at the borders of the area of infiltration. The tubes are often widely separated by this growth, and their outline is also obscured; Dr. Handfield Jones<sup>3</sup> thinks that it sometimes leads to their destruction, but of this I have not been as yet able to convince myself by ocular proof. (See Pl. II. figs. 15, 16, 17.)

In some cases the enlarged glands ulcerate, and it is to their undergoing this degeneration that I believe the majority of the so-called follicular ulcers are due. These form little cup-shaped

<sup>1</sup> Untersuchungen über den Bau der Peyerschen Drüsen und der Darm Schleimhaut.

<sup>2</sup> Untersuchungen über die Lymphgefäße des Darmkanals. Leipzig, 1863.

<sup>3</sup> I consider the structures here described as identical with those to which Dr. H. Jones has applied the terms of nuclear masses and nuclear degeneration. I am not sure whether the import which I attach to them in regarding them as lymphatic structures enlarging and increasing under the stimulus of irritation, in the same manner as is observed in the solitary glands of the intestines under the influence of a purgative, is not somewhat different from his; and they appear to me to consist of cells rather than nuclei (as described by him), imbedded among the tissue. Dr. Jones has certainly the merit of having been the first to describe these tissues in the stomach. In an earlier paper on the subject I expressed some doubt as to the frequency of their existence, which arose from the fact of my having at that time only examined stomachs in a fresh state, when they are with difficulty distinguished, and when the fallacy of cells escaping from the tubules is not easy to avoid. For their proper investigation it is desirable to harden the preparations with chromic acid, and subsequently to examine them by Lockhart Clarke's method of staining with carmine, and subsequent immersion in glycerine or Canada balsam. The solitary glands have been lately observed in great numbers in the stomach, by Dr. Grohé, in a case of poisoning by arsenic (*Virch. Archiv*, xxxiii.). As neither the solitary glands nor the infiltration of the intertubular tissue with cell elements are to be found with any degree of frequency, or the latter to any perceptible extent in healthy stomachs, it is reasonable, I believe, to regard the appearances such as have been now described as being in great measure the result of pathological irritation.



depressions scattered more or less thickly over the surface of the mucous membrane, rarely exceeding at the surface a diameter of two or three lines, and seldom extending deeper than the submucous tissue. Their base is found to rest on a tissue infiltrated with lymphatic cells and with the granular débris of these, which may generally also be noticed for some distance in the surrounding tissue. I have myself thus traced the origin of these ulcerations, in several cases of tubercular phthisis, in typhoid fever,<sup>1</sup> in cholera, and in a well-marked spirit preparation of the kind in the Museum of University College, to which no history is attached.<sup>2</sup> (See figs. 18 and 19.)

There are, however, other ulcerations which are not uncommon, and which do not, I believe, arise from this source; they are more superficial, but may reach the size of a fourpenny piece, and to them the term of erosions is appropriately applied. Their edges are often sharply defined, but there is very little thickening around them; I have never seen them extending for any depth into the tissue, and they rarely involve the whole depth of the secreting glands. I believe that they result from a superficial epithelial erosion, sometimes extending rather deeper into the tissue, and resulting probably from the process described by Beaumont as "stripping and rolling up of the membrane," and they should be regarded as analogous to the superficial ulcerations in the fauces often seen in catarrhal angina.

Early stages of this condition are sometimes found, when in circumscribed patches, giving evidence of acuter inflammatory action; the mucous membrane is found to be superficially reduced to a pulpy débris, the separation of which would probably have caused the erosions here described.<sup>3</sup>

In other cases of a severe type, or when the affection of the stomach complicates septic or gangrenous inflammations in other

<sup>1</sup> Dr. Handfield Jones has also found them ulcerated, in a case having many of the symptoms of typhoid fever. (Stomach, p. 91.)

<sup>2</sup> Dr. Brinton (Lectures, p. 105) has expressed a doubt whether these follicular ulcerations have the origin thus described, because unaffected solitary glands are to be found in their neighbourhood. I do not think that this argument is valid, because the same might be said of the ulcerations of the solitary glands in the intestines in case of tuberculosis and of typhoid fever, when unaffected glands are found in the neighbourhood of others which are ulcerated. I have in several instances traced the stages of ulceration here described.

<sup>3</sup> See Andral, Clin. Méd. ii. obs. iv. p. 19.

parts, sloughs<sup>1</sup> may form on the mucous membrane, which may have a diameter of from a half to a quarter of an inch. I have rarely seen them proceed to any depth, and have no data to enable me to say whether they may give rise to hæmorrhage. I have only seen this form in a few instances, but cases are recorded by Recklinghausen<sup>2</sup> and Klebs<sup>3</sup> of very similar appearances under analogous circumstances to those in which I have observed them, one of which was in a case of gangrenous pneumonia.

In addition to these, smaller solutions of continuity may arise from extravasations of blood, ending in superficial hæmorrhagic erosions, which are recognisable by the effusion of blood in the surrounding tissue, and by their blackened base. As these are, however, much more frequently the result of mechanical congestion than of acute inflammation, their consideration will be more appropriately postponed until that subject is treated of.

Exsudative inflammations on the surface of the stomach seem also to be rare; I have once or twice seen them in phthisis, and Dr. Jenner, as before quoted, has seen them in diphtheria, and Rayer<sup>4</sup> says that they have been seen in cases of "croup." Pain and vomiting have been observed in some of these cases, but no special symptoms seem to be attached to this condition enabling a diagnosis to be made.

Another and still rarer affection is that corresponding to the gastritis phlegmonosa of Cullen, which does not as yet appear to have been recognised during life, and which can hardly be included among the class of diseases which have now been described.

The leading symptoms seem to have been acute pain in the præcordial region, together with vomiting, violent fever, and delirium,<sup>5</sup> ending speedily in death.

In the cases recorded by Wallmann and Bamberger, the affection of the stomach appears to have been idiopathic, and to have been the only lesion present; but in two others which occurred in the practice of Oppolzer,<sup>6</sup> it commenced with puerperal fever.

<sup>1</sup> I am referring to instances entirely independent of corrosive poisons.

<sup>2</sup> Virchow, Archiv, xxx.

<sup>3</sup> Ibid. xxxii.

<sup>4</sup> Dict. de Méd. x. 124.

<sup>5</sup> Bamberger, *loc. cit.* p. 260. Wallmann, Wiener Allg. Med. Zeit. Decr. 1856.

<sup>6</sup> Wiener, Med. Woch. 1851, quoted by Bamberger. They are also described

In these instances the chief anatomical character has been suppuration in the submucous tissues of variable extent, sometimes undermining the whole membrane, or perforating it in various places. Bamberger says that the abscesses thus formed may perforate other organs to which the stomach has formed adhesions, but the rarity of these affections renders them objects of pathological, rather than of clinical interest.

Special descriptions of the appearances produced by the different kinds of poisons belong rather to the questions of medical jurisprudence than to the clinical pathology of the stomach, and I shall, therefore, abstain from entering into them.

TREATMENT.—The primary indication in the treatment of recent inflammatory affections of the stomach, is to secure for the organ as complete a rest as it is possible to obtain; and in the milder forms, a tolerably complete abstinence from food for four-and-twenty hours will frequently do much towards effecting a cure. In severer cases, and where the disorder is more protracted, or when the patient is too weak to bear abstinence, as in the case of infants, much may be effected by nutrient enemata, in sparing the stomach, and allowing it the necessary repose. Such food as is taken should, when the disorder is of any severity, be restricted to milk and lime-water, or milk and soda-water, administered in small quantities every two or three hours. In cases where milk disagrees, as it does with some patients, veal or chicken broth, or beef-tea, in small quantities, may be substituted for it.

In the case of infants suckling, the quality of the milk should be carefully examined, and if the nurse is menstruating, a change is absolutely necessary. In severe cases it is desirable that the child should be withdrawn from the breast for some hours, and a small quantity of rice-water, or of milk greatly diluted, should be given at intervals. In the case of infants brought up by hand, the milk is to be largely diluted, and the addition of lime-water or of carbonate of soda is very desirable. When cow's milk absolutely disagrees, a change to ass's milk is sometimes sufficient to effect a cure; but this is not always the case, and

by Rokitanski; by Engel, *Lehrbuch Path. Anat.*; by Andral, *Prec. Path. Anat.* ii.; by Albers, *Erläuterungen*; Dittrich, *Canstatt*, 1857, iii. 179; Habershon, *Guy's Hosp. Rep.* 3d Series, ii. p. 115.

medicinal treatment is often further necessary. A small quantity of farinaceous food, as arrowroot, sago, or gruel, may often be given with advantage with the milk, and it appears to act beneficially by preventing the coagulation of the casein into lumps in the stomach.

In cases of less severity, in older children or adults, the lighter farinaceous puddings may be allowed, and those composed of bread, corn-flour, arrowroot, sago, and tapioca, generally suit the best. Solid animal food is decidedly to be prohibited as long as any nausea or pain at the epigastrium is caused by food entering the stomach; and when the needful rest of body is enjoined, this enforced abstinence may often be protracted during some days with decidedly beneficial effects. The return to a more nourishing diet is always to be effected gradually, and with great caution. As the symptoms subside, the patient may be allowed a small quantity of fish, or minced chicken, eaten with bread, but without (at first) any vegetables, and he may gradually proceed to game, or tender mutton, taken once in the day; but it must be remembered, that any indiscretion or excess in diet is very likely to bring on a relapse.

Alcoholic fluids are decidedly to be avoided except where great prostration is present. When a stimulant appears to be urgently required, brandy is usually the best form in which it can be given; and in the case of children, and even in infants, it may in such cases be advantageously administered, properly diluted, or combined with beef-tea or milk, by the rectum. Champagne also is occasionally found to be advantageous in checking vomiting; but its efficacy in this respect is much less when the symptom in question is due to inflammatory action than when it arises from sympathetic irritation, or from the erethism of exhaustion.

Rest of body is equally essential, and in severer cases, and particularly when diarrhoea is present, the patient should be kept in bed until the more urgent symptoms have subsided.

General bleeding is decidedly inadmissible, as the disease ordinarily tends to produce great prostration, and any large loss of blood is likely to entail serious consequences, and to retard the recovery of the patient. When pain is continuous, and appears to be unassociated with the presence of undigested food, but to be

caused by the introduction of even small quantities of food into the stomach, leeches are often of great service. They should not, however, be used in the case of children unless under *very* exceptional circumstances, and in weakly persons the number should be restricted to two or three. When there is evidence of much congestion of the liver, or when hæmorrhoids have been present, they may be advantageously applied to the anus; but, as a general rule, the abstraction of blood through their agency from the epigastric region, affords more relief than when practised from any other source.

Hot fomentations are of great value; they should be applied continuously by means of flannel, spongio-piline, or linseed-meal poultices. Counter-irritation by means of mustard-poultices, or by friction with croton oil, or, in severe cases, with tartar emetic, may be occasionally resorted to with advantage. The warm bath is also frequently of decided service.

Emetics may be administered when the presence of undigested food in the stomach is indicated by cramp-like pain, nausea, ineffectual attempts to vomit, and faintness, but care is necessary in the use of these remedies; and it may be stated that experience almost universally agrees in forbidding the use of the stronger agents of this class, and especially of tartar emetic, or even mustard (see *ante*), which have been known to be followed by a great aggravation of the symptoms. Large draughts of lukewarm water, or of infusion of chamomile, are often sufficient to cause the evacuation of the stomach; but an agent of greater efficiency is ipecacuanha, in doses of a scruple to half a drachm, followed by large draughts of warm water. The emetic action may be aided by tickling the fauces, but if vomiting do not occur readily, it is undesirable to repeat the dose, a proceeding which I have known to be followed by very injurious results. It must be remembered that the cramp-like pain originating in the stomach may continue in the intestines when the undigested food has passed into them; and further, as Bamberger has remarked, the effects and sensations attributed to the irritant may continue in the stomach in the same manner that the impression of the presence of a foreign body in the conjunctiva may persist long after its removal.<sup>1</sup>

<sup>1</sup> That undigested food may, however, remain long in the stomach, and be the

In the condition known as *embarras gastrique*, which I have stated before to be, in my opinion, only a milder form of the catarrhal affection, M. Martin Solon<sup>1</sup> has employed ipecacuanha in doses of from six to seven grains, given three times in twenty-four hours. In most of his cases the action of the medicine was exerted also on the intestines, as was shown by bilious stools accompanying the vomiting; in several cases a single administration conducted in this manner accomplished the cure, while in others, when a repetition of the medicine was necessary, this was generally effected within three days. In a few cases the disorder was aggravated by this treatment, showing that it is only available within certain degrees of severity of the affection; but the presence of fever by no means contra-indicated its use. I have not resorted to this plan, as I believe, from my own experience, that an active purgation produces equally good effects with less discomfort to the patient.

As regards the administration of purgatives, there is no question but that in the milder forms of the affection, even when of some standing,<sup>2</sup> their use is of great value, and has been recognised since the days of Hippocrates;<sup>3</sup> and their immediately beneficial effects were plainly seen in several of Beaumont's observations,<sup>4</sup> when the redness and aphthous appearance, accompanied by loaded tongue, frontal headache, and sallowness of skin, were relieved by full doses of calomel and aloes.

I believe the best remedies in these cases to be mercurials in purgative doses. In the case of an adult and vigorous patient, calomel may be advantageously given in doses of from three to eight grains, and followed after some hours by a draught of magn. sulphatis three drachms, magn. carb. two scruples, tinct. jalapæ half a drachm, in aq. menth. pip.; or by castor oil, or the haust.

source of severe pain and discomfort, is shown by two cases related by Sir T. Watson, in one of which a mass of casein, and in another an accumulation of snuff, were vomited, after causing during several days severe gastric pain and disorder. (Lectures, ii. 440.)

<sup>1</sup> Gaz. Méd. de Paris, 1836, No. xvi.

<sup>2</sup> Andral, Clin. Méd. ii. 186.

<sup>3</sup> "Anorexia, heartburn, vertigo, and a bitter taste in the mouth of a person free from fever, indicate the want of purging upwards and downwards."—Aph. 17, lib. i. sec. iv. Syd. Soc. Trans.

<sup>4</sup> See *loc. cit.* pp. 118, 182, 266.

sennæ co., or the decoct. aloës comp. When such active effects are undesirable, the blue pill, with compound colocynth pill and ipecacuanha, often proves very serviceable, and it may be followed by a Seidlitz draught, or by any other moderately purgative mixture.

