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LANE



GIFT

Dr. Grant Selfridge

DISEASES
OF THE
DIGESTIVE CANAL
(ŒSOPHAGUS, STOMACH, INTESTINES)

BY
DR. PAUL COHNHEIM
SPECIALIST IN DISEASES OF THE STOMACH AND INTESTINES IN BERLIN

FROM THE SECOND GERMAN EDITION

EDITED AND TRANSLATED
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ILLUSTRATED

SECOND EDITION.

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1911

DEDICATED
TO HIS HIGHLY ESTEEMED TEACHER
PROFESSOR DR. I. BOAS
OF BERLIN
WITH THE GRATITUDE OF
THE AUTHOR

46897

TRANSLATOR'S PREFACE TO THE SECOND ENGLISH EDITION

THE first edition of Dr. Cohnheim's treatise has fulfilled the expectations of the publishers and translator, in proving that the medical profession desires a work dealing only with those methods which clinical experience has shown to be of working value in diagnosis and treatment of diseases of the digestive canal.

In this issue, the editor has emphasized the increasing value of Skiagraphy in recognizing abnormal conditions of the digestive organs. Other editorial notes include recent improvements in methods of diagnosing lesions of the œsophagus, a discussion of acute dilatation of the stomach, the treatment of gastric and duodenal hemorrhage, and the technique of sigmoidoscopy. New plates and cuts illustrating every-day conditions have been prepared. Acknowledgments are made in the text to those gentlemen who have kindly contributed X-ray plates and other illustrations to the new edition.

The translator ventures to hope that the work in its present form may be found equal to existing requirements and that it may prove as acceptable to practitioners of medicine as the previous edition has done.

Thanks are again due the publishers for their never-failing courtesies.

DUDLEY FULTON, M.D.

LOS ANGELES, September, 1911.



TRANSLATOR'S PREFACE

PERHAPS the most distinctive feature of the present volume is the discussion of the subject-matter purely from the clinical point of view.

Dr. Cohnheim considers the anamnesis the most important part of the examination in the diagnosis of diseases of the gastro-intestinal canal; and throughout the volume he so defines the significance of subjective symptoms that the reader will scarcely fail to be impressed with the value of the art of interpreting these rather than applying himself to complicated details of laboratory work.

The author frankly disclaims any attempt to review the literature, or to compile the views of others, or to present any pathological details and theoretical discussions; every subject is attacked with directness and all non-essentials are ignored. The volume is, in fact, a succinct record of his everyday experience with gastro-intestinal diseases of every kind, and this is perhaps the most valuable asset of the book.

Those who have attended Dr. Cohnheim's clinic know quite well that he has no hesitation in dissenting from conventional theories which have not proven successful in practice.

All of the above-described features are strongly presented in the German editions, and I have endeavored to preserve them intact in the English version; in order to retain this characteristic quality, I have made but few editorial emendations, all such data being enclosed in brackets.

I wish to thank the publishers for their unfailing courtesy, Mr. W. Halven and Miss Ruby Archer for their assistance in the preparation of the manuscript, Dr. Malcolm Lloyd for the drawings which have been added to the English edition, and Mr. Leroy Baumberger for his careful stenographic work and preparation of the index.

DUDLEY FULTON, M.D.

LOS ANGELES, December, 1908.



Handwritten text, possibly a signature or name, written vertically on the right side of the page.

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PREFACE TO THE ENGLISH EDITION

SINCE the first German edition of this medical work made its appearance, many American and English physicians who attended my clinic, but who were not sufficiently conversant with the German language to understand all the details, have repeatedly expressed the wish that an English edition of my work be published.

I have finally decided to act upon this suggestion, and am especially willing to do so at this time for the reason that my esteemed colleague, Dr. Dudley Fulton, of Los Angeles,—who has studied the modern methods of diagnosis and therapeutics of the diseases of digestion in my polyclinic and is thoroughly familiar with the principles upon which my book is based,—consents to prepare the English edition.

I gladly authorize him to do so, and am exceedingly obliged to him, as well as to the publishers, the J. B. Lippincott Company, of Philadelphia, for their manifold courtesies.

Encouraged by many cordial expressions of English-speaking friends, the author trusts that the present edition will supply a need of the general practitioner, and that it will find a friendly reception and kind criticism among its new circle of readers.

PAUL COHNHEIM.

BERLIN, February 16th, 1908.

PREFACE TO THE SECOND GERMAN EDITION

THE demand for a new edition of this work,—after scarcely two years have elapsed,—is evidence, I believe, of its friendly reception by the profession.

The medical press has criticized my book in a favorable way, and has given me helpful hints for improvement in the second edition.

To all kind censors, many thanks!

I am especially grateful to all that have assisted me by suggesting recent developments in the knowledge of digestive disorders; and I desire to thank particularly my fellow specialists, Dr. F. Hoppe, of Hanover, and Dr. F. Ehrlich, of Stettin.

The general plan and arrangement of the book, and the restriction of its contents to a consideration of only practical measures, remain unaltered. I have merely added some of the newer diagnostic and therapeutic methods, and with these changes I present the second edition to the profession.

PAUL COHNHEIM.

♯ BERLIN, September 1st, 1907.

PREFACE TO THE FIRST GERMAN EDITION

IN compliance with the urgent desire of my students, I have finally decided to publish the present volume. My hesitation will be understood when one considers the numerous well-known text-books available on stomach and intestinal diseases. But as my little book contains the essence of what I have used for years in presenting and demonstrating patients and specimens to physicians attending my polyclinic, it offers only the practical points of view.

In order that it might not be over-burdened, I have been obliged to exclude physiological, pathological, and anatomical subject-matter, as well as frequent reference to the literature. Since this book is intended for the use of the general practitioner, I believe I am justified in having done so.

With the same object in view, everything has been omitted that could be spared in the clinical portion of the book.

At the outset, I wish to defend myself against any supposition that the present volume is a compilation from other text-books, and I beg leave to emphasize the fact that it contains the record of personal experience during my many years of work as the assistant of Dr. I. Boas, whom I desire to thank publicly for his aid and scientific guidance. The book likewise includes knowledge gained in my private and polyclinic experience; and since my practice has always been a general one, it has made me familiar with those points that are essential to the general practitioner, and, therefore, to be dealt with in such a work.

Although the reading of any treatise can scarcely replace the advantages of clinical instruction and laboratory demonstrations, yet I believe that this manual will be a trustworthy

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guide to the physician in the difficulties of diagnosis and treatment of diseases of digestion. With this desire I offer it to the public, and hope for a kind reception on the part of its readers.

I owe the execution of the microscopical drawings to the kindness of Miss Paula Guenther.

PAUL COHNHEIM.

BERLIN May 1st, 1905.

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INTRODUCTION

A BOOK, to be a practical guide for the physician in the diagnosis and therapy of stomach and intestinal diseases, must avoid complicated methods which require special experience and the apparatus of a laboratory.

I have, therefore, laid the greatest stress upon a thorough and rational anamnesis in making the examination. The varying complaints and discomforts of patients, as well as the symptoms of the different forms of dyspepsia, are modified so largely by rest, exercise and occupation, by the amount and character of the food, and by the condition of the bowels, that the skilled examiner will be able to form a correct diagnosis in most cases from the answers to his questions. For this reason, I cannot sufficiently emphasize the need of making a provisional diagnosis while obtaining the history of the patient, which the physical, chemical and microscopical findings will either confirm or reject.

When considered alone, the physical findings are far more liable than the clinical history to mislead one in making the diagnosis. For example, the diagnosis of "dilatation of the stomach" is frequently made when the greater curvature of the stomach is found to be below the umbilicus. Now, since vomiting is never absent in actual dilatation of the stomach, and the history of the patient would establish the presence or the absence of this symptom, a careful anamnesis would thus prevent this wrong diagnosis.

I have been very careful, throughout, to emphasize the difference between organic, or anatomical, and functional, or nervous, stomach and intestinal diseases. All other points are of lesser importance in comparison with this cardinal information, since the accuracy of this knowledge determines the therapy. Organic, or anatomical, stomach and intestinal diseases require local treatment; while functional, or nervous,

secondary, or reflex, stomach and intestinal affections, which are symptoms of some constitutional disorder, or are secondary to a disease of some other organ, are to be treated with reference to the primary cause.

I shall give only one example: Phthisis produces very often, at first, a loss of appetite and pressure in the stomach, which are frequently attributed to chronic catarrh of the stomach; and such patients are often prescribed a liquid diet for a long period, in the supposition that an organic stomach trouble exists; when, in fact, only the treatment of the primary disease,—in this case, phthisis,—would cause a disappearance of the symptoms of dyspepsia.

It is appropriate to mention in this place that persons afflicted with lung, heart, kidney, liver and nervous disorders are very frequently sent to the specialist for treatment of dyspepsia.

The examiner must, therefore, in every case of stomach or intestinal disease, make it his absolute duty to examine all the internal organs and also the central nervous system.

The epigastrium, with its numerous sympathetic nerve-ganglia, offers a focus toward which the diseases of all possible organs throw their rays. This explains the fact, not commonly known, that a large percentage of "stomach troubles" are of a functional nature; and therein is found the explanation of the surprising truth that a great many patients suffering from chronic stomach trouble obtain relief through "quacks," after having vainly sought relief for years in the regular schools of medicine. Indeed, the physician who, in clinical instruction in the universities, comes in contact with organic maladies almost exclusively, is naturally inclined to consider most stomach and intestinal affections as organic.

Stomach pathology, more than any other department of medicine, shows the influence of bad habits, excesses "*in Baccho et Venere*," non-hygienic living, worry, anxiety and the restless haste and strenuousness of modern business life. In every rational therapy, therefore, it is of the greatest

importance to establish the cause of the dyspepsia by investigating the occupation, home environment, habits, diet, and general physical condition of the patient.

An exact anamnesis is always the most difficult and prolonged and also the most important part of the examination, because the clues thus obtained furnish not only the best fulcrum for the diagnosis, but also the best indication as to the causal therapy.

The contents of the book are arranged in the following manner:

In the *General Section on Stomach Diseases* these topics are considered:

1. The anamnesis, with the different subjective symptoms;
2. The methods of physical examination, particularly palpation;
3. The chemical and microscopical methods of examination.

The *Special Section on Stomach Diseases* is divided into three parts:

1. The organic, or anatomical, local diseases;
2. The functional disorders, or atony, neuroses, etc.;
3. The symptomatic stomach disorders, secondary to diseases of other organs.

The same arrangement is employed in the *Section on Intestinal Diseases*, except that the presentation is much shorter, in order to avoid repetition.

In the beginning of the *Special Section on Stomach Diseases*, I have given a short abstract on the Diagnosis and Therapeutics of Diseases of the Œsophagus.

As an appendix, I have added a diagnostic and therapeutic glossary, which will be convenient for the practitioner.

At the end of the book are outlines of balneotherapy, electrotherapy, diet, etc., appropriate to our subject.

DISEASES

OF THE

DIGESTIVE CANAL

GENERAL SECTION

Anamnesis and Subjective Symptomatology

Patients are unable to differentiate between the important and the unimportant symptoms of disease. Therefore, in obtaining the history of a gastro-intestinal affection, it is essential that the physician should not allow the patient to enumerate aimlessly all his subjective disturbances, but should require him to give short, precise answers to the following questions:

1. How long have you been ill?

Indefinite statements, such as "A long time," or "Several months," are without value. The physician must ascertain *exactly* how many weeks, months, or years the patient has suffered from indigestion, when the symptoms first appeared, whether the trouble developed suddenly or gradually, and whether the disease has been intermittent or progressive.

The information derived from these answers immediately enables him to differentiate acute from chronic affections.

2. Do you suffer constantly or only occasionally?

This question is important, because the course and progress of the disorder, and the variations of its intensity, are significant in every primary disease of the stomach and intes-

tine. For example, gastric pains which occur periodically are typical of peptic ulcer or of the gastric crises of tabes, etc.; while, on the other hand, symptoms which are constant are characteristic of chronic gastritis, nervous dyspepsia, etc.

It is especially necessary to determine whether periods of normal digestion have alternated with periods of dyspepsia.

3. Can you swallow all kinds of food without difficulty?

With this question, the physician begins the inquiry concerning the symptoms pertaining to diseases of the different portions of the digestive tract.