In the case of the acute indigestion of children beyond the period of infancy, when there is fever and griping, or even when the latter is absent, a dose of calomel and scammony, or of hyd. cum cretâ with rhubarb, followed by castor oil, often proves very beneficial; but children in this complaint bear purging less than adults, and frequently a dose of castor oil will, if followed for a day or two by suitable care in diet, perform all the service that can be obtained from this class of remedies. In severer cases where there is much irritability of stomach, with frequent vomiting and pain, purgatives by the mouth should be avoided, and they are generally inadmissible when diarrhœa is present, unless there is reason to suspect that undigested food is still retained in the intestines; and the action of the bowels may be procured, if this appears necessary, by aperient enemata.

In rarer instances, when much constipation has preceded or attended the attack, and when vomiting is severe and troublesome, calomel in half-grain doses frequently repeated has been found useful in checking the latter symptom; and a similar indication has been fulfilled by the use of the mixt. magn. sulph. cum magn. carb. repeated at intervals until the bowels have acted freely.

With these exceptions, it is always undesirable to continue the repeated exhibition of purgatives, the effect of which is likely to prove as injurious as a single dose is beneficial, and their incautious use is liable not only to aggravate the stomach disorder, but to cause an extension of the complaint to the mucous membrane of the duodenum and intestines, if these have not already suffered. Some caution is also necessary in the earlier stages of the febrile forms of the disorder, lest a case of typhoid should be mistaken for one of simple gastric disorder, and serious consequences be entailed on the patient by the administration of a class of remedies which, in the former complaint, must always be regarded as sources of extreme danger.

After the administration of emetics and purgatives, and in

the severer cases when these are inadmissible, our main reliance must be placed on sedatives and antacids.

One of the most valuable of the former of these is cold; and though it is only rarely that it is advisable to employ it externally (a plan occasionally recommended, but of which I have no experience, believing that warm external applications are preferable), sucking small pieces of ice often affords great relief to the uneasiness of the stomach and to the vomiting. Thirst may also be quenched in this manner, but the desire of the patient to drink largely is to be restricted, as the filling of the stomach thus occasioned is liable to maintain the tendency to vomiting, which it is our object to restrain.

Opium stands in the first place among the medicinal remedies of this class, and when the vomiting is severe, may be administered in full doses with advantage. It is, however, more valuable in the severer than in the milder forms of the disorder; and in the latter, which are more appropriately treated by purgatives, salines, and antacids, its use is seldom beneficial, and sometimes even proves the reverse.

Hydrocyanic acid is of inferior advantage even in checking vomiting in this disorder, being more useful for the pain and irritability connected with the more chronic forms of inflammatory action; but it may be given with occasional benefit in effervescing draughts containing an excess of alkali, as potass. bicarb. half a drachm, acid. hydrocyan. dil. three minims, aquæ one ounce, to which is to be added for each dose, acid. citrici fifteen grains dissolved in half an ounce of water, or it may be combined with some other of the remedies next to be noticed.

Bismuth, either in the form of the trisnitrate or subcarbonate, has a peculiarly favourable effect in all the milder forms of inflammatory action; and I have found it more beneficial than any other remedy in the gastro-intestinal catarrh of children. For adults it may often be combined with advantage with the carbonate of magnesia, or, when flatulence and heartburn are prominent symptoms, with the magnesia usta. The bismuth should be given in doses of from three to five grains to children, and from ten to twenty grains to an adult; it may be combined with hydrocyanic acid, or when pain or diarrhoea are present, with morphia or tinct. opii.



Carbonic acid is also a valuable agent in relieving pain and vomiting, possessing a direct "sedative" influence on the stomach, and probably also anæsthetic properties.<sup>1</sup> The mode of its administration has been already alluded to.

In milder cases, Vichy or Seltzer water forms a very valuable mode of administering antacids and salines; of the former, which I have found particularly useful in the later stages of subacute inflammatory attacks, a pint, or a pint and a half, may be taken daily between the meals. The beneficial action of the alkalies is in these cases due in part to their effect in neutralising the acidity resulting from fermentative changes caused in the food by the unhealthy secretions of the stomach, but I think it probable that some share in their efficacy is also attributable to their direct action on the mucous membrane, though the precise explanation of this is somewhat obscure. Bamberger speaks highly of the value of muriate of ammonia in cases where the disorder threatens to become chronic.

As a general summary of the treatment it may be stated that in the milder forms of the disease one or two doses of a brisk mercurial cathartic, followed by antacids, magnesia, bismuth, Vichy or Seltzer water, and a careful restriction in diet during the attack, will usually bring the disorder to a termination in three or four days. In the severer cases, when pain is felt after food, and vomiting is troublesome, purgatives and emetics are contra-indicated; and repose as absolute as can be obtained for the patient and for the organ, together with opium, ice internally, or small quantities of effervescent drinks, and leeching, fomentations, or counter-irritation to the epigastrium, are the indications principally to be relied on for obtaining a cure.

A weakened state of the digestion, entailing a liability to fresh attacks, may sometimes remain for many days, or even weeks, after the acuter symptoms have subsided; it is often attended with a feeling of languor and of inability for active exertion, and not unfrequently with flatulence or occasional heart-burn, or with some other of the symptoms of atonic dyspepsia. This state requires great care in treatment, and the use of the so-called bitter tonics demands especial caution. I have more

<sup>1</sup> Pereira, *Mat. Med.* i. 155.

than once seen a chronic form of subacute inflammatory action perpetuated by their untimely use, and only overcome by a return to the sedative and alkaline plans of treatment suitable to the later stages of the acute variety.

The general rules laid down for the treatment of atonic dyspepsia are those most applicable in these cases; and the attention to diet prescribed in the treatment of that disorder, is to be pursued with additional caution, which is to be especially extended to vegetables and fruit. Exercise should be moderate, and should not be pushed beyond a degree sufficient to cause a slight and healthy feeling of fatigue. Chills should be carefully avoided; for patients in this condition are as liable to "take cold" in the stomach as others, in whom the respiratory system is weakened, are to attacks of bronchitis. Alcoholic stimulants are only to be used in great moderation—dry sherry (the Manzanilla or Amontillado being the best) or weak brandy and water, or claret and water, are the most suitable forms for their administration; malt liquors, and also the use of coffee, are to be decidedly forbidden. If all signs of irritation have disappeared while those of atony continue, and if deficiency in the appetite indicates the use of bitters, calumba and nux vomica are those most applicable; these may generally be advantageously combined with the mineral acids, and be given immediately before food is taken.

Pepsine, also, often proves very serviceable at this stage.

If anæmia be present, the milder ferruginous preparations are to be employed in the manner indicated under the head of Atonic Dyspepsia.

Care and patience are at all times necessary in cases of this description. The tendency is to a cure, if it be not interfered with by undue haste on the part of the patient to regain strength, by taking food in excess of the digestive powers of the stomach, or by the use of stimulants beyond a degree which the weakened tissue is able to support without their normal action being perverted to inflammatory irritation.

Purgatives, which the sluggish condition of the bowels may sometimes appear to render necessary, are also to be used with great care. Aloes is usually the best form that can be selected, but the use of enemata is to be preferred. In children, small

doses of rhubarb and soda, or of the domestic Gregory's powder, are often decidedly advantageous; or friction with aloes may be employed on the surface of the abdomen.

In infants, small quantities of magnesia will often answer all indications in this respect, but in them the tendency to diarrhœa is more marked than in adults, and purgatives are seldom necessary.

In older children and in adults, the action of the bowels is often facilitated, and irritability of the gastro-intestinal membrane greatly relieved, by wearing over the abdomen, either during the day or night, a compress wrung out of warm or cold water, and protected by a piece of mackintosh. It should be changed three or four times in the twenty-four hours.

Change of air and scene, as spoken of under the head of Atonic Dyspepsia, is sometimes necessary in weakly patients to complete a cure.

## CHAPTER VII.

### CHRONIC INFLAMMATORY DYSPEPSIA, OR CHRONIC CATARRH OF THE STOMACH.

CHRONIC catarrhal inflammation of the stomach, or chronic gastritis, embraces a large number of the cases of obstinate chronic dyspepsia. It includes, in the author's opinion, many of the disorders which have been described as irritative dyspepsia, and even some which have been ranked among the nervous disorders, and especially those forms which have been regarded as resulting from "morbid sensibility"—a condition which in mucous tissues is much more commonly the result of minor degrees of inflammatory action than of mere derangements of innervation.

These processes in the stomach may either exist, *ab origine*, in a subacute form, perpetuated by the persistence of their exciting cause, or be the result and termination of an acuter attack which has not ended in perfect recovery. In other cases the acuter affection may have left behind an impaired state of nutrition—a condition of atony, which renders the tissue of the mucous membrane susceptible to causes which in a state of health would be incapable of injuriously affecting it. This frequent recrudescence of inflammatory action is, after severe attacks, a very common cause of the persistence of disorder of digestion, since each relapse tends still further to exhaust the vitality of the tissue, and thus to increase its susceptibility until the state becomes permanently confirmed. The frequency with which such relapses are liable to occur after cholera has been already alluded to, and the tendency is one which is common in all cases where an acute inflammation of the stomach

has existed either as a primary disorder or as a complication of other severe diseases. Thus I have known the starting-point of a long-continued subacute gastritis in a child, to have originated in the acute affection brought on (in the case before quoted) through sleeping in a room covered with an arsenical paper.

THE *ÆTIOLOGY* of this affection becomes therefore somewhat complex, nor is it easy logically to define in all cases the limits between the predisposing and the exciting causes, since many of each class act apparently in both directions.

Of the predisposing causes, I believe that the disease, either in milder or severer forms, is one so common at all ages and in both sexes, that no special aetiological influences can be attributed to either of these conditions. There is very little doubt that the disorder is to a certain degree hereditary, but whether this tendency is displayed with regard to the idiopathic inflammation, or is only operative through some of the constitutional causes which induce a special proclivity to it, cannot, I think, be decided by any data at present accessible to us.

The most frequent of all conditions predisposing to a subacute inflammatory action is, however, the impaired state of the digestive powers which has been described under the head of Atonic Dyspepsia; and hence, not merely theoretically, but in every-day practice, we may convince ourselves of the truth of the proposition that the causes of this state all act as indirect predisposing causes of the irritative forms, both of the acute and of the chronic kind.

Among the other constitutional diseases which appear to involve a special liability to these disorders—though often acting apparently in diverse manners—may be mentioned scrofula, albuminuria, phthisis, gout, and diseases tending to disturb the portal or abdominal circulation, as emphysema, heart disease, and *à fortiori*, cirrhosis of the liver, or other conditions affecting the circulation through this organ. The following table exhibits the principal diseases with which I have found either acute or chronic catarrh in 100 stomachs examined:—

Acute Catarrh.	No. of Cases.	Chronic Catarrh.	No. of Cases.	Acute and Chronic catarrh Combined.	No. of Cases.
Pneumonia, Acute . . . . .	2	Tubercle of Lungs (uncomplicated) . . . . .	4	Tubercle of Lungs (uncomplicated) . . . . .	2
————— Chronic . . . . .	1				
Variola . . . . .	2	Tubercle of Lungs, Tubercular Peritonitis . . . . .	1	Tubercle of Lungs, Morbus Cordis . . . . .	1
Puerperal Peritonitis, with recent Bright's Disease . . . . .	2	Tubercles of Lungs and Intestines, Bronchi - Ectasis, Morbus Cordis . . . . .	1	Tubercle of Lungs, Tubercular Pericarditis, old Valvular Disease of Heart, Liver, Fatty, Kidneys Granular . . . . .	1
Perimetritis Puerpera, with recent Bright's Disease . . . . .	1	Tubercle of Lungs and Intestines, Liver Fatty . . . . .	1		
Phlebitis, from various causes, associated with first stage of Bright's Disease . . . . .	2	Tubercle of Lungs, Morbus Cordis, Granular Degeneration of Kidneys . . . . .	1	Tubercle of Lungs, recent Bright's Disease . . . . .	1
Endo - Pericarditis, first stage of Bright's Disease . . . . .	1	Tubercle of Lungs, Morbus Cordis . . . . .	1	Morbus Cordis . . . . .	2
Suppurative Parotitis . . . . .	1	Capillary Bronchitis, Morbus Cordis . . . . .	1	Morbus Cordis, Cirrhosis of Liver, recent Pneumonia . . . . .	1
Cholera; Kidneys in first stage of Bright's Disease . . . . .	2	Chronic Bright's Disease, Fatty Liver . . . . .	2	Pneumonia (uncomplicated) . . . . .	1
Typhoid Fever . . . . .	1	Morbus Cordis, Gangrena Pulmonum . . . . .	1	Pneumonia Phlebitis . . . . .	1
Morbus Cordis . . . . .	1	Morbus Cordis, Gangrena Pulmonum . . . . .	1	Morbus Cordis, Gangrene of Lung . . . . .	1
Morbus Cordis, Capillary Bronchitis . . . . .	1	Morbus Cordis, Caries of Pelvic Bones . . . . .	1	Pneumonia, recent Bright's Disease . . . . .	1
Tubercle of Lungs . . . . .	1	Melanosis of Lung, Pleurisy . . . . .	1	Puerperal Fever . . . . .	1
Tubercle of Lungs and Tubercular Peritonitis . . . . .	1	Cystic Disease of Ovaries, Peritonitis . . . . .	1	Typhoid Fever . . . . .	1
Diabetes . . . . .	1	Abscess in Œsophagus . . . . .	1	Delirium Tremens . . . . .	1
Carcinoma Ventriculi . . . . .	1	Hernia . . . . .	1	Cirrhosis of Liver . . . . .	1
		Drunkard. Other pathological conditions not noted . . . . .	1	Suppurative Parotitis, Kidneys Fatty . . . . .	1
Total . . . . .	21	Total . . . . .	19	Total . . . . .	17

One remarkable fact which appears from this table, especially in the contrast between cases of recent and chronic catarrh, is the greater proportionate frequency with which the former is associated with acute, and the latter with chronic inflammatory affections of other organs; and the tendency of the former to complicate disorders which induce among other changes the swollen and cloudy condition of the kidneys which marks the first stage of Bright's disease, is well worthy of attention. I have before alluded to the analogy which I believe to exist between the characters of the affections of the glandular structures involved in the inflammatory process, and it would seem as if the same exciting cause not unfrequently sufficed to produce similar changes in the ultimate structures of many

organs simultaneously. Septic and acute febrile diseases seem especially to possess this tendency, and it is in these cases more particularly that I have observed this coincidence.

The tendency, on the other hand, of diseases obstructing the venous circulation to induce chronic catarrhal conditions of the stomach, is also well illustrated in this table; but the remarkable frequency with which they are associated with phthisis is especially apparent, having been present in 28 per cent. of the whole number, or in sixteen out of thirty-one, or nearly one-half of the tubercular cases examined. My more recent observations, though not capable (from peculiar circumstances) of being framed statistically, have fully confirmed my opinion of the ætiological influence in this direction of these classes of disease; and I have been increasingly struck with the frequency of the co-existence of the anatomical conditions to be described as found in chronic catarrh, with cirrhosis of the liver and with granular conditions of the kidney, to which they bear the strongest resemblance.

Dr. H. Jones' observations also give some support to this view, for in twenty-three cases of catarrh of the stomach, he found tubercles in four and disease of the lungs in eleven more, while in eight there was disease of the kidneys,<sup>1</sup> and in three disease of the heart.

<sup>1</sup> There is a discrepancy between my own and Dr. Handfield Jones's observations as regards the frequency of catarrhal conditions in the whole number of cases examined, which rests partly on a difference of the import attached to certain pathological changes. Dr. Jones appears to include under this term only those cases where vascular injection and catarrhal mucus were present, and states that in many of these (twenty-one out of twenty-three) the *tubes* were found healthy. I have based my observations on a combination of the appearances seen by the naked eye, together with the result of microscopic examination; and I am, from further researches, strongly inclined to adhere to my opinion, that changes in the secreting structures almost invariably accompany these inflammatory processes. The same difference in anatomical data may explain the yet greater discrepancy between my observations and those of Willigk (Prag. Viertel-Jahresch. li. p. 27), who gives the total frequency of catarrhal conditions as only 7·2 per cent. of the results of five years' post-mortem examinations. Prof. Willigk, however, does not give the data on which his diagnosis of the condition was founded; and as I believe that in many cases microscopic examination is necessary for the absolute elucidation of the changes in the tissues, particularly as, from what has been before said, the absence of vascularity *post mortem* cannot be taken as evidence of a healthy condition of the stomach during life, I do not think that my estimate, though founded on a comparatively smaller number of observations, will be found greatly to exaggerate the truth. The main difficulty is to distinguish the

Of the more direct exciting causes I believe that among the most frequent must be placed either an habitual excess in eating, or a constant use of food that disagrees; especially by persons whose general health and digestive power are below the healthy standard: by this means a series of minor attacks of indigestion of an irritative type are excited, which at times alternate with acuter forms of "embarras gastrique," from which such patients are continually liable to suffer. This subject has been already alluded to under the head of Atonic Dyspepsia, where it was pointed out that the boundary line between the two affections is not one that can be drawn with very great precision, though a considerable degree of accuracy can, I believe, generally be attained in distinguishing the characteristic features of these two classes. It cannot, however, be too strongly insisted on that the tendency of undigested food is always to give rise to gastro-intestinal irritation, whether the cause of the indigestion reside in the stomach, or in the quality or excessive amount of the food,<sup>1</sup> or drink, or on some of the other accidental conditions mentioned among the general causes of dyspepsia, especially deficient insalivation or imperfect mastication, or the habits of mental or physical work after meals, or any of the other numerous causes which it is unnecessary to repeat in this place.

The habitual use of spirits, particularly when undiluted, or to any amount that can be considered excessive, is, I believe, an almost unfailing cause, when long continued, of chronic inflammatory changes in the stomach. I have hardly ever met with an instance in which, when this habit had been confessed during life, I have failed to find after death some of the pathological changes hereafter to be mentioned.

degenerations arising independently of inflammatory action, from those which are the result of this process.

<sup>1</sup> Broussais (Lec. Phleg. Gastriques, p. 183) says that the causes which in adult age perpetuate a chronic irritation would, in the earlier periods of life, have produced an acute attack.

<sup>2</sup> The average ratio, in persons who have indulged in these excesses, of deaths from the digestive organs (including disease of the liver) to deaths from all causes, according to Neison's researches, amounts to 12.47. ("Vital Statistics," quoted by Parkes on Hygiene, p. 299.) I believe that the amount of injury to the stomach is much underrated, since changes in this organ often escape observation, and are rarely directly the causes of death.



Chronic or subacute catarrh of the stomach is also a very frequent accompaniment of cancer and ulcer of this organ, as well as of pyloric obstruction. The question of the mode of its causation in the two former of these diseases is one of no little difficulty, but it is probably to its agency that many of the derangements of digestion observed in their course are attributable.

Medicinal causes deserve also some consideration, and especially the abuse of stimulants and tonics or purgatives in many of the forms of atonic dyspepsia; nor can other remedies be absolved from the onus of having occasionally produced these effects, which have been attributed to the prolonged use of arsenic, and bichloride of mercury, and occasionally of cubeb and copaiva.

There are some cases of syphilis recorded, accompanied by symptoms closely resembling those characterising this group of diseases, and which have been cured by the administration of mercury. The evidence of their nature is incomplete, but pending their complete elucidation, I am inclined to believe that, judging of the effects of this poison on other tissues, such disorders are most suitably classified among the inflammatory affections of the stomach.

Lastly may be mentioned, mechanical irritants of all kinds.<sup>1</sup>

THE SYMPTOMS of this disorder are primarily those of indigestion of an aggravated kind, but they are often varied, and very irregular in their course, nor are they always united in one case, some being at times more prominent than others. It is of this class especially that the remarks made with regard to the general symptoms of indigestion will be found to be true, that the condition may often be revealed by the general state of the system, or by impairment in the functions of some other organ, rather than by symptoms appreciable by the patient himself, as truly proceeding from the deranged stomach.

In many cases there are at times intervals of almost complete immunity from apparent dyspepsia, but these are seldom complete, and are speedily followed, often with no apparent cause, by returns of the old symptoms, and with exacerbations of an acuter kind, after the slightest indiscretion in diet; and this irregularity is of no small value in distinguishing the nature of

<sup>1</sup> See a case, of pins swallowed by an hysterical woman.—John Marshall, *Med. Chir. Trans.* xxxv.

the complaint, having its parallel in most of the chronic inflammatory affections of other mucous membranes.

Those referable to the stomach are a sense of weight, oppression,<sup>1</sup> distress, or undefined uneasiness, following at a longer or shorter period after meals, often associated with distension from flatulence, which sometimes may be very considerable; a sense of tightness and constriction at the sternum, or a feeling of fulness in the pharynx and œsophagus.

Food rarely, if ever, causes pain; and this is not, indeed, a prominent or (with any severity) a frequent symptom, though it may occasionally arise if much mucus is secreted, or when flatulence is present; but though absent in the severer forms which characterise some other stomach affections, it is seldom that the uneasiness above described is altogether wanting. In other cases it is felt as an uneasy, ill-defined sensation of discomfort in the dorsal region between the scapulæ, though rarely also in this situation amounting to the acuter pain met with in ulcer and cancer. Tenderness on pressure is not usually a marked symptom, though some degree of it often exists. The sensations complained of generally commence within half an hour to an hour after taking food, and continue more or less during the whole period of digestion, often becoming aggravated after two or three hours, when the imperfectly digested meal is passing the pylorus. Other discomforts follow at a later period, such as intestinal flatulence, and borborygmi, together with an increased sense of distension and oppression, especially felt in the right hypochondriac region. Sometimes these uneasy sensations, when accompanied by acidity, are relieved by taking more food, but this alleviation is frequently only temporary, and is followed by an increase of the original discomfort.

Heartburn and acidity are often very annoying, but they are by no means constant, and some writers (Dr. Todd) have even denied that they exist in this form, though I have known them to be present in cases that presented undoubted features of the catarrhal type, as in some cases of the irritative dyspepsia of phthisis, and when the disorder has proceeded from drink.

Nausea, to a certain degree, is not unfrequent, but it is seldom

<sup>1</sup> *Barre* of the French writers, described "as if a bar were pressed across the epigastrium, or base of the chest."

distinctly felt, and vomiting is rare except in certain special forms, associated with either albuminuria, congestion, the dyspepsia from drink, and occasionally with phthisis.

The appetite presents considerable variations. It is capricious, and generally it is diminished, though not, as a rule, to a marked degree; but eating is soon followed by a sense of satiety, and the feeling of discomfort and fulness at the stomach which often ensues, even during a meal, serves at once to check the desire for food, though if this be neglected, and a full meal taken, the symptoms are usually increased in severity. In other instances, there is the same sense of sinking, and of craving for food, which is observed in some of the neuroses, and which must in these cases be considered as a perverted sensation arising from the condition of gastric irritation; though it should be borne in mind that nervous erethism may at times complicate this complaint, and introduce much complexity among the symptoms observed.

Thirst is a very prominent and distinctive symptom, and it is hardly ever absent in cases of inflammatory irritation of the stomach, whether this be acute or chronic. It exists even during meals, but is most marked in the intervals, when the patients have an extreme craving for fluid; and this is particularly felt in the evening, if the chief meal has been a late dinner. The feeling is not only one of thirst, but a sense of languor, oppression, exhaustion, or internal heat, is often combined with it, which is relieved by drinking, and especially by cold fluids; but in some cases even these give distress, and warm drinks, especially tea, are eagerly taken, though often in the latter case only to be followed by increased discomfort, acidity, and flatulence.

The breath is often heavy and offensive. There is very frequently a bad taste in the mouth, and this is particularly common on first rising in the morning. The gums are spongy, red, swollen, often retracted from the teeth, and inclined to bleed, and the saliva and buccal mucus are occasionally acid. An excessive flow of saliva is not uncommon, and is particularly observable at night, when it may escape from the mouth during sleep, wetting the pillow. The lips tend to become dry and cracked, and the fauces are liable to erythematous inflammation, with slight superficial ulcerations. The pharynx also may be the

seat of a granular inflammation, associated with excessive secretion of a tough, tenacious mucus, which is a source of great annoyance and of discomfort to the patient.

The conditions of the tongue present some variations, but as these are valuable aids to diagnosis, they deserve to be especially dwelt upon.

(a) If associated with distinct atony, the tongue may be broad, somewhat pale, and flabby, but the papillæ generally are enlarged—this being most apparent in the fungiform papillæ on the tip and edges, which are also redder than natural, and there is a thin, white fur over the surface. Sometimes, however, this fur may be present when the papillæ, though enlarged, are pale.

(b) In the more distinctly irritative forms, and especially in children who have any signs of scrofula, and in phthisical adults, the whole organ is redder than natural, and may be of a bright florid colour, and even raw-looking; it is often pointed at the tip, which, together with the sides, present an extreme degree of injection, and the papillæ stand out as vivid red points. There may be at the same time a coating of variable thickness along the dorsum. This form is frequently associated with aphthæ, especially at the tip, and sometimes on the inside of the lips; or with painful spots on the tongue, which are found on close examination to be papillæ slightly abraded.

(c) In older persons, and particularly in those in whom the dyspepsia is the result of excessive or hurried eating, the tongue, while presenting some degree of enlargement and redness of the papillæ at the tip and edges, is often uniformly covered throughout the greater part of its extent with a thicker fur, sometimes whitish, and occasionally of a browner tint, which more resembles the coating attending the acuter attacks, and which patients recognise as a symptom of "biliousness."

(d) Lastly, it must be mentioned, that in cases which I cannot but regard, as far as my experience extends, as being exceptional, though more common where the catarrh of the stomach is secondary to local causes of congestion from venous obstruction, the tongue may present very little deviation from the natural condition, though occasionally even in these, transitory formations of a white fur on the dorsum may be observed on repeated examinations.

Some of the intestinal symptoms have been already alluded to. In addition it must, however, be noted, that constipation is often obstinate; it is frequently associated with much uneasiness in the rectum, and it greatly increases the general feelings of oppression, malaise, and languor. The stools may be dry and scybalous, and are not unfrequently coated with a considerable amount of tenacious mucus, which may even form casts of portions of the intestinal canal. Occasionally they are passed with considerable tenesmus and straining; sometimes they present thin flattened bands, and they are usually accompanied or preceded by the escape of flatus. They are generally pale, both in this state and in another occasionally met with, when the constipation is less marked, and when one or two large, pultaceous, often offensive, and sometimes frothy motions, sometimes containing considerable quantities of undigested food, are passed in the day—when there are often griping pains in the abdomen, and a liability to severer attacks of colic. In other cases the two conditions alternate, or slight causes may give rise to transitory attacks of diarrhoea, which may afford temporary relief, but are commonly followed by an aggravation of the intestinal flatulence and of the general discomfort, and are often attended with increased signs of irritation on the tongue and with the production of aphthæ as before described.

Piles are a not uncommon complication of this state, even when evident disease of the liver is absent.

The cutaneous surface shows various indications of the perverted general nutrition of the body. It is often dry and harsh, sallow, earthy, and wrinkled; and at times, after slight indiscretions of diet or without assignable cause, patients are liable to suffer from eczematous or impetiginous eruptions, which may be followed by a perceptible alleviation of the symptoms.<sup>1</sup>

<sup>1</sup> A case of this kind lately came under my notice, of a young lady whose father is liable to gout, and who had for years been liable to an aggravated form of irritative dyspepsia, but whose symptoms almost entirely disappeared for many months since the eruption of an eczematous rash on her face. Trousseau (*Clin. Méd.* ii. 1862, p. 280) has noticed that in dyspeptic patients who resort to sea-bathing a febrile condition, followed by urticaria, frequently results, and that the eruption of the skin is followed by a great relief to the symptoms of the stomach. Allusion has been already made to the occasional concurrence of

Children are more liable to suffer from these and occasionally from herpetic eruptions than adults, but gouty patients, and those who drink excessively of malt liquors, are occasionally subject to them. A vinous tint on the malar bones and nose is also by some writers attributed to the disturbance of the stomach.<sup>1</sup>

The hair tends to become dry, harsh, and prematurely grey ; sometimes it is lost in considerable quantities when acuter exacerbations supervene. The nails are often furrowed and have a tendency to split. In children who suffer much from irritative dyspepsia during the second dentition, the teeth are often irregular, with thin enamel, and are crenated at the edge, while the anterior and, to a less degree, the posterior surface are marked by vertical depressions or sulci.<sup>2</sup> In adults the teeth suffer from premature caries, often erroneously attributed to the use of mineral acids given for the cure of the complaint, but more commonly due to impaired general nutrition, and especially to the spongy condition of the gums and to their retraction above the enamel.

Emaciation is almost constantly observed when this disorder has persisted for any length of time, though it is not early in its appearance unless the patient has been previously out of health or the disease is severe ; but a gradual loss of flesh and strength is an almost constant symptom, and one that should in the absence of other signs of disease cause a special attention to be directed to the state of the digestive organs.