If the patient answers this question in the negative, some affection of the œsophagus exists. More detailed questions will determine whether solids only are swallowed with difficulty, whether such are vomited, and whether the impediment to deglutition is constant or periodical. (See details in special chapter on Diseases of the Œsophagus.)

4. Have you actual pain or only pressure?

This question is of the greatest possible significance, because a purely functional dyspepsia never causes actual pain. Pain occurs exclusively in organic diseases of the stomach (ulcer, stenosis, carcinoma, etc.), or some neighboring organ (gall-bladder, appendix, colon, etc.).

It should always be kept in mind, that unless patients are very careful on this point they usually say they have "pain," no matter what may be the exact nature of their discomfort, and it also frequently happens that they are really unable to distinguish between actual pain and other sensory disturbances.

I include as *painful* all sensations of a crampy, colicky, cutting, stabbing, boring, or burning nature.

Among those that are *not painful*, I would classify sensations of pressure, fulness, discomfort, distention, nausea, weight, heaviness, or *globus hystericus*.

5. If only pressure and discomfort are felt, are they constant or do they occur only after meals?

Constant pressure in the abdomen, which is independent of the nature of the food, is characteristic of a gastric neurosis or of pressure from a distended intestine, or of encroachment upon the abdominal space from ascites, enlargements of the liver and spleen, etc.

When pressure is located at the epigastrium, inquiry should be made as to whether this pressure is accompanied, as is usually the case, by fulness, distention, flatulence, the rapid satiation of appetite, lassitude after eating, heartburn, regurgitation, or vertigo.

When pressure occurs after eating, it is essential to determine whether it is independent of the quality of the food.

Pressure which occurs only after taking solid food indicates chronic gastritis.

Pressure which occurs after a meal of either solid or liquid foods is characteristic of a functional dyspepsia.

6. If you have actual pain, what is its character, and when and where does it occur?

Is it of a colicky, cutting, boring, or burning nature? Where does it begin, and does it radiate? Is it intermittent, or does it persist with the same intensity for hours or for days? Does it recur every few months? (Cholelithiasis, Gastric Crises.) Or does it occur daily at a definite time after meals? (Ulcer.) Is the pain relieved by warm drinks? (Hyperchlorhydria.) Or is it relieved by the escape of gases or by defecation? (Intestinal Colic.) Is vomiting induced by the pain, and does relief follow vomiting? Do you artificially produce vomiting to experience alleviation of the pain? (Pyloric Stenosis.)

7. Do you vomit?

If so, at what time? Do you vomit early in the morning, or only after meals? Do you vomit certain foods,—for

example, vegetables or grapes,—which you have eaten a few days previously? (Stenosis of the Pylorus.) Do you vomit only mucus? (Gastritis.) Do you vomit only an acid fluid? (Hypersecretion.) Are all foods vomited immediately after eating? (Reflex.) Or do you vomit very profusely every few days and are you thereby relieved? (Ectasia.) Does vomiting recur every few weeks or months, and are you then for a period comparatively well? (Gastric Crises.) Is the vomiting associated with attacks of migraine; and if so, do you vomit until bile is present in the vomitus? (Reflex.) Do you vomit a short time after eating rich, indigestible foods, such as cabbage, cheese, smoked meat, hard boiled eggs, etc. (Gastritis.)

8. What is the condition of your bowels?

Are your bowels regular or irregular? How often do they move? Are the stools formed, semi-solid, or liquid? If the stools are formed, have they a large or small calibre? Are the stools hard and knotted or pasty and spongy? Do you pass mucus? If so, is the mucus free or is it mixed with the feces, or are the latter enveloped by membranous mucus? Have you observed sections of tapeworms in the stools? Have you much gas, and is it associated with abdominal pain? If the pressure of gas is associated with pain, does the escape of gas give relief? (See details in the section on Intestinal Diseases.)

9. What are your general symptoms?

The physician must ascertain whether lassitude, emaciation, loss of appetite, excessive hunger, abnormal thirst, nervous irritability, insomnia, or mental depression is present.

10. From what diseases have you previously suffered, and what is your family history?

It is very important to ascertain whether the patient has previously suffered from serious affections like apical

tuberculosis, venereal infections, inflammatory rheumatism, or typhoid fever; and whether he has been jaundiced, or has masturbated for a long time; and above all, whether he has been physically or mentally over-worked.

In addition to obtaining a careful personal history, it is always the duty of the physician to inquire whether the parents or brothers and sisters of the patient have suffered from tuberculosis, diabetes, carcinoma, gout, or other constitutional diseases.

The exact and complete answers to all these questions are invaluable in arriving at the correct diagnosis.

Not until the anamnesis is obtained with the most patient care, as outlined above, and not until the physician has thereby formed a provisional diagnosis of the disease, should he proceed with the physical examination of the patient.

The frequency with which patients consult a physician with regard to digestive disturbances, when the actual trouble is of an entirely different nature, emphasizes the importance of using the greatest care in the anamnesis, so as to avoid being misled at the outset of the examination.

Physical Examination

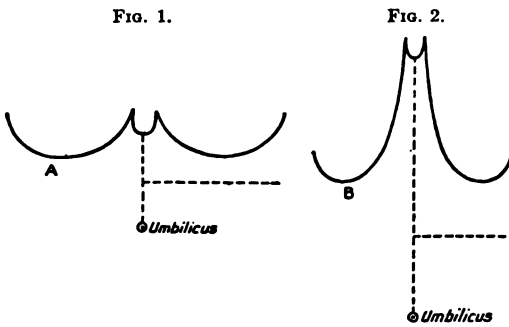
Inspection.—Since the physician must make it his duty in chronic stomach and intestinal diseases to make a thorough examination of the entire body, he should begin by carefully noting the color of the skin, the general nutrition, the facial expression, and above all, “the *habitus*.” All these things are of the greatest importance, because they often determine the differential diagnosis between functional and organic diseases of digestion.

Since I assume the methods of inspection to be known, I shall merely remind the examiner of the need of noticing whether the patient is anæmic, pale, cyanotic, jaundiced, bronze-colored, or cachectic; and whether he appears to be well-nourished, moderately, or very badly nourished.

I will here go into detail in the consideration of the *habitus* only.

According to Stiller, the *normal habitus*, or broad thorax, is differentiated from the so-called "*habitus enteropticus*," which is identical on the whole with the *paralytic* or *phthisical habitus*. The chief characteristics of the *habitus enteropticus* are the following:

A long, small and usually flat thorax; a narrow costal angle, so that the xiphoid process is the apex of an acute angle. In patients with a *normal habitus*, this angle amounts to 120 degrees or more. Where *habitus enteropticus* occurs, the angle amounts to perhaps 60 degrees. The more acute this angle, the more marked is the *habitus enteropticus*, which is accompanied by a loosening of the costal cartilages, so that usually the tenth right and left ribs fluctuate; and in severe cases, the cartilages of the ninth right and left ribs also fluctuate.



A, diagram of normal habitus; B, diagram of habitus enteropticus.

In *habitus enteropticus*, a vertical line drawn between the ensiform process and the umbilicus would be much longer than a line drawn at right angles to this vertical line and extending to the anterior axillary line. In *normal habitus*, on the other hand, this vertical line would be shorter or of about the same length as the line perpendicular to it, extending to the anterior axillary line.

Therefore, in *habitus enteropticus* the epigastrium and hypochondrium have a greater longitudinal than transverse diameter, while in *normal habitus* the transverse diameter of these regions considerably exceeds the vertical. This explains why it is that the organs occupying the epigastrium and the hypochondrium must assume a more nearly vertical position than normally. (See Figs. 1 and 2).

If relaxation of the abdominal wall and diastasis of the recti muscles occur in women with *habitus enteropticus* after pregnancy, the intestine loses its support, so that the stomach

also sinks downward and forward with the greater curvature below the umbilicus, without the stomach itself being dilated.

Normally, the transverse colon is usually two or three finger-breadths below the greater curvature of the stomach. If the latter assumes an abnormally low position, it is natural that the colon should also occupy a correspondingly lower position.

In women who have borne children, the colon is rarely found in the normal position,—namely, one or two finger-breadths above the umbilicus.

In *habitus enteropticus* the right kidney is almost always palpable, the left less often, though the latter is more frequently displaced in men. The right kidney is often palpable, even in emaciated children with *habitus enteropticus*.

Only in the rarest cases are the liver and the spleen displaced.

The significance of *habitus enteropticus* in diseases of the abdominal organs, especially of the stomach, is, that persons with *habitus enteropticus* are predisposed to functional diseases of the stomach and intestine; that is to say, a given irritation would produce disturbances in a person with *habitus enteropticus* which would not affect a person with *normal habitus*.

All causes that lead to insufficient nutrition and to a disappearance of fat from the mesentery and abdominal walls weaken the natural supports of the abdominal organs and produce in the enteroptotic individual some active disease which has, up to that time, been latent. This disease, however, is only of a functional nature, that is, not leading to a demonstrable anatomical change.

With respect to its import, Stiller has designated this entire *habitus* as "*asthenia universalis congenita*." This term indicates that individuals with such *habitus* are predisposed to all possible functional diseases.

From the above-cited principles appears the extraordinary significance of *habitus enteropticus* in affections of the stomach and intestine. The examiner, therefore, should never neglect to make an absolutely correct diagnosis of the *habitus*.

I need not emphasize that inspection should detect any distention or retraction of the abdomen, tumors, circumscribed swellings, hernia, or diastases of the recti muscles, should any exist.

It is especially important to recognize abnormally increased peristalsis, the so-called "stiffenings" of the stomach, small intestine or colon. These are especially significant as indicating stenosis of the pylorus, or of the colon.

Visible peristalsis of the small intestine, which is not pathological, is found in old women in whom well-marked diastases of the recti muscles have remained after pregnancy, and who have become extremely emaciated. The peristaltic action of the coils of the small intestine is shown in a relief-like manner upon the thin abdominal wall around the umbilicus. It is necessary to guard against considering this as pathological, or as "nervous peristaltic unrest" of the intestine, for the visible peristalsis in these cases is attributable merely to extreme emaciation of the patients.

In the course of the examination, the tongue should also be observed. Its appearance has only an indirect relation, however, to diseases of the digestive organs; for the less thoroughly the patient chews his food, the more thickly the tongue will be coated, and mastication in turn depends largely upon the appetite.

Percussion.—In the examination of the abdomen, percussion is of minor value as compared with palpation. Therefore, the physician who can palpate well scarcely needs percussion at all, and it would better be dispensed with, for the reason that it is so often a source of error.

In the determination of the borders of the stomach, the examiner will need to make use of it, if he does not succeed with palpation; for instance, in a patient whose stomach lies so high that it cannot be defined by palpation.

Since distention of the stomach with air or carbon dioxide gas, which were formerly much used and considered very important, is dispensable in practical diagnosis, except when localizing abdominal tumors, it may be mentioned here and will be described briefly in the following discussion of the topography of neoplasms of the stomach and intestine.

Palpation.—In examining a patient, one should always palpate the organs and parts in the following order:

1. The epigastrium and stomach.
2. The cæcum and appendix, the ascending colon, the transverse colon, the sigmoid flexure, and the small intestine.
3. The liver and gall-bladder.
4. The spleen.
5. The kidneys.
6. The abdominal rings.
7. The rectum.
8. The abdominal cavity for tumors, ascites, etc.

Palpation is most successfully and easily performed in the four positions described below,—the examiner sitting on the right side, or if left-handed on the left side, of the patient:

1. In the dorsal position of the patient, the epigastrium, transverse colon, cæcum, sigmoid flexure, small intestine, liver-border, and gall-bladder are to be examined.

2. In the right-side position of the patient, the spleen, the left kidney, the sigmoid flexure, and tumors of the ascending colon are to be examined.

3. In the left-side position of the patient, the right kidney, the liver, the ascending colon, and possible tumors are to be examined.

4. In the knee-elbow position of the patient, the anus and the rectum are to be examined.

Although I am well aware that palpation must be learned through practice, I should like to mention the following points which have best served me in palpation of the abdomen.

Above all, it is essential to palpate systematically,—not haphazard, as is so often done. The accompanying pictures will illustrate the art of palpation.

Stomach and Epigastrium.—The examiner should lay both hands upon the epigastrium, absolutely flat side by side, not using the thumbs (see Fig. 3), and should ask the patient to use the diaphragmatic breathing,—inhaling and exhaling deeply,—during the palpation.