Coldness of the extremities is a very common symptom, and it is not unfrequently attended with flushing of the face and oppression of the head. Patients of this class are almost always chilly. They are liable to slight rigors and to suffer much from changes

this disorder with some of the forms of acute indigestion, and a somewhat similar instance is also mentioned by Schmidtman (*loc. cit.* iii. 225) : “*Novi mulierem in qua herpes faciei cum cardialgia alternabat ; extanti in facie herpete a cardialgia vacabat ; eo disparente extemplo duris torquebatur ventriculi doloribus.*”

<sup>1</sup> Rayer, *Dict. de Méd.* x. 156 ; Chomel, *ib.* x. 92.

<sup>2</sup> This condition of teeth is very common among children to whom “grey powder” has been administered at the time of the second dentition ; but I have frequently observed it, independently of this cause, where there has been much dyspeptic disturbance at this period. In a third class of cases it is hereditary, appearing when the digestion is good ; but it is not unfrequently associated with scrofula.

of temperature, which are often followed by an aggravation of their sufferings.

Febrile reaction of a slight type, preceded by rigor and malaise, is very common. It often appears to be directly associated with the taking of food, or of alcoholic stimulants, but in other cases it seems to have a special tendency to exacerbation in the evening; sometimes returning with such regularity as to have given rise to the suspicion of a malarial cause, and to have led to the ineffectual use of quinine.<sup>1</sup> The skin becomes hot and dry, especially in the feet and hands, but in other cases these may be cold, while a great sense of heat is complained of in the trunk and head. It occasionally occurs at night, and then is often followed by copious perspirations during sleep.<sup>2</sup>

There may be at times an icteric tint of the conjunctivæ, but this is not observed with any considerable frequency. Slight attacks of ocular conjunctivitis, sometimes attended with phlyctenæ, are by no means uncommon.

Slight catarrhal affections of the air-passages are also not unfrequent. Those of the fauces and pharynx have been already alluded to, but the same condition may invade the larynx, giving rise in some cases to injection, with relaxation of the vocal cords, and thus causing dry cough, or hoarseness, and huskiness of the voice; or the affection may extend deeper, and be the source of a muco-purulent secretion, which is often aggravated during the febrile accessions which occur after meals, and especially after wine has been taken, and may give rise to cough coming on at these periods.

Dyspnœa, and a desire to sigh, are very frequently complained of. They are sympathetic symptoms common to all forms of indigestion, but are very marked in the variety now under consideration.

A very interesting and important question connected with this subject, is the relation of these disorders to the causation of phthisis.

<sup>1</sup> Chomel, *Des Dyspepsies*, p. 79.

<sup>2</sup> It may be well here to recall the aphorism of Hippocrates in relation to the causation of many of these forms, and which has been already alluded to: "A copious sweat after sleep occurring without any manifest cause, indicates that the body is using too much food."—Aph. 41, sec. iv.

By some authors, disturbance of the digestion has been considered to be an immediate cause of the development of pulmonary tubercle; while by others the relation of the two conditions has been considered as accidental; or it has been held that the irritative dyspepsia so often observed in phthisis, is secondary to the tuberculizing process in the lung.

As regards the instances in which the gastric irritation appears as a consequence of the tubercle, the chief points connected with this relationship have been already discussed in the ætiological bearings of this and of the other forms of dyspeptic disturbance, and it would appear that tubercle of the lungs may act as a cause of dyspeptic complaints in various ways, of which the following brief summary may here be repeated:—

(1) Of atonic dyspepsia, by the general state of weakness and prostration induced.

(2) Of acute irritative dyspepsia, as a condition depending on the pyrexia attendant on acute tuberculosis; which thus comes within the general category of the febrile diseases, in which the arrest of normal secretions and the accumulation within the body of effete materials, tend to derange the larger number of the secretory apparatuses, through their being called upon to eliminate elements foreign to their structure and injurious to their healthy nutrition and function.

(3) In a more chronic form both by the persistence of the pyrexia owing to intercurrent attacks of pneumonia and bronchitis, and also by congestion caused through obstruction to the pulmonary circulation.

The effects of dyspepsia in causing phthisis were more particularly insisted on by Dr. Wilson Philip, who however attributed this class of cases—to which he gave the name of “dyspeptic phthisis”—to a primarily disordered liver. Mr. Hutchinson<sup>1</sup> has more recently brought forward some evidence of a similar kind, and has shown the frequency of the co-existence of the two diseases—dyspepsia having been absent in four only out of fifty-six cases of phthisis which he examined. Of fifty-two of these he further states that in thirty-three the dyspeptic symptoms (the most prominent of which were flatulence, acidity,

<sup>1</sup> *Med. Times and Gazette*, 1855.



and a dislike for fatty food) were the first observed, while in ten they appeared simultaneously with, and in nine they followed the pulmonary symptoms.

Dr. Brinton's view of the condition which he has described as gastric "phthisis," and which corresponds very closely with the irritative dyspepsia now under consideration, would appear to regard the disease in the lung as the origin of that in the stomach through a reflex irritation communicated by the pneumogastric<sup>1</sup>—an opinion which also has been sustained at some length and with great ability by Dr. Budd.<sup>2</sup>

I have already alluded to the possibility of such a mode of causation of inflammatory conditions of the stomach, but, pending further direct observation, it would appear to me that the theory that reflex nervous disturbance acts frequently in this manner, is one that requires further proof. The ordinary disturbances excited by reflected irritation do indeed bear a certain resemblance to those arising from severe inflammatory action, and the diagnosis is, as I have remarked, attended at times with no little difficulty. But, setting aside the influence of cough in causing vomiting, I cannot say that I have ever seen cases of phthisis in which the dyspeptic disturbances corresponded in character with those where the disorder in the stomach distinctly originates from reflex causes, and in which it is of a more purely functional character. The whole bearing of my own observation has tended to convince me that, in the majority of instances in which phthisis and dyspepsia have been associated, the latter has been due to anatomical changes in the stomach, more or less marked, of the inflammatory type, or of the consequences of this process;<sup>3</sup> and further, that such forms of dyspepsia may, on the other hand, frequently occur without

<sup>1</sup> Diseases of the Stomach, p. 350.

<sup>2</sup> On the Stomach, p. 186, *et seq.*

<sup>3</sup> In some cases of vomiting in phthisis which I have recently observed, the stomach was found *post mortem* in a marked condition of catarrh. One interesting case of this kind was lately admitted to University College Hospital, having been sent in by a very competent observer, as a case of probable ulcer of the stomach, from the severe pain and tenderness at the epigastric region, associated with obstinate vomiting. The former symptom was, however, noticed to be associated with diarrhoea, and to precede the action of the bowels (blood had never been vomited), and after death extensive ulceration was found in the *transverse colon*.

pre-existing conditions of organic disease in the lungs or in any other organs. This is especially true of the dyspepsias occurring in scrofulous constitutions, which are, I believe, analogous to the scrofulous inflammations of other mucous membranes, and, like them, are distinguished by their chronicity, and by the obstinacy with which they resist treatment, but which are often entirely unassociated with the formation of tubercle.

Any influence which dyspepsia may exert in the causation of phthisis depends chiefly, I believe, on the impairment of the health and general nutrition which it induces; but that it has any special power of giving rise to the disease without the co-existence of other conditions, hereditary or acquired, necessary for its production, appears to me extremely improbable, though the risk of the disease in a person subject to such conditions would be doubtless greatly increased by his becoming affected with severe irritative dyspepsia.

There is yet one other point that is not unimportant to recollect in the discussion of any such question as the ætiology of phthisis, especially in relation to dyspepsia, viz. that the former disorder, like the latter, probably includes many, and possibly diverse, anatomical conditions. Some of them are probably of a distinctly inflammatory nature; and the outbreak of one of these may often co-exist with a dyspeptic disturbance of sufficient severity to mask the lung-symptoms, while both may subside simultaneously under appropriate treatment. I have seen more than once, severe irritative dyspepsia, with febrile reaction, coincide with the invasion of dulness and fine crackling râles at the apices of the lungs, which were only attended with a slight cough, attributed to cold, and which without careful examination would have escaped attention. I have known in such cases the lung-symptoms and the physical signs disappear in a few weeks, under careful treatment, coincidently with the improvement of the digestion: but I should not in such a case regard the disorder of the stomach as the direct cause of the pulmonary disturbance, but should rather believe that both were owing to the same catarrhal origin, though there is no question that the former would, if persistent, tend to aggravate the latter.

The urine, in most of the chronic inflammatory affections of the stomach, is more constantly affected in various ways, than

in the other forms of disturbance of digestion before noted ; and this is easily explicable by the persistence of the condition, and by the fact that, from their very nature, chronic inflammatory states of the mucous membrane necessarily induce a greater disturbance of the digestive powers, than either simple atony or mere nervous disturbance. The most common of the changes presented are the deposits of urates, earthy phosphates, and oxalates. None of them are peculiar to this form, and urine of high specific gravity, and characterised by the deposit of urates, is almost invariable in the acuter stages of inflammatory dyspepsia.

Earthy phosphates with urine, sometimes of a high, and sometimes of a low specific gravity, and often alkaline on emission, are also common. The specific gravity depends, in some measure, on the amount of fluid taken with the meal preceding the period at which the urine is passed ; and thus it is commonly low in the morning after breakfast, and generally higher in the evening, when the exertions of the day have probably increased the amount of urea. The cause of the alkalescence has been already alluded to in the chapter devoted to Acidity. By some authors this condition has been referred to duodenal indigestion,<sup>1</sup> the idea having probably arisen from the concurrence of the deposit in the urine with the period at which the food passes into the intestines, and with the aggravation of the symptoms of malaise and flatulence which often occur at that time. I have already given expression to the hypothesis that in marked forms of dyspepsia the alkalescence of the urine may be in part due to the defective secretion of the liver and pancreas ; of the former of these we have frequent evidence in the pale, clayey stools, and also some presumptive proof in the great increase of flatulence which occurs in the intestines. The fact that these deposits often alternate with urates, and sometimes with oxalates, lends a further support to this view, since the latter seem to be invariably associated with faulty assimilation or metamorphosis of protein and saccharine matters,<sup>2</sup> and may probably depend on the abnormal condition in which

<sup>1</sup> Eg. Yeats, "Some Observations on Duodenum," *Med. Trans. Coll. Phys.* 1817, p. 351, and Mayer, "Krank. des Zwölffingerdarms," p. 10.

<sup>2</sup> Parkes, *On the Urine*, p. 225 ; Roberts, *loc. cit.* p. 43 ; Golding Bird, p. 159.

these enter the blood after the imperfect intestinal digestion caused by the deficiency in supply of those secretions.

There seems also some ground for the belief that the formation of uric acid is one of the series of changes effected in the liver, on the extractives derived from tissue metamorphosis,<sup>1</sup> and that its presence in excess in the urine is frequently a result of faulty action in that gland.

The deposit of urates is often associated with the febrile heat complained of after meals, but the same symptom has been noted in connexion with both oxalic and phosphatic deposits,<sup>2</sup> and the whole history of these disorders points to their close correspondence with those, the symptoms of which have now been described. Phosphatic urine and oxaluria may, indeed, occasionally occur when the condition is one of simple atony or neurosis, but it is probable that when they are persistent, or of any severity, some conditions of organic irritation, tending still further to impair the digestive power, are almost invariably present.

The nervous system participates markedly in the general disturbance.

Languor, lassitude, pains in the trunk and limbs—the latter sometimes dull and aching, sometimes, when in the scapular region, severe and lancinating, at others directly affecting the muscles, and simulating conditions of chronic rheumatism; a feeling of inability for exertion, especially marked after meals, and often felt on rising in the morning; irritability or excitability of temper, intellectual depression, loss of judgment, and of the reasoning powers, and of memory. Hypochondriasis, in its proteiform characters, occurs also more commonly in connexion with this condition, than with almost any other form of dyspepsia. Fear, timidity, anxiety, despondency to such a degree that “in a merchant surrounded by affluence, apprehensions of impending beggary often embitter the moments that are free from the excitement of business; in the mechanic, unfounded ideas of immediate loss of employment, and visions of the interior of a workhouse, are generally present.”<sup>3</sup>

<sup>1</sup> In some analyses of livers made in Prof. Scherer's laboratory, in 1856, I found uric acid among the extractives. See Würzburg Verhandl. 1857, p. 263.

<sup>2</sup> Golding Bird, *loc. cit.* pp. 244, 291.

<sup>3</sup> *Ibid.* p. 308. This mental state, so graphically described by Dr. Bird as

Headache, and a feeling of tension, are frequently present, but the sick-headache is not so common in advanced forms of the disease, unless under the supervention of acute attacks of indigestion, as in the simple atonic or acute forms, the feeling being generally rather one of fulness, or of dull pressure, in the occipital or frontal regions. *Vertigo* is occasionally met with, especially when irritation has supervened on the atonic form, but with this exception it is, comparatively speaking, rare in this variety.

The expression is anxious and careworn, and in conjunction with the emaciation and sallow tint of skin so commonly present, gives to the individual a look of premature age.

Extreme degrees of sleeplessness are very common; or when, after hours of restlessness, sleep is at length attained, it is disturbed by dreams and nightmare, and is often associated with nocturnal emissions.<sup>1</sup>

The heart's action is often irregular, and easily excited to painful palpitation on slight exertion, conjoined with which there may be at times some irregularity of action. The pulse is accelerated during the febrile movement following digestion, when it is full and compressible; at other times it becomes weak and slow, in proportion as the patient loses strength by the continuance of the dyspepsia.

In the foregoing sketch, a description has been given of the leading symptoms which correspond to cases where the anatomical characters hereafter to be described are found; but the whole of this group does not invariably appear simultaneously. The course of the disorder is also modified by the various ætiological conditions under which it occurs bringing certain symptoms into greater prominence than others, and also by its occasional complication with some of the neuroses, to which reference has previously been made, and which are among the chief sources of obscurity in the diagnosis of the severe forms of both affections. This is especially true of some of the cases of hysterical pain and vomiting, and probably also of the dyspepsia of pregnancy, in which latter, though true organic irritation in all probability

occurring in connexion with phosphatic urine, may be found in conditions of irritative dyspepsia when these changes in the urine are not at the time present.

<sup>1</sup> Chomel.

exists, the symptoms are aggravated out of all proportion to the anatomical changes by the co-existence of nervous phenomena, but which are not without their parallel in other parts, as is seen in the irritable ulcer, and in some cases of conjunctivitis.