Patients who breathe thoracically should be shown how to breathe abdominally,—the examiner laying his hand on

his own abdomen and demonstrating to the patient that during the inspiration the hand is raised, and during the expiration it is lowered. It is clear that only through diaphragmatic breathing may the patient effect the desired displacement of the organs of the abdomen,—namely, the stomach, liver, spleen, kidneys, and colon, or of possible existing tumors.

FIG. 3.



Palpation of the abdomen.

While the patient inspires and expires as deeply as possible, the hands of the examiner should remain absolutely quiet on the epigastrium; and only at the moment of the beginning of the expiration should the finger-tips be pressed somewhat deeply downward. In this way, all the organs during their elevation must come into contact with the finger-tips and are in this manner best palpated, since the finger-tips have a most delicate sense of touch. The examiner should attempt to palpate even any slight irregularities which may be present.

During palpation of the epigastrium, the physician should keep in mind the possibility of existing tumors, irregularities of the liver, abnormal pulsations, epigastric herniæ, sensitiveness to pressure, arteriosclerosis of the aorta, and palpability of the pylorus, which occurs not infrequently. Of course, the most important question is, whether a tumor is palpable or not.

Determination of the Borders of the Stomach by Palpation.—The patient lies flat on a reclining chair with the upper part of the body slightly raised, and is given from one to two glasses of water (200 to 400 c.c.).*

The examiner should place on the epigastrium of the patient the fingers of his right hand, spread out claw-shaped (see Fig. 4), and should palpate without raising the fingertips, by a short pushing stroke, centimetre by centimetre, beginning from below and passing upward, until he feels the splash of the water under his fingers.

He should not assume, however, that the lower border of the stomach is as low as where the splashing sounds are heard. While this is often the case, such a premise sometimes leads to error.

The lower border of the stomach reaches only as far as the palpating fingers *feel* the water.

For the purpose of accomplishing the palpatory percussion introduced by Obrastzow, the examiner should require the patient to render the diaphragm tense by a deep inspiration, so that the stomach is pushed downward. The examiner can also assist this downward movement of the stomach by a strong pressure of his left hand upon the epigastrium of the patient just below the xiphoid process. But we must always take into consideration the fact that the lower border of the stomach lies perhaps two or three finger-breadths lower during inspiration than when the lungs are passive.

In enteroptosis the greater curvature, *i.e.*, the lower border of the stomach, lies, as a rule, as low as from one to two finger-breadths above the level of the umbilicus; while

* Persons with enteroptosis require one glass of water, while patients with *normal habitus* need two.

in individuals with *normal habitus*, the lower stomach-border lies a hand's breadth above the umbilicus, so that only a small portion of the stomach is in contact with the anterior abdominal wall so as to be palpable.

When *habitus enteropticus* occurs in women who have borne children, the greater curvature frequently lies below the umbilicus as much as four finger-breadths, without there being in any sense actual dilatation of the stomach.

FIG. 4.



Obrastzow's palpatory percussion method for determining the borders of the stomach.

On the case-card of the patient, the physician should enter the findings in the following manner:

For instance, if the greater curvature lies two finger-breadths above the umbilicus, he should record G.C. $\frac{2}{U}$; or if the greater curvature lies three finger-breadths below the umbilicus, he should record G.C. $\frac{U}{3}$. If the greater curvature extends to the umbilicus, he should record G.C. at U. He may add to the above whether the findings were during inspiration or expiration. These formulæ express briefly and clearly the position of the stomach.

When the patient has a very broad thorax and strong abdominal wall, the examiner cannot palpate the greater curvature, even after the patient has taken a half litre of water,—in which case the position of the stomach is considered normal.

Besides this method of Obrastzow's, there are quite a number of other means for determining the greater curvature, as well as the position and size of the stomach. Among these I will consider only distention of the stomach with air by means of a stomach-tube and a Davidson syringe, or by carbon dioxide gas produced by administering effervescent mixtures.*

Either of these methods, however, is disagreeable to both patient and physician, and may be dispensed with. They are to be used only in special cases; for instance, when it is essential to demonstrate whether a tumor which is felt in the epigastrium is situated in the anterior wall of the stomach, or whether it lies behind the stomach. Tumors lying behind the stomach naturally become inaccessible to palpation when it is inflated.

The Boas "sound" palpation for the determination of the position of the greater curvature is dispensable in general practice; likewise the illumination of the stomach (gastrodiaphany) introduced by Einhorn. All of these methods are explained in detail in well-known text-books.

For practical work, the best of the above-mentioned methods is that of Obrastzow.

In patients with enteroptosis, the examiner can often palpate the normal pylorus, which might easily be mistaken for a tumor by the inexperienced. It generally lies at or near the umbilicus, and resembles a tumor about the size of a walnut. It will be recognized by the following characteristics:

1. Its consistency continually changes; it is sometimes as hard as a board, sometimes so soft that it is inaccessible to palpation.
2. The expulsion of chyme from the pylorus can be heard, as well as felt.

The Spleen.—The patient should lie on his right side on the examining table, with the arm not thrown upwards but lying over the chest slightly flexed, so that the abdomen is relieved of tension. The physician should sit with his right side to the patient, laying his right hand upon the left costal arch and placing the finger-tips of his left hand on the costal cartilage.

The patient should now be required to take a deep inspiration, and the examiner should press strongly downward and inward only at the moment of inspiration. By this procedure

[*The latter is best performed by dissolving about one dram of tartaric acid in a half glass of water, which the patient is requested to drink; this is followed by an equal amount of sodium bicarbonate dissolved in a like quantity of water.]

the spleen is pushed below the edge of the ribs so that the finger-tips which are pressing downward slip over the level differences and detect any enlargement of the spleen. Several repetitions of this mode of palpation will convince the examiner of the correctness of his findings. Simultaneously it should be determined whether the spleen is moderately or greatly enlarged, whether it is soft or hard, and whether the edge is sharp or dull.

The fact that an enlarged spleen occasionally reaches even as far as the cæcum need only be mentioned here. Percussion of the spleen is quite valueless; and a spleen which cannot be palpated must, in general, be considered as normal in size.

The Liver.—The liver should be first palpated in the right mammary line. If it extends below the edge of the ribs, the examiner should palpate again with the hand applied absolutely flat upon the abdomen, and should exert pressure as soon as expiration begins. Then the finger-tips should slide over the liver-border into the soft tissues of the abdomen.

The examiner should determine whether the liver is hard, soft, smooth, or knobbed; whether it has a sharp or a rounded edge; whether it is sensitive to pressure; whether the left lobe is especially enlarged; whether the entire liver is contracted; and moreover, whether the gall-bladder is sensitive to pressure, and whether or not it is swollen.

When the liver is only slightly enlarged, the examiner should palpate somewhat differently. He should place the eight fingers of both hands almost perpendicularly on the eleventh costal cartilage and should press the eight finger-tips (naturally with short nails) as deeply as possible downward toward the posterior abdominal wall as far as the patient can bear it, and should request the latter to inspire as deeply as possible. If the liver now projects below the edge of the ribs, it will strike against the finger-tips producing a feeling of sudden resistance both to the examiner and to the patient.

Naturally, this palpation method is possible only with persons whose abdominal walls are not too rigid. In a great number of patients, the palpation of the liver is not successful, and the examiner must resort to percussion.

There are only a few pathological conditions in the liver inaccessible to palpation that need to be considered in a discussion of diseases of the stomach and intestine.

One word more concerning the contracted liver: The consideration of this affection is important in order to avoid confounding it with malignant tumors. The contracted liver is met with almost exclusively in women who have never, or at least rarely, worn corsets, but who have always fastened

FIG. 5.



Palpation of the right kidney.

their clothes around the body with draw-strings. For the diagnosis it is necessary to demonstrate that the supposed malignant tumor exists in connection with the rest of the liver.

The Kidney.—It is well known that the right kidney in quite a large number of women and girls is palpable; in men, on the other hand, rarely so except in individuals with *habitus enteropticus*. The right kidney should be palpated in the left-side, and the left kidney in the right-side, position; and always bimanually, the examiner placing one hand on the region of the kidney and the other on the corresponding anterior region. (See Fig. 5.)

After the patient has taken a deep inspiration, the examiner should press in deeply with the right hand at the moment when expiration begins. If he can palpate the entire kidney and push it here and there from the umbilicus to its normal position, this indicates "displaced" kidney. If the entire kidney or only a portion is felt during expiration, and if it returns during inspiration to its normal position, the condition should be designated as "movable" kidney.

The left kidney is palpable in exactly the same manner. Even experienced examiners have difficulty in differentiating a movable left kidney from a displaced spleen, as it is often impossible to decide whether the organ lying in this position is the spleen or the left kidney. In men, the left kidney is found loosened more frequently than the right.

Only when the kidney returns during expiration to its previous position is the examiner justified in diagnosing "movable" kidney, and not "displaced" kidney.

Three degrees of movable kidney are differentiated: The first degree is present only when the lower part of the kidney is palpable; the second degree, when half of the kidney is palpable; the third degree, when the entire kidney is palpable.

The Intestine.—Normally, the colon, the cæcum, the appendix, and the sigmoid flexure can be palpated only under the most favorable conditions. The small intestine is too soft to be palpated.

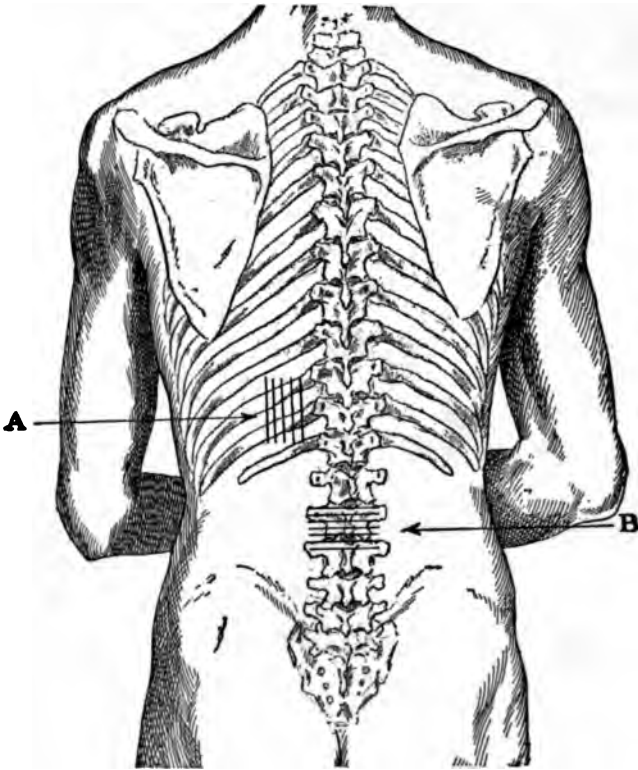
The examiner should always begin with palpation of the sigmoid flexure by placing the fingers of the right hand upon the abdomen at right angles to the direction of the course of the sigmoid, and attempting to roll the sigmoid back and forth under the fingers by pressing downward against the iliac fossa.

During this rolling movement, the examiner will determine whether the sigmoid is empty or is moderately well filled, whether it is hard or soft, contracted or relaxed; whether it is sensitive to pressure; and whether a tumor is present. These differentiations naturally require some practice.

The transverse colon is palpated in the following manner: The physician should place both hands (thumbs excepted)

close to each other on the middle of the abdomen, the fingertips extending somewhat above the umbilicus; and, while the patient inspires and expires deeply with diaphragmatic respiration, should roll up and down with the tips of his fingers

FIG 6.



Pain zones in (A) gastric ulcer, (B) constipation, enteroptosis, colitis.