The most typical examples of the disease, as affecting both the digestive organs and the nervous system, are those where irritative dyspepsia has supervened in a debilitated constitution, and has been preceded by the symptoms of atonic dyspepsia. They are yet more marked if in such a constitution there is any taint of hereditary gout, which may not have been revealed by a distinct attack, but where the emaciation, weakness, and hypochondriasis are familiar to all who have had opportunities for observing these complaints. There is, however, a constitution of a different type, which, though most common in the gouty diathesis, is yet occasionally met with independently of any such taint, where the individual is to all appearance healthy, florid, active, and tends to become corpulent, but habitually eats too much, and is constantly subject to acidity and flatulence, the stools having a pultaceous character, and being often offensive from the food being passed only partially digested, while the urine often abounds in lithates, and the tongue is commonly furred and also redder than natural. It is probable that the loose condition of the bowels in these cases acts in some degree as a safety-valve to the digestive organs, and to the system generally. Patients of this class are, nevertheless, often subject to severe attacks of indigestion, which can only be regarded as an aggravation of a tendency constantly present to a greater or less degree; and though generally cheerful, they are liable to attacks of hypochondriasis and depression of spirits, which are only relieved by active treatment directed to the digestive organs.

In the scrofulous forms in children, the attention of the parents may be directed only to the pallor, weakness, and gradually progressing emaciation of the patient, and the evil is constantly aggravated through ill-advised attempts to improve the nutrition by forcing increased nourishment on a stomach already incapable of digesting the normal amount. Phthisical dyspepsia, on the other hand, is often painfully complicated by the diarrhoea proceeding from ulcers in the intestines, but which possibly in some degree aids in preventing the oppression and

hypochondriasis which so frequently attend the constipation presented by some of the other varieties.

There yet remains a group of cases where vomiting constitutes a more prominent symptom than in those which have hitherto been passed in review, and it is often accompanied with a profuse secretion of mucus, which stands in the same relation to the forms in which this is not so apparent as a bronchorrhœa, or leucorrhœa, or nasal catarrh occupies to the drier forms of inflammation of the mucous membrane from which those fluxes may proceed. The cases where gastrorrhœa is a prominent symptom, are ordinarily those of congestion of the stomach from pulmonary, cardiac, or hepatic disease, and of dyspepsia in habitual drunkards, in which the last-named cause of congestion often, I believe, plays a prominent part; and to these must be added many cases of albuminuria.

As regards the latter disease, it not unfrequently forms a complication of the disorders arising from the abuse of alcohol, the effects of which it seems further to aggravate; but independently of this, the condition of uræmia, as has already been stated, tends to cause a constant secretion from the stomach, not necessarily associated with the inflammatory condition. This result of physiological observation refers, however, only to experiments conducted through a shorter period of time than the ordinary duration of a case of albuminuria, and from pathological experience I am able to state that few cases of this disease, which have long exhibited any marked symptoms of stomach disturbance and vomiting, have failed to show post-mortem signs of chronic or subacute inflammatory action.<sup>1</sup> Nor is it difficult to understand how this should be the case, when we consider the altered nature of the secretion thus furnished, as well as the perversion of the physiological functions of the stomach implied in its continuance, independently of the presence of food, in a state of constant secretion.

Sometimes the vomiting of albuminuria occurs on first rising in the morning, when it is occasionally relieved by food;<sup>2</sup> under these circumstances it is possible that it is of cerebral origin, and is caused by the disturbance of the nervous centres through

<sup>1</sup> See Rayer, *Mal. des Reins*, ii. 347.

<sup>2</sup> Christison, *Granular Degeneration of the Kidneys*, p. 96.

the poisoning of the blood; but in a large class it takes place within half-an-hour to an hour after food has been taken. Pain, however, is but rarely complained of; and though much acidity is sometimes present, the reaction of the vomited matters may be at other times alkaline, but the cause of this difference has not, as far as I am aware, been made the subject of special observation.

In the dyspepsia of drunkards, the vomiting of mucus is often one of the most prominent symptoms. It usually occurs in the morning, and is easily excited by slight stimuli. During the rest of the day there may be comparatively little disorder in the stomach, though acidity and flatulence are sometimes present, and the appetite is often greatly impaired. In other cases a painful sense of sinking is experienced at the epigastrium, together with a craving for the accustomed stimulant, which too frequently replaces all desire for food. The disturbances arising from this indulgence affecting the nervous system, the ascites, and sallow skin, the icteric tint of the conjunctivæ and the signs of cirrhosis, belong more properly to other sections of clinical medicine and pathology.

In some cases, however, a symptom common to it, and to other forms of congestion, occurs in hæmatemesis, which may occasionally be profuse, and return with such frequency as to threaten life and to reduce the patient to an extreme degree of anæmia. The severer forms are most frequently associated with cirrhosis of the liver, causing obstruction of the portal vein; but minor degrees of the affection often appear in conjunction with disease of the kidney. It is very probable, judging from the results of post-mortem observation,<sup>1</sup> that hæmorrhage not unfrequently takes place without being disclosed by the blood vomited, the matters brought up being chiefly alkaline mucus (sometimes considerable in amount, and which may here and there only have a coffee-ground tint), bile, or altered food. Sarcinæ are occasionally found in the vomited matters of the whole of this group of cases.<sup>2</sup>

<sup>1</sup> See Handfield Jones, "Stomach," p. 91, where grumous blood was found in the stomach after death, none having been vomited during life. I have met with several such cases.

<sup>2</sup> For the more special description of the nature of the matters ejected I would refer the reader to the chapter on Vomiting as a Symptom.



Pain in these cases is a symptom which is variable in the frequency of its occurrence; it is often complained of after each meal, but is seldom if ever of marked severity. Flatulence is almost constant. Acidity is common, but is not comparatively so frequent. The progress of the disorder, in other respects, depends much on the complications with which it is connected.

**PATHOLOGY.**—The changes which accompany the more marked forms of this disorder are tolerably characteristic. Many of them are apparent to the naked eye, others are only disclosed by microscopic examination. The most characteristic are alterations in the vascularity of the mucous membrane, changes in its colour, increase in its thickness and resistance, occasional increase of the lymphatic structures in the intertubular tissue, and various forms of degeneration of the glandular and other structures.

The degree of vascularity, however, presents the same difficulties as a criterion as were mentioned in the description of the appearances observed in the acuter form; and instances were then cited of cases where even congestion from obstruction, which probably had been of old standing, had left no distinct traces in the mucous membrane after death. Often, however, the long continuance of distension of the vessels produces an amount of dilatation which, when combined, as the affection frequently is, with exacerbations of an acuter kind, give greater post-mortem evidence of hyperæmia than is found in the cases when inflammatory action has been of shorter duration.

Where much congestion has been present, the hæmorrhagic erosions previously alluded to are also very common.<sup>1</sup> They depend on an extravasation of blood in the substance of the mucous membrane, which in all probability results from capillary rupture, as they seldom exceed two or three lines in diameter. They are generally superficial; but they may be sometimes seen extending through the whole depth of the mucous membrane. In some places the tissue may be seen still infiltrated in patches, where the blood has been effused, without detachment of the softened surface, but in others there are seen little pits or

<sup>1</sup> Willigk, Prager Viertel Jahreschrift, vol. li. gives their frequency as 1·8 per cent. of all the bodies examined. I know of no statistics mentioning their relative frequency to causes likely to produce these extravasations.

depressions with a blackened base, and with sides still infiltrated with blood, which, on microscopic examination, is found to occupy the tubules, staining their epithelial contents. They may possibly in some cases be the source of pain, but when small they appear to have little other pathological significance.<sup>1</sup> Vascularity may be found in any part of the mucous membrane; but changes of colour and thickenings of the tissue are more common in the pyloric portion, as also are many changes in the glandular tissue hereafter to be described.

The most characteristic change in colour is an ash-grey pigmentation, which, when closely examined, is found to depend on minute black specks scattered closely over the surface of the membrane. It is generally most marked in the pyloric half of the stomach, though traces of it may occasionally be met with near the cardia. When examined with the microscope, these spots are found to depend on pigment derived by imbibition from the hæmatin of the blood, and deposited in a minutely granular form in the cells of the connective tissue between the tubes (see Pl. I. fig. 6), and sometimes in the epithelial contents of the latter. It is most commonly met with when mechanical causes of congestion have co-existed with catarrhal changes, and requires probably, as an antecedent condition for its production, the rupture of capillaries in the superficial layers of the membrane, caused by continued passive congestion, or by repeated attacks of inflammatory hyperæmia; and it is very commonly associated with similar changes in other parts of the intestinal tract. But though its presence is a valuable indication of the nature of the causes in which it has had its origin, its absence by no means excludes the diagnosis of past inflammatory action, of which other and independent evidence can be found in the consistence of the membrane and changes in the glands, and which, though often associated with pigmentation, can also frequently be discovered when this is absent.

Andral described a milky-white colour of the membrane as characteristic of chronic inflammation.<sup>2</sup> There is generally a

<sup>1</sup> Larger extravasations appear, however, sometimes to serve as the origin of the chronic ulcer of the stomach.

<sup>2</sup> In some of Andral's cases, the appearances described were those of cicatrices of ulcers. See Clin. Méd. ii. 153, 154.

certain degree of opacity induced in this condition ; but unless an acute affection should have supervened before death, I do not think that it is common in this disease, except in spots resulting from fatty degeneration of the glands, presently to be noticed.

Thickening and induration of tissue is almost as uniform a result of chronic inflammatory action in the mucous membrane of the stomach as it is in other tissues. This may at times acquire an extreme degree of firmness and resistance,<sup>1</sup> tearing with great difficulty, and being capable of being stripped from the submucous tissue in large pieces. There may be sometimes a slight degree of softening of the surface when recent inflammation has supervened on the chronic form, but it does not usually extend sufficiently deep to affect the general characters of induration which are so characteristic of this state. These changes depend on an increase of the interstitial tissue between the glands,<sup>2</sup> which is often associated with atrophy of the latter, and thus find their precise parallel, as was pointed out by Andral, in the thickenings and induration of the mucous membrane of the air-passages in chronic bronchitis, and also in the changes of the liver and kidney in the processes of cirrhosis and granular degeneration. It is not in the majority of cases a mere apparent increase dependent on gland atrophy, for it may exist when this secondary change has not ensued, and when these structures are merely separated by greater intervals from each other ; and it is usually associated with a distinct thickening of the membrane, showing a growth of fresh elements of the connective tissue. (See Pl. I. fig. 5.)

In some cases local spots of increased thickening may be seen as irregular swellings formed of the interstitial tissue and the glands conjointly, giving in their minor degrees an irregular granular appearance to the mucous membrane, and, when carried to an extreme extent, forming warty or polypoid vegetations which have been fully described by Rokitanski,<sup>3</sup>

<sup>1</sup> This was noticed by Broussais (*Lec. Phleg. Gastriques*, 1823, p. 105), who gave it the term "coriaceous." I have myself found the membrane almost as tough and resisting as leather in more than one case.

<sup>2</sup> It is scarcely necessary to point out the fallacy which may occur when the section of the membrane is subjected to pressure. This must be carefully avoided in making these observations.

<sup>3</sup> *Path. Anat.* 1861, iii. 154, 155.

and which may in some cases, when occurring at the pyloric ring, form obstructions at this orifice to the egress of the food.<sup>1</sup>

Enlargement of the solitary glands, together with a decided increase of the cellular structures, which I have before described as lymphatic interstitial growths between the glands, are common, though not constant, in this form. When present, they contribute greatly to the widening of the spaces between the glands, but I have seen this induced by thickening of the ordinary connective tissue, independently of these structures. Their increase appears to depend on the persistence of the inflammatory irritation which was seen to determine their primary enlargement in the acuter form.

The mammillation considered by Louis<sup>2</sup> as a constant sign of inflammatory action, and coincident usually with the other appearances now described, has given rise to considerable diversity of opinion among pathologists regarding its origin,<sup>3</sup> the reason for which appears to be that this term has been applied to more than one condition. It is, however, under any circumstances almost invariably found in the neighbourhood of the pylorus rather than in that of the cardia, where only very slight traces of it can be discovered. The appearance described by Louis, of irregular prominences more or less rounded, of two or three lines in diameter, separated by sulci, and resembling the granulations upon wounds, when found in a healthy stomach most commonly results from the contraction of the muscular layer shown by Brücke<sup>4</sup> to exist around the bases of the secreting glands.<sup>5</sup> A very similar appearance may, however, be produced

<sup>1</sup> Though for these polypoid growths the existence of an excessive "nutritive irritation," as Virchow has expressed it, would seem a necessity, the process seems in some cases to be a purely local hypertrophy, and not necessarily connected with general catarrhal inflammation of the rest of the organ, though evidences of this are often present. A minute description of these growths, and an account of the authors by whom their existence has been recorded, will be found in a paper by Ebstein, Reichert und Du Bois Reymond's *Archiv*, 1864. I have sometimes found them in a marked form around cancerous growths. See also Andral, *Prec. Path. Anat.* ii. pp. 50-53; *Clin. Méd.* ii. 60.

<sup>2</sup> *Rech. Anat. Path.* 1826, p. 111, "Etat Mamelonné."

<sup>3</sup> See Hodgkin, *Morbid Anatomy of Mucous Membrane*, ii. 280.

<sup>4</sup> *Bericht der Wiener Akad.* 1851.

<sup>5</sup> Dr. H. Jones (*loc. cit.* p. 119) states that mammillation is not due to the contraction of the muscular coat—meaning apparently thereby the layer below the submucous tissue, to which this term is generally applied—but hints at the possibility of its

by hypertrophy and distension of the gland tubes with the products of secretion,<sup>1</sup> forming, together with the thickened interstitial tissue,<sup>2</sup> small granulations, which are often rendered increasingly apparent by the atrophy of adjacent structures, and which thus present a counterpart in the stomach to the conditions observed in the granular kidney and in cirrhosis of the liver.<sup>3</sup>

Coincidentally with the above, other changes take place in the secretory structures which must necessarily tend greatly to impair their functional activity. They may be briefly summed up as consisting in fatty degeneration of the glandular epithelium, associated with thickening of the membrana limitans, and finally tending to changes in shape or to atrophy of the glands.

Fatty degeneration of the glands generally occurs in the stomach, as in other glandular organs, in scattered groups, of one or two lines in diameter, giving the appearance of small dead white spots imbedded in the mucous membrane. When microscopically examined, the epithelium of the tubes is found either fattily degenerated or the cells have entirely disappeared, and the contents of the tubules consist of nothing but free fat granules (Pl. I. fig. 4). I have never observed any intermediate stages of enlargement of the epithelium, so as to form the granule cells and granule masses sometimes found in similar conditions in the kidney. The tubes are often irregularly narrowed and puckered, and thickening of the membrana limitans may not unfrequently be observed around their bases,<sup>4</sup> and these changes lead finally to the obstruction of the tubes at some part of their length, and to the formation of cysts from

being produced by contractile tissue within the corium. If sections are made of membranes in this state, after hardening in chromic acid, it will be seen that the depressions consist of a group of from ten to twenty glands dragged down, as it were, below the surface of the others, but perfectly healthy in every other respect, and with no sign of atrophy of the glands, or of alteration of the surface.