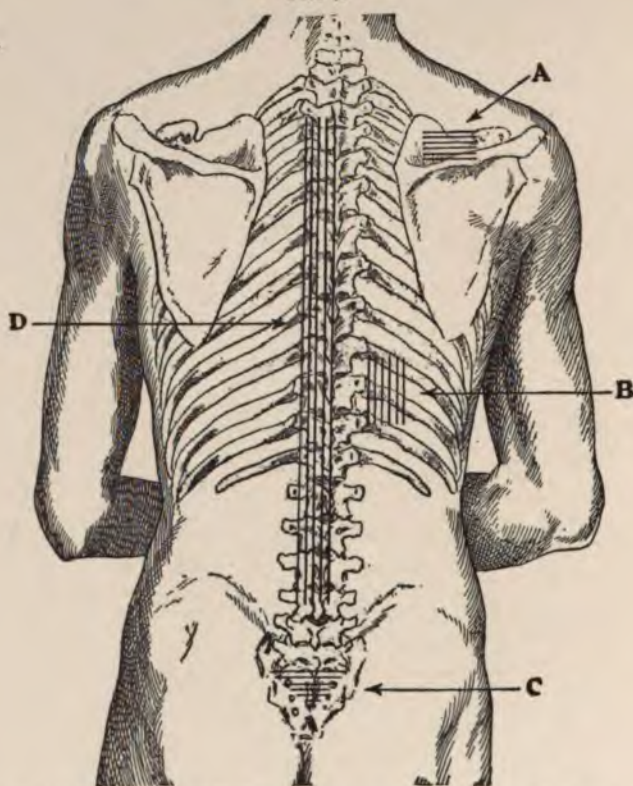
and at the beginning of each expiration press downward lightly. (See Fig. 3.) In this way he is able to differentiate, unless the colon is completely relaxed, as to whether the transverse colon is soft or hard, sensitive or insensitive to pressure, or whether it feels like a cord, more or less filled.

As a rule, a pathologically altered transverse colon only can be felt, except in cases of *habitus enteropticus*, with descent of the

intestine and relaxation of the abdominal walls after pregnancy. In this latter case, a normal colon is, as a rule, palpable.

In the *normal habitus*, the colon lies three or four finger-breadths above the umbilicus ($\frac{3-4}{U}$). In *habitus enteropticus*, the

FIG. 7.



Pain zones in (A) cholelithiasis, (B) disease of liver and gall-bladder, (C) diseases of rectum, (D) nervous dyspepsia.

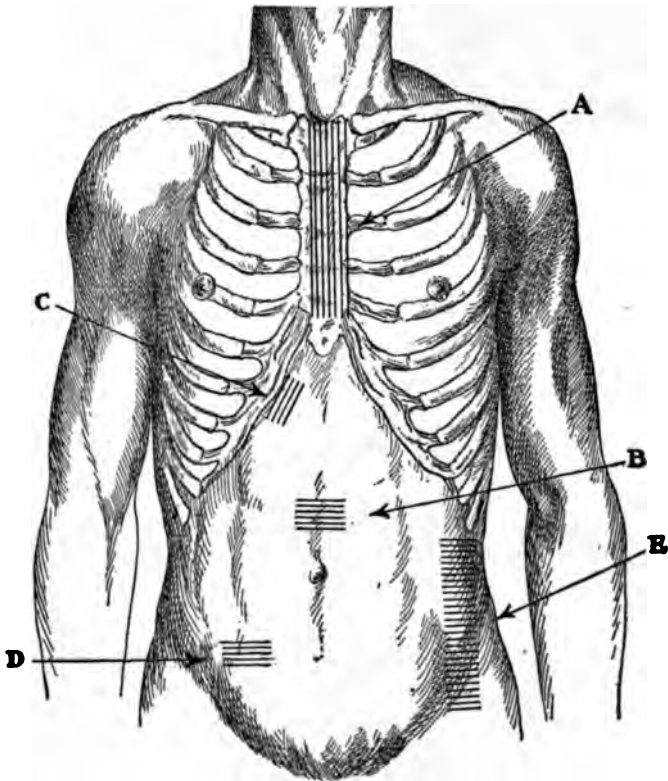
transverse colon lies at the level of the umbilicus or one finger-breadth above or below it. In "hang-belly," the middle portion of the transverse colon may reach to the symphysis pubis.

The palpation of the colon is of double importance: first, for determining the position of the intestine and of possible existing tumors; and second, as a means to assist in the differential diagnosis between the two forms of habitual

constipation,—atonic and spastic. Only in the spastic form can one feel the hard and contracted transverse colon.

The examiner should make it a rule to lay the palpating hands on the abdomen at right angles to the course of the

FIG. 8.



Pain and pressure zones in (A) diseases of œsophagus; (B) diseases of stomach; (C) gall-bladder disease; (D) appendix; (E) diseases of colon.

colon. If the transverse colon assumes an arched form, as frequently occurs, with the convexity downward, the right half should be palpated in a different direction from the left half. It often happens that the transverse colon forms an arch which extends to the symphysis, so that the right and left sides of the arch are almost vertical. (U-form of the transverse colon.)

The examination of the remaining portion of the large intestine should then be made.

The palpation of the cæcum is easily accomplished by the following method:

The examiner should sit at the right side of the patient, placing his left hand over the cæcum at right angles to its course and pressing downward with a rolling movement. Usually a gurgling murmur is heard, which, by the way, is of only slight importance.

The examiner should attempt simultaneously to palpate the appendix. With practice, this is possible in a large number of cases. It lies generally in a direct line from McBurney's point to the symphysis. If the attention is directed continually to this point, the examiner will find by experience that the normal appendix is easily felt, by the rolling pressure of the finger, to be a cord about the size of a lead-pencil and as long as the little finger. He will also discover by this method any sensitiveness to pressure or thickening of this organ.

The ascending and descending portions of the colon are less frequently accessible to palpation. They are to be palpated exactly as the other portions, bimanually, by laying the hand upon the abdomen always at right angles to the course of the portion under examination, and ascertaining the condition by a rolling movement combined with downward pressure.

It is important, in making the diagnosis, to ascertain whether these organs are sensitive to pressure; whether they are contracted or distended; or whether they contain fecal masses.

For the sake of completeness, it must be added here that in supposed stomach-diseases, the urinary bladder can often be palpated; for instance, in patients suffering with prostatic affections. If the examiner will remember that unusual resistance above the symphysis may be caused by distention of the urinary bladder, no confusion should occur in the diagnosis. I need scarcely mention that the examiner should always keep in mind the necessity of palpating for possible existing ascites.

One other affection should also be mentioned that is often overlooked in practice. I refer to epigastric hernia in the *linca alba*,—"rupture," as it is called by the laity.

FIG. 8a.

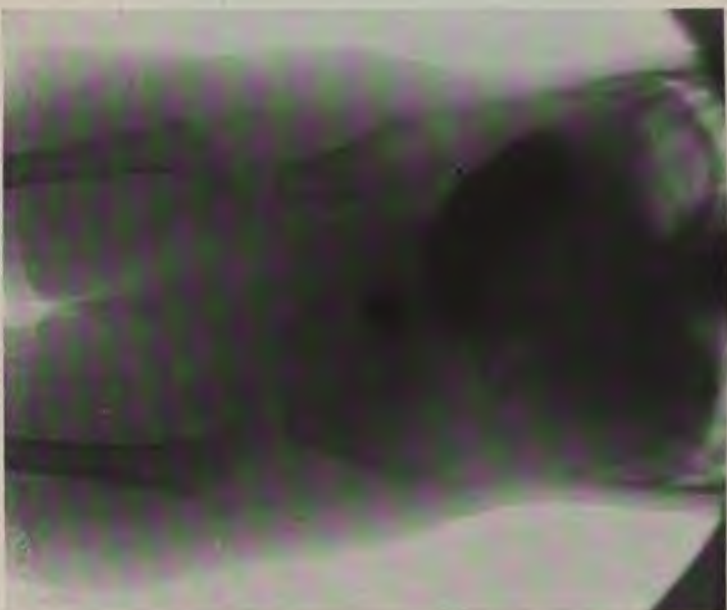


FIG. 8b.



FIG. 8a.—Radiograph of stomach of female child aged two years and nine months, showing the normal shape and position of the organ in the erect posture. The size may be regarded as approximately normal, although the stomach appears small because of the refusal of the child to take as much food as was desirable. The position is reversed in this radiograph, due to the use of an intensifying screen, which necessitated a reversal of the plate. Time of exposure, one-fourth second. [Courtesy of Dr. H. K. Pancoast.]

FIG. 8b.—Radiograph of colon of an adult female, showing the normal position on relations of this structure throughout, with the patient in the erect posture, plate anterior. Bismuth administered per rectum. [Courtesy of Dr. H. K. Pancoast.]

FIG. 8c.



FIG. 8d.



FIG. 8c.—Radiograph of female aged twenty-three years, showing a stomach almost normal in position, shape, and size, in the erect posture. This case illustrates, however, a very early stage of visceroptosis, as is suggested by the tendency of the stomach to assume a more nearly vertical position than normal, together with the moderate degree of rotation of the liver, ptosis of the right kidney, and the slight ptosis of the hepatic flexure and very low position of the caecum, as shown in Fig. 8d. [Courtesy of Dr. H. K. Pancoast.]

FIG. 8d.—Radiograph of colon of same case as shown in Fig. 8c and made eighteen hours later. The abnormally low position of the hepatic flexure illustrates what is to be frequently observed in the early stage of enteroptosis. In addition, the caecum is markedly ptosed. Exposure one second, without screen. [Courtesy of Dr. H. K. Pancoast.]

The abdominal rings should always be palpated.

The examiner should also look for a sensitiveness to pressure in the abdomen, and indeed in the skin, muscles, plexuses, and intestines. Pinching of the skin is usually not painful; in hysteria, however, or when there are inflammatory conditions of the intestinal organs,—such as occur in colitis, appendicitis, or cholelithiasis,—even a slight pinching of the skin will be quite painful.

Head explains this by assuming that there is a projection of pain to the skin overlying the inflamed organs.

Finally, the examiner should test the back of the patient for sensitiveness by means of pressure and striking of the muscular parts on both sides of the spinal column.

According to Boas, in gastric ulcer the skin to the left of the tenth, eleventh, or twelfth dorsal vertebra will be found sensitive to pressure. In cholelithiasis, on the contrary, the skin to the right of the corresponding vertebra is sensitive to pressure. In general neurasthenia, the entire area along both sides of the spinal column is sensitive to pressure, especially in the interscapular and sacral regions.

Having done all this, the examiner should not fail to palpate the anus and rectum. This is best done in the knee-elbow position. (See details in the section on Intestinal Diseases.)

Auscultation.—In the examination of the abdominal organs, auscultation may be almost entirely dispensed with, so far as practical purposes are concerned.

Internal Chemical and Microscopical Examination of the Stomach

Introductory Remarks. — The Boas-Ewald test-breakfast is used almost exclusively in the examination of the gastric juice. This consists of from 60 to 70 grams of dry wheat bread and 400 c.c. of cool water. The test-breakfast should be eaten by the patient on an empty stomach, and exactly one hour afterwards should be siphoned from the stomach by an ordinary soft stomach-tube. (See technic, page 42.)

Before filtering the contents of the stomach, the physician should note:

- a. The appearance; whether the meal has been well or poorly digested.
- b. The odor; whether normal or fetid. [Sour or rancid.]
- c. Whether blood, pus, or stagnant remnants of food are mixed with the test-breakfast.
- d. Whether free hydrochloric acid is present; this is done by moistening a strip of congo paper with the stomach-contents.

In the well-digested test-breakfast, there should be a layer of finely-divided bread on the bottom of the glass containing the stomach-contents, and over this should be a layer of semi-transparent gastric juice.

If the test-meal is poorly digested, as occurs in *achylia gastrica*, the stomach-contents will consist of only a small quantity of fluid and many coarse lumps of bread.

With a little practice, the examiner will easily recognize the macroscopical differences between the normal and the impaired digestion. He will also observe that in cases which have a normal acidity or a hyperacidity, the stomach-contents are easily removed; and that when anacidity exists, considerable effort and retching on the part of the patient are required to obtain the necessary quantity of gastric juice for examination. The examiner must sometimes utilize even the small quantity of stomach-contents which has remained in the lumen of the stomach-tube. In such cases, the stomach-tube should be quickly withdrawn and the contents blown into a glass. When necessary, even this small quantity will suffice to determine whether hydrochloric acid is present.

I have never made use of an aspirator for removing the test-breakfast from the stomach, although I recommend its use to beginners. It consists of a large rubber bulb connected with the stomach-tube by a short glass tube. By pressing the air out of the bulb, a vacuum is produced which readily aspirates the gastric contents.

The test-breakfast should be filtered through a folded filter-paper; but if only a very small quantity of the test-meal

has been obtained, the examiner would better use instead the unfiltered stomach-contents.

The following determinations should be made from the filtrate:

- a. Total acidity.—T.A.
- b. Free and combined hydrochloric acid (F.HCl and C.HCl).
- c. Rennin and pepsin, in cases in which the reaction of free hydrochloric acid is negative, *i.e.*, when congo paper is not colored blue by contact with the gastric juice. (See below.)

Qualitative Examination.—For practical purposes, congo paper is used almost exclusively. [Congo red in solution is even more sensitive than congo paper.] Its red color is changed to blue by contact with free hydrochloric acid. The more free hydrochloric acid the gastric juice contains, the more nearly sky-blue will be the color. If only a small quantity of free acid is present, a weak, blue-black coloration will result.

If free acid of any kind is present in the test-breakfast, the change of color is always indicative of free hydrochloric acid, and never lactic or other acids, because the Boas-Ewald test-breakfast contains only free hydrochloric acid.

Lactic acid is found present only in test-dinners or in conditions in which there is food stasis. It is, therefore, quite superfluous to resort to the Uffelmann test when the ordinary Boas-Ewald test-breakfast has been given. (See below.)

The examiner should determine whether the congo reaction is normal, weak, or strong. It should be noted that the mixture of mucus with the stomach-contents often disturbs, or even prevents, the reaction. In these cases, hydrochloric acid may be found in certain parts of the test-breakfast, while the reaction is negative in other parts.

After practice, the examiner will be able to form quite accurate conclusions concerning the degree of acidity of the gastric juice by the intensity of the coloration of the congo paper. Normal gastric juice changes congo paper to a sky-blue.

Lactic acid should be tested for only in cases in which there is stagnation of the stomach-contents.

FIG. 9.



Separating apparatus suitable for making test for lactic acid. (Strauss's.)

The test is made as follows:

One drop of liquor ferri chloridi is added to from 8 to 10 c.c. of water in a test-tube. The gastric filtrate is then added drop by drop. If the resulting color is a yellowish-green, about the shade of Esbach's reagent, lactic acid is present.

The foregoing is Kelling's modification of Uffelmann's test.

[Strauss's test is more accurate as a qualitative test than Uffelmann's, as the latter is usually made; and since the former permits a rough estimate of the quantity of lactic acid present, it is preferable to Uffelmann's in clinical work. (See illustration.)

A small separating funnel should be employed, graduated to hold 5 c.c. and 25 c.c. The funnel should be filled to the 5 c.c. mark with the filtered stomach-contents and then to the 25 c.c. mark with ether. The combination should be thoroughly shaken for two or three minutes and then allowed to stand until the ether separates as a clear layer above the milky gastric juice. The stopcock at the lower end of the funnel should then be opened and the stomach-contents and the ether allowed to run out until the 5 c.c. mark is reached. This leaves 5 c.c. of the ethereal extract of lactic acid in the funnel, which should then be filled with distilled water to the 25 c.c. mark. Two drops of a 10 per cent. solution of ferric chloride should be added, and the whole gently shaken.

If 0.1 per cent. of lactic acid is present in the stomach-contents, an intense yellow-green color will appear; 0.05 per cent. will show a slight green color; quantities smaller than this, which are of little clinical importance, give no reaction.]

Quantitative Examination.—In practical work, the determination of the total acidity of the gastric juice is usually sufficient, for the reason that the same test-breakfast is always given, the albuminous contents of which vary only within narrow limits.

The examiner should have a normal sodium hydrate solution or a normal potassium hydrate solution, which can be obtained in any pharmacy. Every normal solution contains, dissolved in one litre of distilled water, a quantity of the ingredient equal to its molecular weight in grams. A normal sodium hydrate solution, for instance, contains 40 grams of sodium hydrate to one litre of water ($\text{Na} + \text{O} + \text{H} = 23 + 16 + 1 = 40$); a normal HCl solution, 36.5 grams to the litre ($\text{H} + \text{Cl} = 35.5 + 1 = 36.5$). A decinormal solution contains, naturally, a tenth part of a normal solution. Therefore, one litre of a decinormal NaOH solution contains 4 grams of sodium hydrate, and one litre of a decinormal HCl contains 3.65 grams of HCl; it follows therefore that:

1 c.c. decinormal NaOH contains 4 milligrams = 0.004 NaOH.

1 c.c. decinormal HCl contains 3.65 milligrams = 0.00365 HCl.

One c.c. of decinormal HCl solution should exactly neutralize 1 c.c. decinormal NaOH solution.

To prepare the decinormal solution in the best manner, the examiner should himself place 10 c.c. of a normal solution in a graduated beaker and dilute with distilled water to 100 c.c.

The examiner should now fill a 50 c.c. burette with a decinormal hydrate solution and titrate the filtered stomach-contents as follows:

Five c.c. of filtered stomach-contents should be placed in a beaker or large test-tube. Two or three drops of a one per cent. alcoholic phenolphthalein solution should be used as an indicator. The decinormal sodium hydrate solution is now added, drop by drop, until the contents of the beaker remain a permanent red color. It should be remarked here that the

reading of the column of the decinormal NaOH solution in the graduated burette should always be made from the lowest point of the concavity of the fluid. The examiner should avoid shaking the beaker containing the stomach-contents; for if this were done too vigorously, a portion of the added alkali might be neutralized by the carbon dioxide of the air, which would be a source of error in the test.

Example.—If for the neutralization of 5 c.c. of gastric juice, 3 c.c. of decinormal NaOH solution were required, the fluid level in the graduated burette would be lowered from 16.5 to 13.5. For the neutralization of 100 c.c. of gastric juice, twenty times as much decinormal solution would be needed; therefore, 60 c.c. of decinormal NaOH. The total acidity (T. A.) has been generally accepted as representing the amount of decinormal NaOH solution required to neutralize 100 c.c. of gastric juice. In our example, therefore, 100 c.c. of gastric juice contains as much acid as 60 c.c. of decinormal NaOH will neutralize.

The total acidity of the test-breakfast is the sum of the following four factors:

1. Free hydrochloric acid.
2. Combined hydrochloric acid.
3. Acid phosphates.
4. Traces of organic acids (CO₂, lactic acid, acetic acid, butyric acid, etc.).

The total acidity does not express, therefore, the percentage of hydrochloric acid in the gastric juice, but merely the degree of acidity of the latter. To determine in a given case the proportion of free and of combined hydrochloric acid, it is necessary to deduct from the total acidity the sum of the acid phosphates and the organic acids.

The acid phosphate and organic acid present in the test-breakfast amount, on an average, to from 4 to 8; but in conditions which cause stasis of food in the stomach, to considerably more.

If, for example, the total acidity of the gastric juice is 50, then the sum of the free and the combined hydrochloric acid would be $50 - 6 = 44$; that is to say, 100 c.c. of the gastric juice in such a case holds exactly as much HCl as is contained in 44 c.c. of decinormal HCl solution. Therefore, 44×0.00365 gram of HCl = 0.01606 gram HCl, or (since 100 c.c. = 100 grams) = 0.1606 per cent. = 1.606 per mille.

Another Example.—

The total acidity of the filtrate	= 68
The total phosphates and the organic acids	= 6
	62HCl

The difference represents HCl, which is 62.

Therefore, 62×0.00365 gram of HCl in 100 c.c. of gastric juice = 0.2263 per cent. = 2.263 per mille HCl.

By common agreement, the total acidity of the test-meal is indicated in clinical records of cases by the number of cubic centimetres of decinormal NaOH solution required to neutralize 100 c.c. of gastric juice, rather than in percentages of acidity.

It is proper to mention here that values of 40 to 65 in the Boas-Ewald test-breakfast (about 60 grams of white bread and 400 c.c. of water) constitute normal acidity; more than 65 is considered hyperacidity of the gastric juice; and under 40, subacidity.

Although the physician might approximately estimate the total acidity by noting whether the congo reaction is positive or negative, weak or strong; yet it is more exact in the qualitative and quantitative examinations of the gastric juice to determine accurately the different component parts of which the total acidity of the gastric juice is composed.

Töpfer's Method.—By this method the total acidity, the free hydrochloric acid, and the combined hydrochloric acid, are determined in the following manner:

1. The total acidity is determined, as previously described, by using phenolphthalein as an indicator.

2. Free HCl is estimated by the same procedure, using as an indicator two or three drops of a one-half per cent. alcoholic solution of dimethyl-amidoazobenzol, a coloring matter which, in the presence of free HCl, appears yellow. The decinormal NaOH solution is added to the gastric juice, drop by drop, until the solution is permanently yellow. Reckoning on the basis of 100 c.c. of gastric juice, the number of c.c. of decinormal NaOH solution used denotes as much free HCl as is present in the specimen.

3. The combined HCl is titrated with the use of two or three drops of a one per cent. aqueous solution of alizarin [sodium alizarin sulphonate] as an indicator. Alizarin is a red-violet pigment which turns to yellow all acid factors of the gastric juice, with the exception of combined HCl, which

is immune to this transformation. The alizarin value represents, therefore, the sum of all acid values of the gastric juice, except that of combined HCl. To ascertain the value of combined HCl, the examiner must subtract the alizarin value from the total acidity of the specimen.

*Example of an Examination of the Stomach-Contents
by Töpfer's Method*

1. The patient, Mr. Müller, was given the Boas-Ewald test-breakfast, consisting of from 60 to 70 grams of bread and 400 c.c. of water. After one hour, this was removed from the stomach. It was easily obtained and was well digested. It settled in two layers. The lower, in the bottom of the glass, was a fine, flaky, crumbly mass of bread. The upper layer was a somewhat opaque fluid, upon which floated small quantities of sputum, saliva and mucus. On pouring the gastric contents from one glass into another, it was noted that very little mucus was present, also that it was not tenacious, the fluid contents leaving the glass drop by drop. The odor of the test-breakfast was sour, but not offensive. The macroscopic examination did not reveal the presence of blood, pus, fibres of meat, or remnants of vegetables. Congo paper, brought into contact with the stomach-contents, turned sky-blue.

Titration gave the following values:

1. Total acidity (phenolphthalein as an indicator)	= 60
2. Free HCl (dimethylamidoazobenzol as an indicator)	= 36
3. Combined HCl (alizarin as an indicator)	= 20
4. Sum of free and combined HCl (36 + 20)	<u> = 56</u>
5. The remaining acids, consisting of acid phosphates and organic acids (60 — 56)	= 4

The examination gave, therefore, the quantitative value of each component part of the gastric juice. If the percentage of HCl is desired, the HCl value should be multiplied by 0.00365; therefore $56 \times 0.00365 = 0.204$ per cent. = 2.04 per mille HCl.

2. Patient, Mr. S. Diagnosis: Atrophic Gastritis.

One hour after eating the Boas-Ewald test-meal, the stomach-contents were removed, but with considerable difficulty, as they were quite thick. The upper layer of gastric juice, which normally is present, was lacking. The specimen contained mucus and traces of fresh blood. None of the food eaten by the patient on the previous day was found in the stomach. The odor of the stomach-contents was that of bread-pap. The test with congo paper was negative. The total acidity was 10. Töpfer's method was not adaptable, because there was no free HCl present.

Clinical Significance of HCl.—As already mentioned, the normal total acidity of the Boas-Ewald test-breakfast is from 40 to 65. In hyperchlorhydria, the acidity amounts to from 65 to 120. After the test-dinner, the acidity is even higher.

Gastric juice, the total acidity of which is under 20, does not react positively to congo paper, since, as a rule, no free hydrochloric acid is present. The above values are constant because the bread of the Boas-Ewald test-breakfast contains a nearly constant percentage of albumen.

The absence of free hydrochloric acid from the gastric juice is spoken of as "anacidity." This is not logical, since combined hydrochloric acid may still be present. The total acidity is never below 5 or 6, because the Boas-Ewald test-breakfast always contains traces of acid phosphates and of organic acids. The total acidity of the gastric juice, when in excess of 8, indicates that the gastric mucous membrane has not lost its secretory function.

The physician may nearly always assume that atrophy of the gastric glands has occurred if the total acidity does not exceed from 5 to 8. He may also assume the presence of an interstitial gastritis which has not yet led to atrophy when the total acidity amounts to from 10 to 15, and when traces of hydrochloric acid are present.

When the total acidity exceeds 16, and in those cases of subacidity in which free hydrochloric acid is secreted in quantities as high as from 20 to 24, the existence of a simple gastric catarrh or of a gastric neurosis may be indicated, as either of these affections may be associated with subacidity or anacidity.