<sup>1</sup> Andral, Clin. Méd. ii. 76.

<sup>2</sup> It is, I think, possible that the mere thickening of the interstitial tissue, especially when this is induced by a rapid increase of lymphatic growth, may in some instances alone suffice to induce this appearance.

<sup>3</sup> H. Jones, *loc. cit.* p. 121.

<sup>4</sup> This, which is an inflammatory change, met with also occasionally in the acuter forms, requires to be distinguished from a fallacious appearance of the same kind which sometimes follows the addition of liq. potassæ or liq. sodæ to a section of a healthy mucous membrane. The pathological change may be recognised without reagents, or in glycerine, which does not produce this effect.

the distension of the portion below the obstruction with the products of secretion. (See Pl. I. figs. 7, 8, 9.)

These cysts rarely exceed in size that of a pin's head, and require a good light for their detection. They may, however, easily be recognised by the naked eye, appearing as little glistening bodies on the surface of the membrane; and when a vertical section, made with a Valentin's knife, so as to include one of them, is examined under the microscope, they are found to contain epithelial cells, similar to those of the gland tubules, and by which they may be distinguished from the solitary glands, which are also much denser in their structure. The interest attaching to them lies in their forming another point of resemblance in the analogies between chronic inflammatory changes in the stomach, and those occurring in other glandular organs, and especially in the kidney;<sup>1</sup> and in some cases, there is a tendency to the implication of the whole canal in changes of a similar character.<sup>2</sup>

Spots of fatty degeneration are also found, affecting both the gland-tubes and interstitial tissue, which sometimes extend through the whole thickness of the tissue, and are in some cases attended with a similar degeneration, both of the capillaries and of the smaller arteries leading to the spot affected. These changes sometimes lead to a breaking down of the tissue, which resembles that seen in the superficial fatty degeneration of the lining membrane of the aorta, to which Prof. Virchow has applied the name of "fatty usur;"<sup>3</sup> the appearances thus presented are depicted in Pl. I. figs. 10 and 11, Pl. II. fig. 12.

Cases of chronic gastro-intestinal catarrh are sometimes found associated with the lardaceous, waxy, or amyloid degeneration;

<sup>1</sup> Further details on the structure and mode of origin of these cysts will be found in a paper by the author, *Med.-Chir. Trans.* vol. xli. ; also in Dr. H. Jones' work, p. 115. I confess that I am unable to understand Dr. Jones's view, that they may occasionally originate as simple vesicles. I have further expressed some opinions as to cyst formations, in a paper on these growths in the ovary, *Med.-Chir. Trans.* xlvii. See also Virchow, *Die Krankhaften Geschwülste*, i. 235.

<sup>2</sup> Sir J. Y. Simpson, "*Obstetric Works*," vol. i. p. 308, has described a "pellicular inflammation" of the stomach and intestines. My friend Dr. A. R. Simpson, of Glasgow, first pointed out to me cysts in the pharynx and rectum in a case in which I had found them in the stomach. I have since then met with occasional examples of this coincidence.

<sup>3</sup> *Cellular Pathology*, Chance's Translation, p. 340.

which, however, usually only occurs in these viscera when other tissues of the body, the liver, spleen, kidneys and mesenteric glands, are largely affected with the same disorder. The extent to which the degeneration proceeds differs in individual instances, as also do the signs of the accompanying catarrhal action. During life diarrhœa is often present, especially when leucocythæmia or albuminuria have co-existed;<sup>1</sup> in other instances, I have observed this change associated with absolute anorexia, and in one case with great irritability of the stomach, and vomiting. I have also found the disorder associated with much hyperæmia of the stomach, together with thickening and induration of the mucous membrane, and with fatty degeneration of the epithelium in parts where the specific lardaceous changes were but little apparent. These present the well-known reaction of a brownish-red colour with iodine, extending to variable depths of thickness in the mucous membrane, which is also usually simultaneously found in the villi of the intestines. In the stomach, in some instances, all traces of the epithelial cells are destroyed, and the contents of the tubes are converted into the refracting homogeneous, irregular masses, into which the histological elements of the tissue are always changed in cases of this disease.

The exact relationship borne by this degeneration to the catarrhal conditions has not as yet been fully elucidated; it is probable that the two disorders may proceed *pari passu*, and such a combination is most prejudicial to the digestive process, as is seen from the rapid and marked emaciation which is so common an attendant of the lardaceous disease.

THE TREATMENT of chronic catarrh of the stomach requires considerable diversity, according to the varied ætiological conditions under which the disease may occur.

Some account has already been given of the method to be adopted in cases supervening after an attack of the acute affection, and it has been stated that the sedative plan of treatment is that which, under these circumstances, is usually followed by the most favourable results. Of all single remedies bismuth is the one which ordinarily proves the most efficacious, and it may often be advantageously combined with magnesia, or where there

<sup>1</sup> Bennett, Princ. and Pract. Med. 532. Loeschner und Lambl. aus dem Franz Joseph Kinder Spital, Beobachtungen und Erfahrungen, 1860, p. 341, *et seq.*

is much nervous irritability of the stomach, with morphia and hydrocyanic acid, in the manner before mentioned. The chief indications for its use in this state are, pain or uneasiness at the stomach after taking food, with a sense of load at the epigastrium, followed by acidity and combined with a red and irritable tongue, or with one furred in the centre and red at the tip and edges.

The value of opium will be further treated of in relation to some of the special forms of the disorder.

In other cases, of longer standing, more direct astringents are serviceable, and it is probable that their action is of a local character, since those are most useful the effects of which are found, when locally applied, to be beneficial in inflammatory affections of external parts. It must, however, be admitted, that in the case of the stomach such treatment is more tentative in its nature than where the result of the remedial agent is at once visible, yet it must be remembered that even in these latter we have occasionally to proceed on a similar plan, and to vary our remedies according to the effects produced.

The most efficacious among the remedies of this character is the nitrate of silver, given in doses of a quarter of a grain to a grain, combined with opium, two or three times daily. Its value in allaying chronic inflammatory action of the stomach has been attested by numerous observers, and it is especially in this class of cases that it merits the repute which it has thus gained. It is also one of our most valuable remedies in cases which most frequently occur in the female sex, when subacute inflammatory action is attended by severe pain of the neuralgic type; and when its administration for a fortnight or three weeks often permits of the subsequent use of iron, and other tonic remedies suited for these cases. It is best administered in the solid form in pill, and may be taken with advantage during two or three weeks. Its efficacy is, according to the experience of all observers, greater than that of the oxide, but I have occasionally found the latter useful in cases where the nitrate is less well borne. In other cases, characterised by considerable irritability and much flatulence, I have found the oxide of zinc, in doses of from one to three grains, of considerable service; and in some instances of this class, even when pain and great irritability of



the stomach have been prominent symptoms, and have lasted for many months, I have found the use of alum, in doses of from one to four grains, in the ounce of water, productive of remarkably favourable results.<sup>1</sup>

Matico has also proved in my hands of great service, especially in the cases for which it has been indicated by Trousseau,<sup>2</sup> viz. in irritable dyspepsias associated with anæmia or pseudo-chlorosis, which are most common in the female sex, but when the condition appears rather to be associated with chronic inflammatory action, than with simple disturbances of nervous origin.

Arsenic in minute doses has been recommended by some writers as a valuable remedy. I have tried it in some cases, but hitherto without success, and we have not as yet obtained any definite indications for those in which it is likely to prove suitable; while it certainly aggravates the affection in cases for which it is not adapted.

In other and more atonic cases a decoction of oak-apples has been recommended, both by Barras<sup>3</sup> and Trousseau,<sup>4</sup> and the latter advises that they should be roasted and made into an infusion, like coffee. I have never used this remedy, and am doubtful whether it would possess any decided superiority over tannic acid, as recommended by Dr. Handfield Jones.

The *mineral acids* are very useful, when given with meals, as aids to digestion. The relative value of these has been before considered, and there is little to be added to the remarks made on their efficacy in the treatment of atonic dyspepsia. It is only in marked forms of irritation that their use is contra-indicated, and when, as is so commonly the case, the inflammatory condition is complicated by one of atony, their employment is peculiarly advantageous. Their utility is sometimes considerable in the dyspepsia of phthisis, as pointed out by

<sup>1</sup> In one of these cases—that of a lady who for months had been almost unable to take solid food, from the epigastric pain which it caused, and who had lived almost entirely upon small quantities of cream, and had previously tried various other remedies without success—I obtained, in a few weeks, by the use of this remedy, and of pepsin and solid food, upon which latter I insisted strongly, the most satisfactory results.

<sup>2</sup> *Traité de Thérap.* ii. 522.

<sup>3</sup> *Loc. cit.* p. 604.

<sup>4</sup> *Traité de Thérap.* i. 449.

Trousseau,<sup>1</sup> though it is by no means confined to this form, in which, when the irritability of the stomach is very marked, sedatives and alkalies often succeed better—or at least until the acuter degree of the affection has subsided. They are also often of peculiar advantage in cases of irritative dyspepsia associated with deposits of oxalate of lime in the urine, and they are occasionally of service when the urine is phosphatic; but their influence in relieving either of these conditions depends, I believe, on their power of improving the digestion, rather than on any effect produced by them on the composition of the urine, on the reaction of which they have very little direct influence.

Antacids and absorbents, administered between the periods of food, are often useful when flatulence or acidity are present. Where the former predominates, magnesia suspended in equal parts of infusion of rhubarb and aq. menth. pip., often gives relief. Where heartburn alone is present, a scruple to half a drachm of the bicarbonate of potassa or soda may be taken dissolved in half a tumbler of water, and I have known this treatment equally beneficial even in the absence of this symptom, when there has been a feeling of load and uneasiness three or four hours after a meal, accompanied with great physical languor and intellectual depression: the same advantage may also be obtained by drinking a tumbler of Vichy water between the meals, and especially on retiring to rest at night.

The mode of action of this class of remedies has been already alluded to. Their beneficial effects are probably due to their power of neutralizing abnormal acids, and also of dissolving the thick mucus secreted by the stomach; with which object Whytt recommended for persons troubled with mucous vomiting, a tumblerful of lime water, to be drunk on an empty stomach in the morning.<sup>2</sup> They are further useful when urates or uric acid appear in any quantity in the urine, and particularly in the acid dyspepsia of gouty cases. Caution, however, is required, in order that the habit of taking these substances does not become confirmed, as more permanent injury to the digestion may result from their prolonged use.

*Pepsine* is also often of value in this disorder. I have found

<sup>1</sup> *Traité de Thérap.* i. 206. *Clin. Méd.* ii. 1862, p. 337.

<sup>2</sup> *Works*, p. 664.

it especially so in the dyspepsia of scrofulous children where the tongue is red and irritable, but I have employed it also under other circumstances, with great utility.

The cautions given with regard to the indiscriminate use of purgatives in dyspeptic complaints, cannot, I believe, be too often repeated; nor are they unnecessary in respect to the form of disorder now under consideration, since from the temporary relief which they afford, both the medical attendant and the patient are often induced to resort to them, to a degree far beyond what is necessary.

In children especially their frequent use is undesirable; and Dr. Jenner's advice, that the bottle of hyd. c. cretâ should be labelled as "dangerous,"<sup>1</sup> cannot be too earnestly insisted upon, and the occurrence of pale, yeasty, or offensive stools is not to be regarded as an indication for the employment of mercurials, since evacuations of this nature are principally due to imperfect digestion; and the defective secretion from the liver is, I believe, chiefly attributable to the imperfect performance of the functions of the stomach, and small occasional doses of castor oil or of rhubarb and soda will generally be found sufficient to act upon the bowels.

There is, however, a class of cases where irritative dyspepsia, often of long standing, and which has been mainly due to errors in diet, chiefly on the side of excess, may sometimes be cured at once, and permanently, by a free purgation with calomel or blue pill and colocynth, followed by a saline aperient draught. The strength of the dose should, however, be carefully adjusted to the powers of the patient; and if it fails to relieve, it is seldom, if ever, desirable to continue the purgative action except at considerable intervals: and there are, I believe, few practitioners who would fail to verify my conviction, that cases of irritative dyspepsia are often greatly aggravated by a persistence in purgative treatment.

There is one class of cases which form an exception to this rule, and in plethoric and gouty individuals who have lived freely and suffer much from acidity and heartburn, the use on alternate nights of a pill composed of calomel or blue pill, combined with colocynth and colchicum, will often prove of the greatest service,

<sup>1</sup> Lectures on Ricketts, *Med. Times and Gazette*, 1860.

and will effectually relieve dyspeptic symptoms which may have troubled them for many months. I have also used podophyllin in doses of one-third to one-half of a grain, combined with creosote and hyoscyamus, with great advantage in this class of disorders; but in weakly persons of a gouty diathesis, though the occasional administration of blue pill will sometimes prove of service, yet it is to be very cautiously employed, as it frequently aggravates the dyspeptic symptoms.

Cases, however, do occasionally occur when a severe and long-continued inflammatory condition of the stomach which has resisted all other remedies and also a careful dietetic regimen, yields promptly to a mild mercurial course sufficient to touch the gums; after which medicines which previously had been unavailing, have proved beneficial. This plan, well laid down by Dr. Hunt,<sup>1</sup> has been illustrated by some cases of Dr. H. Jones. Nor is such a result to be wondered at when we recollect the efficacy of mercurials as local applications not only to the skin, but also to the mucous membranes of the nose and throat. The cases in which such a plan of treatment is necessary are, however, on the whole, rare, as the disorder will generally yield to milder treatment combined with a regulated diet carried out with sufficient perseverance.

When the catarrhal state of the stomach is the result of congestion, even in cases when this latter is so considerable as to give rise to hæmatemesis or melæna,<sup>2</sup> and especially when the cause of the disordered circulation arises from hepatic obstruction, it is often benefited by free purgation, which, by unloading the congested vessels of the peripheral portal system, relieves the congestion both of the liver and of the stomach.<sup>3</sup> This

<sup>1</sup> Heartburn and Indigestion, p. 73, *et seq.*

<sup>2</sup> These are the cases in which purgatives prove efficacious in the relief of this symptom (Watson, *loc. cit.* ii. p. 435), but great care is necessary in the diagnosis, as they aggravate those in which the hæmorrhage proceeds from ulcer or cancer. In some instances, however, the hæmorrhage from congestion may be sufficiently severe as to threaten life, under which circumstances the ordinary means for checking the flow must be resorted to. Among these I have found none so efficacious as the acetate of lead combined with opium, but other astringents may be employed, as alum or tannin. The perchloride and sulphate of iron appear to be less useful. Turpentine has been much praised by some writers, and ice, in small pieces, should be swallowed frequently.