Ferment-Tests.—When the stomach-contents show an absence of free hydrochloric acid, and when the total acidity is 20 or less, it is desirable to determine quantitatively the ferments of the stomach, since this procedure furnishes a valuable diagnostic differentiation between neuroses of the stomach and gastritis.

The quantitative test need be made in those cases only in which anacidity exists. It is superfluous and therefore absurd to examine the gastric juice for

the presence of ferments when the normal amount or an excess of hydrochloric acid is secreted, for in these cases the quantitative estimation of the ferments of the gastric juice is of scientific value only.

As a working rule, it may be said that the amount of the gastric ferments—rennin and pepsin—corresponds with the amount of hydrochloric acid secreted.

In general work, an exact determination of the total acidity of the gastric juice will enable the examiner to estimate with sufficient accuracy the amount of ferments present, provided, of course, he always uses the same test-breakfast.

Rennin-Test.—The q u a l i t a t i v e examination of rennin has but little diagnostic value. On this account, I always use Boas' quantitative test for rennin in cases where there is an anacid gastric juice. This test depends upon the dilution-principle and shows the degree to which the gastric juice can be diluted without losing its property of coagulating milk. Boas neutralizes the gastric juice before making the test. I consider this unnecessary for two reasons: first, because only anacid gastric juice is examined; and second, because the gastric juice, being poor in acids, becomes so weakened by dilution that its ability to coagulate milk is completely lost. (The fear of this is the reason some authors neutralize the gastric filtrate.) I prefer, in performing the test, to use test-tubes and a water-bath heated to 40° C. [102° F.], rather than beakers and an incubator. The details of the rennin-test are as follows:

The examiner should, with a pipette, introduce 1 c.c. of the gastric juice into a graduated cylinder of 10 c.c. capacity. The cylinder should then be filled with tap-water to the 10 c.c. mark. This mixture should be shaken several times, and half of it should then be poured from the graduated cylinder into a test-tube, which should be marked "1 to 10" with a wax pencil, and should then be set aside. The examiner should now add water to the 5 c.c. which remain in the graduated cylinder until it again reaches the 10 c.c. mark and should mix the solution by inverting the cylinder several times, as before. Five c.c. of the contents of the graduated cylinder should again be poured into a second test-tube marked "1 to 20." The dilution of the original 1 c.c. of the gastric juice should be repeated

several times in like manner, and the test-tubes containing the respective dilutions should be marked "1 to 40," "1 to 80," "1 to 160," "1 to 320," etc. The examiner should then add to each test-tube 5 c.c. of boiled [or raw] milk and $2\frac{1}{2}$ c.c. of a one per cent. calcium chloride solution. After the contents of each test-tube are properly mixed by shaking, the test-tubes containing the specimens should be placed in the water-bath, which has been heated to 40° C. [102° F.]. It is usually best to use a control specimen of only milk and calcium chloride solution in the same proportions in which they are used in the test-tubes containing the specimens. This control specimen should remain uncoagulated. Normally, the milk in the test-tube which is marked "1 to 160" should show a firm, cake-like coagulation; and the next specimen, which is marked "1 to 320," should show a fine, flaky coagulation. All the preceding dilutions should show a solid, cake-like coagulation. The examiner should discriminate between strong, or cake-like coagulation, and weak, or flaky coagulation. In higher dilutions than the above, except in cases of hypersecretion of gastric juice, coagulation of the milk does not occur. In hypersecretion, coagulation has been obtained in a dilution of 1 to 800.

Since the examiner can easily prepare a water-bath in any home, and since the entire procedure requires, at most, fifteen minutes, this test is very suitable to general practice.

The clinical value of the rennin-test is as follows:

If the examiner finds normal rennin-activity in a case in which the gastric juice is anacid, he may conclude, as a rule, that the cause of the anacidity is a gastric neurosis. The prognosis is good in such a case, as it is probable that the secretion of hydrochloric acid will return. If the secretion of rennin is diminished,—for instance, when coagulation does not occur in a specimen which is diluted 1 to 100,—catarrhal gastritis is generally present. Here, also the prognosis may be favorable, as the secretion of hydrochloric acid will again be established by rational treatment. (See Special Section.)

If, on the other hand, the examiner finds an absence of rennin-activity in the specimens or if, at best, a positive reaction is obtained only when the dilution is as low as 1 to 10, he should always assume that total atrophy of the glandular structures of the stomach is present. If he finds a positive test only in a dilution of 1 to 20 or 1 to 40, a diagnosis of interstitial gastritis may generally be made.

It should be mentioned here that rennin is not always secreted as an active ferment, but that it is secreted from the mucosa as an active lab-enzyme, which is transformed into the active rennin-ferment by the action of hydrochloric acid.

The calcium chloride solution exerts practically the same influence upon the lab-enzyme as does hydrochloric acid. Although this transformation of the lab-enzyme into rennin by the action of the calcium chloride is not positively proven, the fact nevertheless remains that the examiner can conveniently measure the milk-coagulating power of the gastric juice by this method.

To prove that the coagulation of the milk was not caused by traces of combined hydrochloric acid, which might still be present in the diluted specimens, the following test should be made:

The examiner should prepare two test-specimens of gastric juice, each of which is diluted 1 to 100. One of these is then boiled. The examiner should then add 5 c.c. of milk and 2½ c.c. of one per cent. calcium chloride solution to each specimen, after which he should place them in a water-bath or incubator, heated to 40° C. [102° F.]. The boiled specimen will remain uncoagulated, because the rennin-ferment is destroyed by boiling; while the unboiled specimen will be coagulated within a few moments.

In benign gastritis, provided total atrophy of the glands of the mucous membrane has not yet occurred, it will be found that with improvement of the condition there will be an increase in the production of rennin and hydrochloric acid. In malignancy, on the other hand, it will be found that the production of rennin will gradually sink to nil.

Pepsin-Test.—Although a carefully performed rennin-test renders it unnecessary to make the pepsin-test, the latter should, nevertheless, be described, for the reason that in many cases it is the deciding factor as to whether a malignant affection is present: and after treatment for a period, an increase or a decrease in the secretion of pepsin has the same significance as an increase or diminution of rennin-activity in indicating whether the anacidity in a suspicious case is caused by a malignant disease or by a simple inflammatory affection.

There are several tests for the quantitative estimation of pepsin, such as the methods of Oppler, Mette and Ham-

merschlag,—the simplest and most practical, in my opinion, being that of Hammerschlag, which is performed as follows:

The examiner should have on hand a one per cent. solution of albumin which contains about 4 per mille of hydrochloric acid. Experience has taught me that this is most easily prepared in the following manner:

To make $\frac{1}{4}$ litre of Hammerschlag's solution, I use:

1. 30 to 35 c.c. of fresh white of eggs.
2. 4 c.c. of concentrated hydrochloric acid.
3. 250 c.c. of tap-water.

This solution should be renewed every two or three weeks, because the amount of albumin gradually decreases through decomposition. Hammerschlag uses dry egg-albumin, which, in my opinion, is not so convenient as the above.

The examiner should place the 30 c.c. of egg-albumin in an open glass receiver and should then add the HCl solution slowly while stirring. (The HCl solution is easily prepared by mixing 4 c.c. of the concentrated 25 per cent. HCl with 250 c.c. of tap-water.) The mixture should then be filtered through a linen cloth properly arranged in a funnel. The entire procedure should not require more than 5 to 10 minutes. In case the examiner does not use this test frequently, it is needless to keep more than one-quarter of a litre of Hammerschlag's solution on hand. The preparation of a full litre of the solution naturally requires four times the indicated amounts of the ingredients; that is to say, 1000 c.c. of tap-water, 120 to 140 c.c. of egg-albumin and 16 c.c. of concentrated hydrochloric acid.

The technic of the pepsin-test should be as follows:

Five c.c. of the gastric juice should be placed in a test-tube, which is appropriately marked with a wax pencil; 5 c.c. of tap-water should be placed in a second test-tube [which is marked "W"]; 10 c.c. of Hammerschlag's solution should then be added to each test-tube. If necessary, the examiner may carry on several albumin-tests simultaneously. The specimens should now be placed in an ordinary drinking-glass containing water at a temperature of 38° to 40° C. [98° to 102° F.], and then placed in a water-bath or an incubator, which should be kept at a temperature of 38° to 40° C. [98° to 102° F.], by means of a small gas flame, or by the addition of hot water.

The specimens should remain in the incubator or water-bath exactly one hour. Should they be placed in the incubator or water-bath immediately, a considerable space of time would elapse before the specimens could reach the temperature at which digestion occurs. To avoid inaccuracy in the test, therefore, the examiner should place the specimens already heated, as

above directed, in the incubator or water-bath. After one hour, the specimens should be removed and immediately placed in cold water for two or three minutes to interrupt pepsin-digestion. The examiner should now take two Esbach tubes, one of which is to be marked with the name of the patient and the other with the letter "W" (water), and should fill these with the respective specimens up to the letter "U." The remainder of the specimens may be thrown away. The Esbach tubes should then be filled up to the mark "R" with Esbach's reagent, then shaken well, closed with rubber corks, and put aside to stand for twenty-four hours. After this time has elapsed, the examiner should note the height of the albumin-column in each tube.

Example.—If the column in the Esbach tube which contains the gastric juice stands, for instance, at 1 per mille, and in the tube containing the water, at 5 per mille, there would necessarily be 4 per mille of the 5 per mille of the albumin peptonized, that is, $\frac{4}{5}$ digested, which equals 80 per cent.

The examiner should enter in the clinical record of the patient, therefore, that the pepsin-digestion, according to Hammerschlag, is 80 per cent.

Second Example.—In a case of hyperchlorhydria, the column of albumin in the tube containing the gastric juice was $\frac{1}{2}$ per mille; the tube containing the water was 6 per mille. Therefore, $5\frac{1}{2}$ per mille was peptonized; or out of 12 parts, 11 parts were digested, therefore, $\frac{11}{12}$ digested, or 91 $\frac{1}{2}$ per cent.

According to Hammerschlag, normal pepsin-digestion is from 70 to 80 per cent.; in hyperchlorhydria, 90 per cent.; while in cases of subacidity or anacidity, there are values as low as 10 per cent., or even smaller.

As a rule, the intensity of pepsin-digestion corresponds to the amounts of hydrochloric acid and rennin secreted by the gastric juice. When there is normal acidity or hyperacidity, the tube which contains the gastric juice is usually cloudy, because the albumin of the gastric juice remains in suspension, since it is not affected by Esbach's reagent and is not precipitated as a sediment.

In general work, the pepsin-test is employed only in cases of subacidity or anacidity. From the practical standpoint the rennin-test suffices, however, when there is anacidity of the test-breakfast; but it is advisable to perform Hammerschlag's pepsin-test to demonstrate the presence or absence of the peptonization of food in cases in which there is stagnation of the contents of the stomach, in order to assist in making a diagnosis of the nature of the lesion.

The following table indicates the corresponding amounts of hydrochloric acid, rennin, and pepsin, in the various organic diseases of the stomach:

	Atrophy.	Interstitial Gastritis.	Simple Catarrh.	Subacidity.	Hyperchlorhydria.
Total Acidity	5-6	6-12	14-20	25-40	70-100
Rennin	1-1 to 1-10	1-10 to 1-40	1-80 to 1-160	1-200	1-200 to 1-800
Pepsin	0-5	10-25	30-60	70-80	90-98

Motility Tests.—*Test-dinner*: To test the motility of the stomach, the Riegel test-meal is sufficient. This consists of a plate of soup, 150 grams of beefsteak, a roll of bread, a small dish of potato-purée, some stewed fruit and one glass of water. Seven hours after the meal, the stomach should be washed out. It will be found empty if the motility is normal. If remnants of food are present, there exists a weakness of the muscles of the stomach, the so-called *atonia ventriculi*, and sometimes also hypersecretion of the gastric juice.

Test-supper: To test gross motor disturbances I use a combination of the methods of Boas and Strauss. About 8 o'clock in the evening, the patient should eat a plate of porridge, cooked with rice or raisins, and one or two slices of bread and butter. The next morning before breakfast, or about twelve hours after eating, the stomach of the patient should be lavaged. A gross disturbance of the gastric motility is present if remnants of food are found, for instance, rice or raisins, which are easily recognized macroscopically. Such a disturbance is usually caused by some mechanical obstruction at the outlet of the stomach, the nature of which will be considered later in detail. It need scarcely be mentioned that the examiner will be obliged to make use of the microscope to recognize food-remnants in the sediment of the lavage-water, when only minimal amounts of food are retained.

The Remnant-Test of Mathieu-Rémond.—This test is used to detect the milder disturbances of motility and to ascer-

tain the results of treatment in such cases. I do not discharge from my clinic any patient suffering from dilatation of the stomach until the remnant-test has shown an approximately normal motility of the stomach.

The test is made as follows:

Exactly one hour after the Boas-Ewald test-breakfast, the examiner should remove a portion of the stomach-contents, "a," with an ordinary stomach-tube. The portion remaining in the stomach is the unknown quantity and is designated "x." To determine "x," the physician should dilute the unknown quantity, "x," with a known quantity of water, "q," which should be introduced into the stomach through the stomach-tube and mixed thoroughly with "x," according to the following equation:

$$a_1 : a_2 = x + q : x,$$

i.e., the first acidity, "a₁" (before the mixture with "q," therefore, the acidity of "a," since "a" and "x" have the same acidity), is inversely proportionate to the second acidity, "a₂" (after the mixture with "q"), as the respective quantities are proportionate to each other, because the acidity of "a₂" is as much smaller than the acidity of "a₁" as the addition of water, "q," is larger. The formula, therefore, is:

$$x = \frac{a_2 \times q}{a_1 - a_2}.$$

Example.—45 c.c. of stomach-contents (a) are removed one hour after the test-breakfast, the total acidity of which is 60 (a₁). The acidity of the portion remaining in the stomach after mixing with 400 c.c. of water is found to be 18 (a₂). Therefore,

$$x = \frac{18 \times 400}{60 - 18} = 216.$$

In normal acidity, the total remnants of the Boas-Ewald test-breakfast amount to from 180 to 200 c.c.; in *achylia gastrica*, to about 120 c.c.; in atony and in hypersecretion, to from 220 to 280 c.c.; and in motor insufficiency of the stomach, to from 300 to 400 and over.

Microscopical Examination of the Stomach-Contents.—This examination, which is very important in diagnosis, must

be made exclusively with fresh unstained material obtained from the fasting stomach. Although the examination of the test-breakfast reveals only starch-granules, and now and then some yeast-cells, squamous epithelium and swallowed sputum, all of which are of no diagnostic value, the examination of the contents of the *fasting* stomach is of the utmost importance.

FIG. 10.



K, free nuclei; *Sp*, spirals; *Sch*, mucus; *H*, yeast-cells; *E*, epithelium; *AE*, alveolar epithelium.

The examiner must distinguish between:

A. Contents obtained from the fasting stomach with no food-remnants present.

1. When hydrochloric acid is present.
2. When hydrochloric acid is absent.

B. Contents obtained from the fasting stomach when food-remnants are present.

3. When hydrochloric acid is present.
4. When no hydrochloric, but lactic acid, is present.

1. The contents obtained from the fasting stomach which contain hydrochloric acid, but no food-remnants (see Fig. 10):

All of the cell-bodies are digested except the nuclei of leucocytes and epithelia, which the examiner will recognize as free, or so-called Jaworski's nuclei.

The mucus is streaked.

The so-called myelin, which is converted into spirals by the action of the gastric juice, is seen in the sputum which is almost always present in the gastric contents, and easily recognized by its light gray color.

Myelin spirals, mucous threads and free nuclei are evidence, therefore, of the presence of hydrochloric acid and pepsin in the gastric juice, since they cannot occur unless these are present. Lactic acid cannot be responsible for producing these changes, because it is present only when associated with stagnation of the stomach-contents. The

FIG. 11.



E, epithelium; *L*, leucocytes; *RB*, red blood-cells; *F*, fat-cells.

above-mentioned findings occur, therefore, in the gastric contents obtained from normal stomachs, as well as in gastric neuroses and in hypersecretion.

2. Contents from the fasting stomach which contain no hydrochloric acid nor food (see Fig. 11):

In simple gastritis and in *achylia gastrica*, the examiner will often find an alkaline reaction of the material removed from the fasting stomach. The microscopical examination shows the presence of a large number of unchanged epithelia and at times, also, of amœbæ and infusoria.

In addition to the above, if the examiner finds blood, or a large amount of pus, either in isolated clumps or mixed with the epithelial cells of the gastric mucosa, he should

suspect the presence of a malignant process. Infusoria, likewise, when found combined with alkaline stomach-contents, are nearly always a sign of cancer of the stomach.

Leucocytes, as such, do not indicate carcinoma. The source of white blood-cells can be determined only from their association with other cells. Leucocytes originating in the sputum are surrounded by alveolar epithelium and myelin droplets. Leucocytes from the mouth are surrounded by squamous epithelium; those originating in the stomach, by columnar epithelium.

3. Contents obtained from the fasting stomach which contain food-remnants and hydrochloric acid:

FIG. 12.



St, starch-cells; *H*, yeast-cells; *Sa*, sarcinae; *M*, muscle-fibres; *F*, fat-balls and droplets; *K*, potato-starch cells.

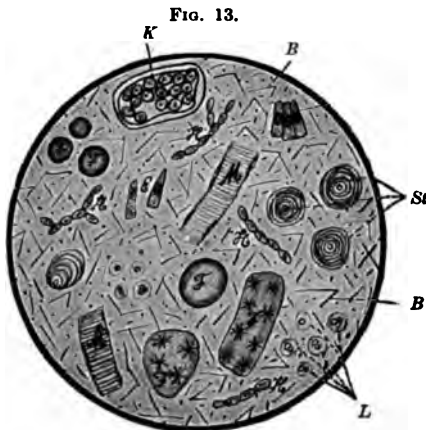
Even macroscopically, the different kinds of food,—such as meats, fruits, and vegetables,—will be easily recognized. The microscopic examination shows at once whether hydrochloric acid is secreted by the following:

If either free or combined hydrochloric acid is present, the well-known sarcinae balls will be seen, provided that food-stasis is not acute. Sarcinae cannot develop unless stagnation of food has lasted two or three days.

Besides sarcinae, the examiner will usually find large numbers of yeast-cells and other fungi undergoing sporulation; otherwise, there are few micro-organisms. Constituents of stagnating foods, especially starch-granules, meat-fibres, fat-droplets, fat-balls, fatty-acid crystals, remnants of vege-

tables, all kinds of plant-fibres, chlorophyll and other plant-pigments, will be observed in the microscopic examination. Mucus, if present, is striped, as it always is when in an acid medium. (See Fig. 12.)

Stomach-contents which contain both hydrochloric acid and food are associated exclusively with obstruction of the pylorus, especially when the obstruction has caused a dilatation of the stomach. The obstruction is almost always of a benign nature. Sometimes it is caused by a carcinomatous degeneration of an ulcer of the pylorus. In these cases, the secretion of hydrochloric acid very often continues up to the time of the death of the patient. Such carcinomatous obstructions give the same chemical and microscopical findings as benign stenoses of the pylorus. They are differentiated clinically by the presence of a tumor and by the malignant course of the disease.



B, yeast-cells; *M*, muscle-fibres; *L*, leucocytes with shrunken nuclei; *B*, Oppler-Boas bacilli; *St*, starch-cells; *F*, fat; *E*, epithelium; *K*, potato-starch cells with yeast-cells.

Stagnation is often so slight that it can scarcely be recognized macroscopically. Only the microscope shows the presence of sarcinae and traces of food-remnants, and therefore a disturbance of the motility of the stomach, as a consequence of the narrowing of the stomach-outlet. Very often, besides sarcinae, only fat and starch are obtained from the fasting stomach, but no muscle-fibres. The absence of the latter is explained by the fact that the pepsin and hydrochloric acid of the gastric juice have digested the meat-fibres during the night.

4. Contents of the fasting stomach which contain remnants of food and lactic acid, but no hydrochloric acid:

These are microscopically characterized by the presence of immense numbers of bacilli, which will be at once detected by the examiner as filling the spaces of the microscopic field between the individual particles of food. These are the well-known Oppler-Boas lactic-acid bacilli. (See Fig. 13.) Sarcinæ do not develop under conditions that favor the formation of lactic acid, or very little when a slight secretion of hydrochloric acid still remains. Otherwise, the examiner will find exactly such remnants of food as occur in stasis when hydrochloric acid is present. It is unnecessary, therefore, to repeat the details of the microscopical findings. (See Fig. 13.)

The Oppler-Boas bacilli are the microscopical evidence of lactic acid fermentation, which occurs only under the following conditions:

1. If there is total atrophy of the gastric glands.
2. If there is stagnation of the ingesta.

Since experience teaches that the latter occurs almost exclusively in carcinoma of the pylorus, the presence of lactic-acid bacilli indicates to the highest degree the probability of a malignant stenosis of the pylorus.

There is one exception only when the Oppler-Boas bacilli occur in the absence of carcinoma, and that is in hypertrophic stenosis of the pylorus, the so-called *cirrhosis pylori*, which is the result of an atrophic gastritis with inflammatory hypertrophy of the pyloric musculature. This is only rarely observed, so that from a practical standpoint it scarcely ever comes under consideration, and it is differentiated from carcinoma of the pylorus only through prolonged clinical observation. (See Special Section.)

Examination for Blood.—Aloin-Test: If the microscope shows the absence of red corpuscles, the examiner should make a chemical examination for blood in the following manner:

Ten c.c. of the stomach-contents should be placed in a test-tube, one-third as much acetic acid added, *i.e.*, 3 to 4 c.c., and 6 to 8 c.c. of ether. The mixture should be thoroughly shaken and set aside to allow the ether to separate in an upper layer. To the ether layer the examiner should then add 30 drops of H_2O_2 , and 10 to 15 drops of freshly prepared alcoholic solution of aloin (a knife-point of aloin added to 6 to 8 c.c. of alcohol). In the presence of hæmoglobin, a strawberry-red color appears immediately, or within a short time. Boas considers this test to be of especial significance in supposed cases of cancer. [See Benzidin-test for occult blood, page 252.]

Final Remarks.—Besides the methods described above, there are quite a number of delicate procedures for testing the absorption and secretion of the stomach and intestines, and also for ascertaining the intensity of pain and the sensitiveness to pressure in the various diseases of the digestive tract. Unfortunately, the limited space of this book does not permit a description of them.

Technic, Indications and Contraindications in the Use of the Stomach-Tube

The soft-rubber stomach-tube is used almost exclusively at the present time,—the hard-rubber tube being reserved for lavage of the stomach in a comatose condition, as after poisoning. The soft tube should have, near its lower extremity, one or two lateral openings, as large as possible, but there should be no opening in the end of the tube, because of the danger of injuring the mucous membrane of the stomach with its sharp edges. The stomach-tube should possess as large a lumen as possible, but its walls should not be too thick. For the removal of the test-breakfast, a large stomach-tube, No. 9 to No. 11 [American No. 21–No. 23], should be used for adults; size No. 8 [American No. 16–No. 18], for children; and a Nélaton catheter for babies.

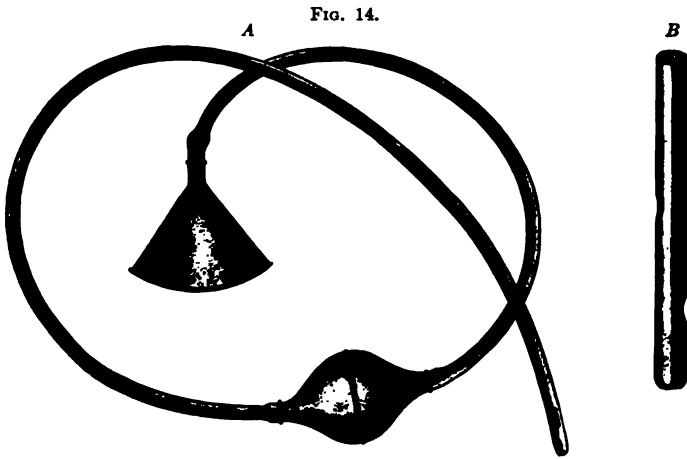
To obtain the test-breakfast by the “expression-method,” the examiner should follow three procedures:

1. The physician should stand at the right side of or behind the patient, like a dentist (see Fig. 16), and with the left arm should hold the patient’s head to prevent him from jerking it backwards, and should then introduce the tube backward to the epiglottis with a quick push. It is unnecessary to press the patient’s tongue down with a finger of the other hand. This is required only if the tongue is very thick and if the pharynx is greatly swollen, or if the patient has a very thick crista at the posterior pharyngeal wall, which narrows the œsophageal opening.