<sup>3</sup> Barlow, art. "Gastrodynia," *Cyc. Pract. Med.* iii.

method has also a favourable effect in cases of gastrodynia, associated with the vomiting of ropy mucus. The best purgatives to be employed under such circumstances are mercurials, and especially calomel combined with colocynth, repeated every second or third evening, and followed the next morning by a saline aperient draught until the evacuations have regained a healthy character; but the subsequent use of astringents may in many instances be necessary to complete a cure after the bowels have been freely evacuated.

When the bowels are constantly sluggish, the most suitable preparations are, however, those containing aloes, and a sufficient amount only should be given to procure a regular daily evacuation, the dose for which purpose need often not exceed half a grain or a grain of the extract. aloes aquos., and which may sometimes be combined advantageously for a short period with a quarter of a grain of the extract of nux vomica, and should be taken with the food. The same effect may also be easily obtained by taking from two to four drachms of the decoct. aloes comp. on first rising in the morning. When, however, there is much irritability of the rectum, or piles exist, contra-indicating the use of this class of remedies, the confectio sennæ, or a small quantity of Rochelle salts (one to two drachms), may be taken in the morning. In such cases, castor oil proves an excellent purgative, and the repeated administration of small doses of this remedy, as recommended by Dr. Todd,<sup>1</sup> is often followed by great advantages in relieving epigastric load and oppression, restoring the healthy functions of the bowels, increasing the appetite, and improving the general health and nutrition of the patient.

Many of the natural mineral waters have a very decidedly beneficial effect in restoring a healthy condition of the functions of the alimentary canal when suffering under chronic catarrhal affections. The most valuable in this respect in our own country are those of Harrogate, Bath, and Leamington; but the waters of Carlsbad and Marienbad have long had a high and well-deserved reputation in these complaints—the former being most useful when there is much portal congestion, and the latter when the disorder depends more on simple irritation of the gastro-intestinal canal, and also in young persons who suffer from

<sup>1</sup> Loc. cit.

constipation.<sup>1</sup> The mineral waters of Kissingen, containing a large proportion of iron, are also of great service when general atony or anæmia are combined with the irritative state of the mucous membrane. Those of Vichy are of great general utility as alkaline remedies, and are also specially applicable to dyspepsias of gouty origin; and though their efficacy is less explicable, the springs of Pouges, Plombières, and Bagnères de Bigorre have obtained a high reputation.<sup>2</sup>

In respect, however, of the constipation which is found in a large proportion of the cases of chronic inflammatory dyspepsia, it is desirable to repeat the caution before given with regard to the habitual use of purgatives, the necessity for which may often be obviated by the employment of enemata of cold water after breakfast. The value of belladonna, as pointed out by Bretonneau and Trousseau,<sup>3</sup> is often very marked in these cases. It is to be given either in the morning or evening in doses of from one-tenth to half a grain, and the latter quantity should not be exceeded. It may be necessary at first to combine it with small doses of castor oil, but after a few days it can usually be employed alone.

The special condition arising from the abuse of alcoholic stimulants requires certain modifications of the plans above indicated. Occasional mercurial purgatives prove most undoubtedly beneficial, but when there is much irritability of the stomach or vomiting of mucus, opium has a special value. Its efficacy in combating the last-mentioned symptom has been pointed out by René Prus, and by Andral,<sup>4</sup> and of late its value has been strongly insisted on by Dr. Budd; and its action may often be greatly assisted by its combination with astringents, and particularly with the compound kino powder. Its beneficial effect appears to be of a twofold character; locally, it allays the irritation of the stomach, and checks the excessive mucous secretion, while, by tranquillising the nervous system and procuring sleep, it restores the tone of the digestive organs, and frequently enables the patient to digest solid food. Opium is also of considerable use in cases of subacute inflammatory

<sup>1</sup> Oppolzer, Zeit. Gesellsch. Aertzte zu Wien. Canstatt, 1857, iii. 175.

<sup>2</sup> Trousseau, Clin. Méd. ii. 379.

<sup>3</sup> Clin. Méd. ii. 381.

<sup>4</sup> Prec. Anat. Path. ii. 201.

action, combined with great nervous irritability, and where atony also exists; it may often be given with advantage combined with nitrate of silver, as before recommended.<sup>1</sup>

The simple bitters may be used in those cases where the acuter symptoms have subsided. Strychnia, or nux vomica combined with the mineral acids, or the oxide of zinc, are also remedies which are specially applicable to the state of combined disturbance of the nervous system and of the digestive functions which these cases exhibit.

The disturbance of the digestive organs associated with albuminuria is often greatly relieved by free purgation with the compound jalap powder, as pointed out by Dr. Budd.<sup>2</sup> The vomiting is, according to my own experience of the disease, more effectually checked by ice than by any other remedy, and I have lately met with a case in which its use was continued during several months, and taken before each meal it had the effect of almost entirely controlling this very troublesome symptom, and of enabling the patient to enjoy and digest his food. In these cases an animal diet often suits better than a vegetable, and large quantities of slightly underdone meat may often be taken with considerable advantage. Creosote, as recommended by Rayer,<sup>3</sup> as means of checking vomiting from this source, is sometimes also useful, but its efficacy is somewhat uncertain.

The irritative dyspepsia of phthisis offers greater difficulties to a complete cure than almost any other of the forms of this disorder. One essential point to be borne in mind with regard to it, is the necessity of chiefly employing sedative remedies; and of these I have found none so efficacious as hydrocyanic acid, the value of which remedy is, I believe, more marked in this disorder than in almost any other form of dyspepsia. It may be most usefully combined with the carbonates of potassa or soda, and given in combination with infusion of calumba, twice or three times daily in the intervals of meals. And I have repeatedly witnessed the most beneficial results ensue after a week or fortnight's employment of this medication in the removal of the distress and

<sup>1</sup> Barras thought the good effect produced by opium in these cases was an evidence of their non-inflammatory nature, but the value of opium as a local application in inflammation is too well established to allow us to regard this reasoning as valid.

<sup>2</sup> Loc. cit. p. 248.

<sup>3</sup> Mal. des Reins, ii. 347.

nausea after food, the diminution of the thirst, and of the redness of the tongue, and in the ability of the patient to resume the use of cod liver oil and ferruginous remedies which had previously aggravated the dyspeptic symptoms.

Bismuth may also in some cases be employed with advantage, especially when there is diarrhœa, under which circumstances its combination with opium or morphia is indicated ; but when this latter symptom is absent, and the irritation is principally confined to the stomach, I know of no single remedy equal in efficacy to hydrocyanic acid.

Purgatives and mercurials, except in very occasional doses, are as a rule contra-indicated in these cases. There is, however, one class, to which allusion has been before made, where the cough sets in with acute febrile disturbance, attended with a loaded tongue, thirst, and oppression at the epigastrium, and with slight dulness or râles at the apex of one or both lungs, where the administration of a few grains of hyd. c. cretâ, followed by a mild saline aperient, such as the citrate of magnesia or the tartrate of potassa and soda, is often productive of the best results in the relief of the gastric disorder. When combined with active counter-irritation to the chest, this treatment has in more than one case which has come under my observation been followed by a complete disappearance of the pulmonary symptoms, from which the patient has afterwards remained completely free. If in such cases any irritability of the stomach remains after the use of the purgative, a sedative and antacid treatment, with great care in diet, may be necessary to ensure complete restoration.

The dyspepsia of scrofulous children—in whom the tongue is red and irritable, the complexion sallow, the spirits uneven, the general strength deficient, as shown by frequent complaints of lassitude, the appetite irregular and often voracious, but not unfrequently perverted, and the bowels irregular, the motions being sometimes loose and pultaceous, and at others scanty and confined, but generally pale and offensive ; and who often complain much of thirst : or of those of relaxed and atonic constitutions, in whom the external signs of scrofula are not well marked—is another form which requires great care both in treatment and diet. This caution applies especially to the use



of purgatives, and particularly to mercurials, which seldom fail to aggravate the condition.

The first and most essential point to be attended to in such cases, is the regulation of the diet, both as to quality and quantity: *all* undigestible substances are to be carefully eschewed, and the amount of animal food is to be strictly limited until marked improvement in the digestion has taken place. In carrying out this system the physician will often have to encounter no little difficulty from the friends of his patient, who, seeing the loss of flesh and strength, not unfrequently endeavour to remedy the weakness by increased food, wine, and tonics—a plan which unfailingly tends to aggravate the symptoms, while an opposite procedure, during a limited period, is often productive of the best results. I have known the most obstinate irritative dyspepsias of this nature speedily yield under a diet from which during nine weeks animal food has been almost entirely excluded, and the patient restricted to the use of light farinaceous puddings and bread and milk. Great care is necessary also in ensuring the due mastication of food; and when children have acquired the habit of performing this imperfectly, they often require to be carefully watched during some weeks until it has been overcome. Animal food may in such cases often be advantageously minced; but it must be remembered that the necessity of mastication is equally to be insisted on with all the food taken.

The constipation which marks these cases is to be met by small doses of rhubarb and soda, or by castor oil; a few stewed prunes may often be advantageously allowed with the meals, but other fruits, with the exception of strawberries, are, as a rule, to be avoided, and the use of vegetables is only to be very cautiously permitted; and in severe cases they are to be forbidden.

As long as marked irritation persists it is desirable to continue the use of sedatives, and of these bismuth is the most efficacious; but small doses of the carbonated alkalies, with one or two drops of hydrocyanic acid combined with infusion of calumba, may be given.

As the disorder abates, a condition of atony which underlies these cases often remains, and is sometimes very difficult to remove.

Pepsine, as before stated, is often of great service in aiding the digestion, but the chief remedial agent is iron, which should be given, as indicated under the head of Atonic Dyspepsia, in the neutral form or combined with alkalies; and when the stomach permits of its use, the administration of cod-liver oil is often markedly beneficial. The clothing should be particularly warm; the neck and arms should, at least in winter, be covered with flannel.<sup>1</sup> The bedroom should be well ventilated, and from two to four hours should be spent daily in the open air. Horse-exercise, when possible, should be advocated. The hours of lessons, to young children, should be restricted to two or at most three daily.

The cold bath is sometimes useful in the summer, but unless reaction is good it should not be practised. Sea-bathing is injurious when any signs of gastric irritation exist, though it may be useful in restoring the tone of the system after this has been removed; but it should only be resorted to on warm, still days, and unless the reaction of the skin is very decided it should be at once discontinued; and sponging with sea-water, either cold or tepid, according to the vigour of the patient, should be substituted for it. The warm bath, on the other hand, is frequently beneficial when the stomach is irritable, and particularly so in children of gouty or rheumatic parents.

A very important point to be recollected in these cases is that they are liable to frequent relapses, and that under such circumstances a return for a few days to a restricted diet and a sedative treatment becomes absolutely necessary.

There remains to mention a class of cases where disorder of the digestion accompanying a syphilitic taint of the system has been cured by mercurial treatment. The first case recorded of this kind of which I am aware, is one mentioned by Andral,<sup>2</sup> and another is given by Trousseau.<sup>3</sup> I have lately had a case under my own care of a patient who had suffered for many years from a syphilitic psoriasis, and also from great distress at the stomach after eating, associated with flatulence and acidity, while the tongue had also some fissures with thickening around

<sup>1</sup> The exposure of young children of delicate constitution to cold, by imperfect clothing, in the manner so commonly practised, cannot be too strongly reprobated.

<sup>2</sup> Clin. Méd. ii. pp. 201, *et seq.*

<sup>3</sup> Traité de Thérap. i. 269.

them indicative of a syphilitic origin, whose gastric symptoms completely disappeared after a blue pill had been given every night for a fortnight, and the amelioration of the digestive function was speedily followed by the cure of the psoriasis.

It requires to be borne in mind that a weakened state of the digestion often remains long after signs of irritation have disappeared, and the cautions respecting the treatment of such cases given in the chapter on Atonic Dyspepsia require to be borne in mind. The amount of food taken should be regulated by the digestive power of the stomach. Stimulants should only be taken in great moderation, and of these the drier varieties of sherry, or claret, or Chablis, should be preferred. It is very difficult to prevent patients in this condition from eating more than their stomachs can digest, under the erroneous idea of thereby regaining their health and strength: it is not uncommon to find feeble subjects of irritative dyspepsia using very little exercise, and taking meat three times daily, together with a considerable quantity of stimulant, and with beef-tea once or twice in the intervals, who improve at once and rapidly on submitting to a more restricted diet. The just medium in these cases is at all times one difficult to attain, but the effects of a certain degree of abstinence are often most beneficial, and it is rarely that it is carried too far, at least in comparison with excesses in the opposite direction.

The advantages of moderate exercise, and of change of air and scene, cannot be too strongly insisted on, and are often productive of the happiest results. One very important point to be attended to is that patients should always wear flannel, and be sufficiently clothed to protect them against the effects of change of temperature, to which they are peculiarly liable, and the general regimen of atonic dyspepsia should be most carefully observed.

## CHAPTER VIII.

### DIAGNOSIS.

I HAVE reserved the history of the diagnosis of the varieties of dyspepsia which have been now treated of for a separate chapter, believing that a general summary of their leading and more distinctive features will conduce most effectually to a clear understanding of the differences observable between them, and that thus much unnecessary repetition may be avoided.

The chief points where a distinction is difficult are the following :—

Between simple atonic dyspepsia and the milder forms of chronic catarrhal inflammation.

Between nervous disturbances of the digestion and the severer forms of inflammatory action, (1) acute, (2) chronic.

Between nervous disturbances of the digestion and ulcer and cancer.

Between the severer forms of chronic catarrhal affections and ulcer and cancer.

Between the febrile forms of recent inflammatory affections of the stomach and typhoid fever.

Dyspepsia, or indigestion of food, is a symptom common to all these conditions, and therefore its immediate effects, as shown by fermentative changes resulting in acidity and flatulence, offer but few distinctive features. It is thus to associated symptoms that we have to look for a clue to assist us, rather than to those which are common to the whole class of these affections. The differences between the forms which have been described will in some measure be apparent in the history given of their symptoms ; and our chief difficulty is, that with

regard to many of these latter, the predominance of one or the other is often rather a question of degree than of its presence or entire absence, and also that the same symptom (and this is particularly true of pain) may arise from many and different causes. Nor can it be forgotten that different states may at times complicate one another, as has been already pointed out in various places in their pathology and symptomatology; and of none is this more true than of the atonic forms, in which the stomach is very liable either to suffer from subacute inflammatory action or to be affected with conditions of nervous erethism.

Still, the importance of the diagnosis of the condition on which the dyspepsia depends, as a guide to successful treatment, is so great, that it will well repay the difficulties of the attempt; and it is especially with regard to the two first-named diseases that this is practically desirable.

The main features which distinguish chronic catarrh from atonic dyspepsia may therefore be briefly summed up as follows:—

Dyspepsia of a more highly marked character, associated with greater uneasiness at the epigastrium, and a sense of constriction in the thorax, sometimes amounting to actual pain, which is however seldom acute:—the uneasiness and discomfort following soon after food, and continuing during the whole digestive period, and increased by stimulants of all kinds. Acidity and intestinal flatulence often occur also to a more marked degree. Nausea is common after a full meal in all but the slighter forms, but vomiting, except under special circumstances, is rare; though when it occurs, and is associated with mucus, and the existence of severer affections can be excluded, it forms a valuable criterion. Tenderness on pressure, though not always discoverable, and generally slight in degree, is, when present, and distinctly referable to the stomach, an additional aid.

The appetite is irregular, capricious, variable, sometimes excessive, but soon followed by a sense of satiety. Thirst is also a distinctive symptom, being very little observed in atonic dyspepsia. The bowels are constipated. Mucus is often observed in large quantities with the stools, and diarrhœa is sometimes easily excited by slight causes, to be followed by increased

constipation. Colic, to a greater or less degree, is a frequent symptom.

The state of the mouth and gums and tongue also differs in the two diseases. The latter in chronic catarrh presents some of the various modifications before described, of which the most characteristic are the furred condition, and the redness at the tip and edges, while the gums are red and spongy, and the teeth decayed. Salivation is frequent, and the fauces and pharynx tend either to ulceration, or to a chronic inflammatory hypertrophy of the follicles.

Febrile heat, especially after meals, increased by stimulants, and often preceded by chilliness (which latter may be the most prominent feature), and eczematous affections of the skin, which is often dry and harsh, at other times perspiring on slight exertion, are among the characteristic symptoms.

Many of the sympathetic nervous symptoms are also much more prominent in catarrh, and especially despondency and irritability of temper, hypochondriasis, and sleeplessness: languor and lassitude, together with pains between the shoulders and limbs, are also much more marked in this than in the simple atonic dyspepsia.

The nutrition also suffers more severely. There is more marked emaciation, and a peculiar earthy tint of the skin, before described, is more commonly observed.

The appearances presented by the urine are less distinctive, but changes in it are more common than in the atonic forms. The presence of lithates, when independent of the accidental causes which occasionally give rise to their appearance (cold, muscular exertion, &c.), and of other inflammatory causes, should, when associated with dyspepsia, always excite the suspicion that this is of inflammatory origin, and oxaluria is more frequently associated with this condition than with the atonic variety.

Simple atonic dyspepsia, on the other hand, is distinguished by the absence of tenderness at the epigastrium, and also of pain, unless there be much flatulence. The sensation is one of weight or load rather than of severe suffering, and it occurs later in the digestive process than when inflammatory irritation is present.

The appetite presents less irregularity, and it is usually constantly and markedly impaired. Thirst is generally absent, and the condition is often marked by dislike for fluids, which, instead of giving relief, may aggravate the dyspeptic symptoms.

The tongue is habitually pale, broad, and flabby, and I believe that this feature, subject to the exceptions before noted (class D. Chronic Catarrh, p. 195), presents one of the most valuable signs for diagnosis, for the special details of which the reader is referred to the description before given.

The absence of pyrexia, or of slight rigors, is also a very valuable criterion ; and the nutrition, though often indicating a general want of tone, in the flabbiness of the muscles and the relaxed, soft skin, does not suffer to the degree of producing the marked emaciation which distinguishes the more obstinate cases of chronic catarrh.

The course of the affection is also more uniform and regular, and, except under irregularities of diet, is not liable to the exacerbations and remissions which mark the inflammatory state.

The diagnosis of the nervous disturbances of the stomach is, on the other hand, in some cases, one of the greatest difficulty, but there are certain criteria which are valuable aids.

As regards the severer cases which have been recorded as forms of this disorder, I have already pointed out certain fallacies which may lead to the suspicion that some of them at least may have depended on organic causes, which have eluded observation, even when post-mortem examinations have been made ; and it is not improbable that many of the cases of severe pain in females recorded by the older writers may have been due to ulcer of the stomach, especially as in some of these hæmatemesis is mentioned as a symptom.

Setting these aside, a tolerably correct opinion may, however, generally be formed from one or more of the following circumstances attendant on the symptoms :—

The presence of causes of sympathetic irritation, and the aggravation or alleviation of the symptoms of the stomach affection in a direct ratio to the increase or diminution in the severity of these.

The presence of constitutional states predisposing to nervous excitability, the chief of which are great exhaustion, and the hysterical diathesis in females, or the analogous state sometimes observed in the male sex.

The disproportion observed between the severity of the gastric symptoms and the general state of the patient, and especially the absence of emaciation, where severe vomiting forms a prominent feature. The absence of cachexia is also of some value, but it is a sign upon which no great reliance can be placed, particularly in the nervous disturbances that occur in chlorosis and amenorrhœa and in connexion with uterine disorders; while, on the other hand, it is also important to remember that chlorotic females, whose menstruation is disordered, are also frequently the subjects of ulceration of the stomach.

In the case of pain, its frequent complete remissions are almost diagnostic of the absence of inflammation, though by no means excluding the possibility of its cause being due to either ulcer or cancer. But with regard to the pain of inflammatory affections, it has already been stated that this seldom presents the intensity of suffering produced by neuralgia of the stomach. The seat of the pain, and especially of tenderness, requires careful investigation; and when this is exclusively superficial,<sup>1</sup> it would strongly favour the opinion of the nervous character of the disorder, even when under these circumstances it is allied with vomiting.<sup>2</sup>

The relation of this pain to the ingestion of food is also valuable as a means of diagnosis; for though pain is observed in some cases of ulcer when the stomach is empty, and in others, still more rarely, when it is relieved by food; yet these are on the whole very exceptional, and in the majority of the instances in which this combination of conditions occurs, and in the absence of the more distinctive features of ulceration,

<sup>1</sup> I have known in some cases, where, from the presence of hæmatemesis and of severe pain occurring immediately after food, there was the strongest suspicion of the existence of ulceration, there was yet great superficial tenderness. Careful examination, however, revealed the existence of tenderness on deeper pressure in limited portions of the epigastric region.

<sup>2</sup> See Bricquet's cases, before quoted.



it may, subject to certain limitations,<sup>1</sup> be regarded as almost pathognomonic of a pain of nervous origin.

The co-existence of other neuralgiæ, and the alternation of pain with these, is also a strong ground for suspicion that the affection of the stomach belongs to the same class. Intercostal neuralgia limited to the left side, though deserving of consideration, is, however, of minor value as a means of distinction, as it may be observed in cases of ulceration. Dorsal pain is common in both classes, and I have been unable to observe in this respect any positive features of distinction between them; for though, comparatively speaking, that connected with neuralgia of the stomach is more frequently connected with distinct spinal tenderness, yet this symptom is sometimes wanting; and on the other hand, I have found it to be present more than once in cases of ulceration.

Vomiting from nervous disturbance partakes often to a great degree of the features described as characterising the symptom when arising from cerebral causes: among the most prominent of these are the facility with which the act takes place, and the absence of relief to the pain or nausea which attends the evacuation of matter irritating a stomach which is the subject of organic disease. It is also to be noted, that in nervous cases the nature of the food has little or no influence in checking or determining the vomiting, and that in many hysterical cases food apparently the most unsuitable is retained, while simple and less stimulating articles are rejected. The co-existence of pyrosis with pain affords but little conclusive evidence as to its origin, since this symptom may arise from causes both of organic and of purely functional nature. Except in the very rare cases of menstrual hæmatemesis, the presence of blood distinctly proceeding from the stomach must almost invariably remove the disease from the category of functional disorders, and create a strong suspicion, when it appears in connexion with severe pain, that its source is in an ulcer or cancer; the probability between which will be in

<sup>1</sup> A craving for food is sometimes experienced in cases of chronic catarrh, but, when yielded to, it usually aggravates the uneasiness. There are, however, exceptional cases of an hysterical character, before alluded to, where, though a strong desire for food exists, eating is speedily followed by vomiting.

a great measure determined by the age of the patient, by the discovery of a tumour, and by the duration of the disease.

The absence of pyrexia usually distinguishes these affections from those of inflammatory origin, though it is of no value in their diagnosis from ulcer and cancer, in which disorders a febrile state is very seldom observed except from the presence of some other inflammation capable of exciting it.

The state of the tongue usually serves as an additional guide in the diagnosis from inflammatory affections. It is usually unaffected when the disturbance is of nervous origin; its characters in the catarrhal states have been already described.

On the other hand, the tongue is of little value in the distinction of the neuroses of the stomach from ulcer and cancer, where the appearances which it may present are very uncertain, and depend more on the presence or absence of the complication of catarrhal states than on any other cause.

The diagnosis of severe attacks of spasm in gouty cases from those of inflammatory origin is one of considerable obscurity, as the intense depression often masks to some degree the inflammatory symptoms. Fortunately, cases of the latter class are so rare that Dr. Garrod, as before stated, is disposed to doubt their existence.<sup>1</sup> The chief symptoms which should create suspicion are febrile disturbance, a loaded tongue, tenderness on pressure at the epigastric region, and burning or heat at the stomach, as distinguished from the cramp-like pain which usually marks the attacks of a more purely spasmodic form.

Finally, the co-existence of other neuroses, associated with spasmodic pain, such as marked hypochondriasis or palpitation, globus, or some of the various other disturbances which so commonly accompany or replace these symptoms, may all be taken as indications of their real nature.

It must, however, be borne in mind that great nervous excitability may sometimes complicate inflammatory affections; and that in females the association of both disorders in a chronic form is not uncommon. It is of considerable importance in such cases that the inflammatory condition, when present, should be recognised, as the treatment will be materially modified by

<sup>1</sup> Garrod, on Gout, p. 507.

its existence, since it will be found necessary to defer the administration of iron and antispasmodics until it has been relieved by appropriate remedies.

The diagnosis of simple chronic catarrh of the stomach, from the disorders produced by cancer and ulcer, is rarely difficult, even when, from disease of the liver or heart, hæmatemesis may form a complication of the former. In these cases the hæmorrhage is seldom, if ever, attended by the paroxysmal pain which is so constant in both cancer and ulcer; and even when this symptom is present, it is usually the result of flatulence, and is not aggravated by food or by the influence of position, as is usually the case in ulcer; and we may have also in the discovery of the cause of the congestive hæmorrhage a further clue to aid in the diagnosis.<sup>1</sup> On the other hand, in cases where chronic inflammatory action is aggravated by the complication of neuralgic pain or vomiting, we usually have in the absence of hæmatemesis, or of the signs of a tumour, in addition to those before cited, sufficient criteria to lead us to a conclusion which in the majority of cases will prove correct.

Tenderness on pressure also may either be entirely absent in cases of inflammatory action, or when present it differs markedly in the degree of its intensity from that existing in the other complaints which are now the subjects of comparison.

The earlier stages of cancer sometimes bear a closer resemblance to the forms of simple atonic dyspepsia than to any of the other varieties, being attended by a distinct failure of appetite, and by a certain uneasiness after food, rather than by any more prominent symptoms.<sup>2</sup> Such cases are often involved in considerable obscurity, but when marked by coincident failure of flesh and strength they should always, when other distinct causes for these symptoms are wanting, be regarded with considerable suspicion; though absolute certainty of diagnosis cannot be attained without the detection of a tumour, or the super-vention of other signs of this disease, such as pain, vomiting, hæmatemesis, or cachexia. The aid afforded by the age of the patient

<sup>1</sup> As in contraction, or great enlargement of the liver, or by the feeling of the nodular edge in cirrhosis.

<sup>2</sup> Abercrombie, p. 60. Chomel, p. 126. Brinton, p. 194.

in arriving at a diagnosis is also not without its value, for in the earlier periods of life, during which from many causes atonic dyspepsia is very common, cancer of the stomach is comparatively rare. Cases presenting the obscurer symptoms above alluded to, would therefore in every probability, when recurring before the age of forty, be referable to functional causes: though after this period the difficulty would, as far as any criteria derived from the age of the patient are concerned, remain as before.

Such cases are, however, on the whole, comparatively so rare that an allusion to them is only necessary in order to guard against the possibility of overlooking the graver disorder when its more distinctive features are absent.

The diagnosis of acute gastric catarrh from the early stages of typhoid fever, may be a task of considerable difficulty, and in some cases a certain degree of uncertainty must exist, during the first few days of the affection. Both disorders are attended with fever, malaise, cerebral oppression, and headache, which in children may be of considerable intensity, and may even pass into delirium; and in some cases of gastric catarrh diarrhoea may be present as a complication tending to introduce an additional element of uncertainty, though when vomiting also occurs this symptom is strongly in favour of the gastric origin of the disturbance. As a general rule, the temperature in gastric catarrh does not rise so high as in typhoid fever, and usually declines within a week to nearly the normal standard. If the elevation is persistent beyond this period, the eruption of the rose spots of typhoid, together with the increasing cerebral oppression and the enlargement of the spleen in the latter disease, will generally aid in removing the difficulty, which is further assisted by the presence of tenderness in the iliac fossa as opposed to that at the epigastric region.

Moreover, in typhoid, the skin is usually dry and pungent; whereas in gastric catarrh, general or partial perspirations are by no means uncommon. Additional aid may sometimes be obtained by the presence of an herpetic eruption on the face or lips, which is very rare in typhoid, but is an occasional accompaniment of acute gastric derangement.

The chief importance, in an early diagnosis, depends on the propriety of giving or withholding purgatives, which the author believes to be decidedly injurious in fever, but occasionally beneficial in gastric disturbance, and particularly when this results from unsuitable food. It is however better, when any serious doubt exists, to wait and employ a mild and expectant treatment, than to run the risk of aggravating the more serious disease by the untimely administration of remedies of this class.

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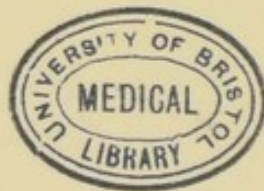
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