2. When the point of the sound has reached the epiglottis, the physician should ask the patient to close his mouth without bringing the teeth together, and, at the same time, to swallow, which the patient will be able to do when his mouth is closed. At the moment of swallowing, the physician should push the tube over the closed epiglottis into the œsophagus and, as quickly as possible, into the stomach, meanwhile requiring the patient to breathe deeply through the mouth.

(A procedure which has been recently suggested by Moos, of Regensburg, is very often found helpful. The patient should be instructed to take a mouthful of water, and after the physician has introduced the stomach-tube into the mouth, he should request the patient to swallow the water. At the same moment the physician should push the tube, with a slight pressure, over the epiglottis into the œsophagus. Although the gastric juice is slightly diluted by this procedure, the error is so small that it is of scarcely any importance. I have succeeded in introducing the stomach-tube many times in this way.)

3. When the tube has entered the stomach, the physician should tell the patient to press down, as when at stool. By carefully moving the tube up and down, vomiting will be induced from the irritating effect upon the gastric mucous membrane. During this procedure the patient should lean forward.



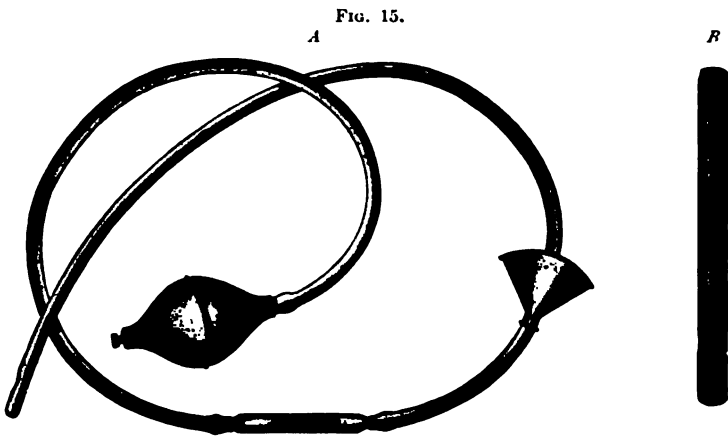
A, American stomach-tube; B, Riegel's stomach-tube.

In cases where the gastric juice has a normal acidity, or a hyperacidity, the physician will very easily obtain the necessary amount of stomach-contents for examination. On the other hand, this is often very difficult in those cases of gastritis in which there is a deficiency of gastric secretion.

Even if nothing is obtained from the stomach one hour after the test-breakfast by this simple "expression-method" of Boas-Ewald, it is a mistake to assume that the meal has passed into the intestine. The examiner should, in such a case, connect a glass funnel with the stomach-tube and wash out the stomach. He will in this way readily prove that often, in cases of *achylia gastrica* considerable amounts, even up to 120 c.c., of the test-breakfast are still present in the stomach.

This method of introducing the stomach-tube has given me the best results, but I admit that many other methods have been used with equal success. Some examiners, for instance, stand directly in front of the patient and introduce the first finger of the left hand into the mouth, for the purpose of directing the tube to the posterior pharyngeal wall. Others resort to the use of the rubber-bulb aspirator when the stomach-contents are not expelled by the straining and efforts of the patient.

Finally, it must be mentioned that the patient should never bend his head forward or backward on the neck while the stomach-tube is being used, but should sit slightly forward, as in eating. Most patients have the tendency to bend the head backward at the very sight of the stomach-tube. In order to prevent



A, Modified Jacques stomach-tube; B, Ewald's stomach-tube.

this, I generally hold the head of the patient with the entire left arm, and, at the same time, bend him slightly forward.

When hard bougies are being introduced into the œsophagus, the patient must, on the contrary, bend the head backwards as far as he can, in order to make the passage-way from the incisors to the diseased portion of the œsophagus as straight as possible.

Indications.—The stomach-tube should be used for diagnostic purposes whenever it is necessary to determine, in chronic cases, whether an organic or a functional nervous affection exists. In cases where the anamnesis and the physical

examination have clearly established the diagnosis, the stomach-tube need not be used.

For therapeutic purposes, the stomach-tube is rarely used at the present time. It is almost exclusively limited to lavage of the stomach when stagnation of food has resulted from obstruction

FIG. 16.



Method of introducing the stomach-tube.

at the pylorus. Now and then the use of the stomach-tube is resorted to for its psychical effect in neuroses of the stomach, such as hysterical vomiting, nervous eructation, nervous anorexia, etc.

Contraindications.—The stomach-tube should never be used in cases of recent ulcer, especially chlorotic ulcers, or in aortic aneurism, *habitus apoplecticus* [advanced tuberculosis, heart affections, old age].

[During menstruation, the tests for gastric secretion may yield results which vary considerably from those obtained at other times.]

Laboratory Apparatus

The equipment of a laboratory for diagnostic and therapeutic uses in diseases of the stomach and intestines, should consist, if possible, of the following:

1. A number of stomach-tubes of different sizes, and from 70 to 90 cm. in length, of red patent-rubber (Jacques Patent), with a blind extremity and two lateral openings.
2. Two glass funnels, each having a capacity of one-half litre, and provided with a half-metre of rubber tubing, and also a piece of glass tube to connect with the stomach- or colon-tube for lavage and irrigation.
3. Some Naunyn rectal-tubes, constructed just as the stomach-tubes. They should be 25 cm. long, and the distal end of each should be enlarged like a funnel.
4. A number of bougies, and a Trousseau's knob-headed sound, for use in diseases of the œsophagus. It is also well to have coin- and bone-forceps.
5. A stomach-electrode (a stomach-tube, the lower end of which is perforated like a sieve and which contains in the interior of the tube a spiral of wire, for connection with one pole of an electric battery).
6. An intestinal electrode of the same construction.
7. A faradic and a galvanic apparatus, with two plate-electrodes about 150 cm. square, which may be applied to the epigastrium or the back of the patient.
8. A burette-stand with two graduated burettes,—one with a rubber faucet attached for decinormal NaOH solution, the other with a glass stop-cock for decinormal HCl solution.
9. A pipette-stand, with different pipettes of 1, 5, and 10 c.c. capacity.
10. Several graduates of 10, 50, 100 and 250 c.c. capacity.
11. One dozen glass beakers of about 30 c.c. capacity, for use in titrating specimens.

12. A reagent stand and a wooden shelf for glassware.
13. A microscope with suitable objectives; cover-glasses, forceps, and teasing-needles.
14. The necessary chemical reagents, such as solutions of phenolphthalein, alizarin, aloin, congo paper, etc., besides the chemical reagents used in the examination of the urine.
15. A water-bath or an incubator, and a Bunsen burner.
16. A Rosenheim œsophagoscope.
17. A rectoscope (Herzstein or Strauss) of two or three different lengths.
18. A battery with cable and a Casper's electroscope.
19. Einhorn's gastrodiaphane.
20. Bougies for use in rectal stenosis.
21. Small glass funnels, filter-paper, and litmus-paper.
22. A pair of scales and a measure graded in centimetres, for use in weighing patients and taking their measurements.
23. A clinical case-record.
24. A good library, for which the following works are to be recommended:
 - Ewald: "Diseases of Digestion."
 - Boas: "Diagnosis and Therapy of the Diseases of Digestion."
 - Rosenheim: "Pathology and Therapy of the Diseases of the Stomach and Intestines."
 - Riegel: "Diseases of the Stomach."
 - Nothnagel: "Diseases of the Intestines."
 - Schmidt and Strassburger: "Examinations of the Feces."
 - Herz: "The Stomach and its Relation to Other Organs of the Body."
 - Wegele: "The Dietetic Treatment of the Diseases of the Stomach and Intestines."
 - [Gautier: "Diet and Dietetics."
 - Pawlow: "The Work of the Digestive Glands."
 - Modern Clinical Medicine: "Diseases of the Digestive System."
 - Starling: "Recent Advances in the Physiology of Digestion."]

Skiagraphy

[The application of the X-rays to the study of abnormalities of the digestive canal marks an important advance in gastro-enterology. Both the fluoroscope and the photograph X-ray plate are serviceable. The fluoroscope is adapted to observing the peristaltic function of the œsophagus, stomach, and intestine; while the photographic plate obtains better results as to the size, shape, and position of the abdominal organs.

With a properly equipped X-ray apparatus, the following methods of study may be applied to the digestive canal:

œsophagus. - If the patient swallows a capsule of bismuth the peristalsis of the œsophagus may be observed with the fluoroscope. Normally the capsule will pause for a second or two at the arch of the aorta and then pass quickly into the stomach. Should the capsule lodge anywhere in the course of the œsophagus, the existence of stenosis is suspected. A steady but slow progress of the capsule through the gullet, occupying more than twenty or thirty seconds before reaching the stomach, is suggestive of impairment in the motor power of the œsophagus.

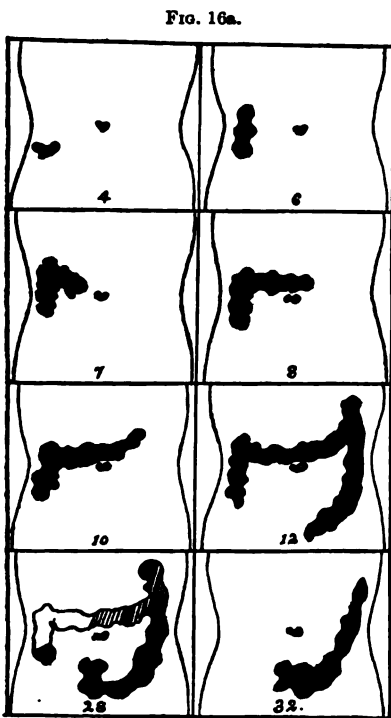
To determine the position, size, and shape of diverticuli and dilatations, the X-ray plate should be used and the patient given a bismuth mixture.

Mucilage of acacia is the best vehicle in which to give bismuth. It adheres to the œsophageal wall and can be readily washed out. A half ounce of bismuth subcarbonate is mixed with the acacia and drunk by the patient immediately before taking the exposure.

Stomach.—For the radiographic examination of the stomach it is essential that the organ be empty of food. The patient should be in the standing position, especially if it is desired to determine the size of the stomach, the degree of ptosis present, or the relation of the stomach to other organs. A coin fastened over the umbilicus with adhesive tape serves as a useful landmark. An ounce of bismuth subcarbonate, preferably suspended in acacia, or admixed with apple-sauce,

or given in milk, and taken a few minutes before the exposure, will give an outline of the greater and lesser curvatures and pyloric region of the stomach.

Intestine.—To obtain pictures of the intestines, sufficient time must be allowed for the bismuth mixture to reach any given part of the canal. The accompanying diagrams, adapted from Hertz,* portray the normal rate of peristalsis in different parts of the intestinal tract.



Series of colon skiagrams in a normal individual. The numbers represent the hours after a bismuth meal was taken.

Radiography has proved of greater use in the diagnosis of abnormalities of the colon than of any other portion of the intestine. As in the X-ray examination of the stomach, a better idea of the anatomical relations of the colon to other organs is obtained if the negative is made with the patient standing. The same bismuth meal will serve for a radiograph of both the stomach and colon if a double quantity of bismuth is eaten and if the negative of the colon be taken the following day at the same hour.

If the outline of the colon only is desired, the bismuth emulsion as an enema may be given with the patient in the left-lateral position and with hips elevated.

To interpret properly a skiagraph of the digestive canal requires considerable experience and familiarity with radiographic appearances and a knowledge of anatomical relations.

* Constipation and Allied Intestinal Disorders.

Less difficulty is encountered in correctly interpreting a skiagraph of the œsophagus and colon than one of the stomach, because of the wide normal variations in the position and shape of the latter organ.

In presenting the essential anatomical points for the radiographer to remember, in order to interpret skiagraphs of the stomach correctly, we shall quote from Pancoast,* whose well-known experience in radiography stamps his work as authoritative:

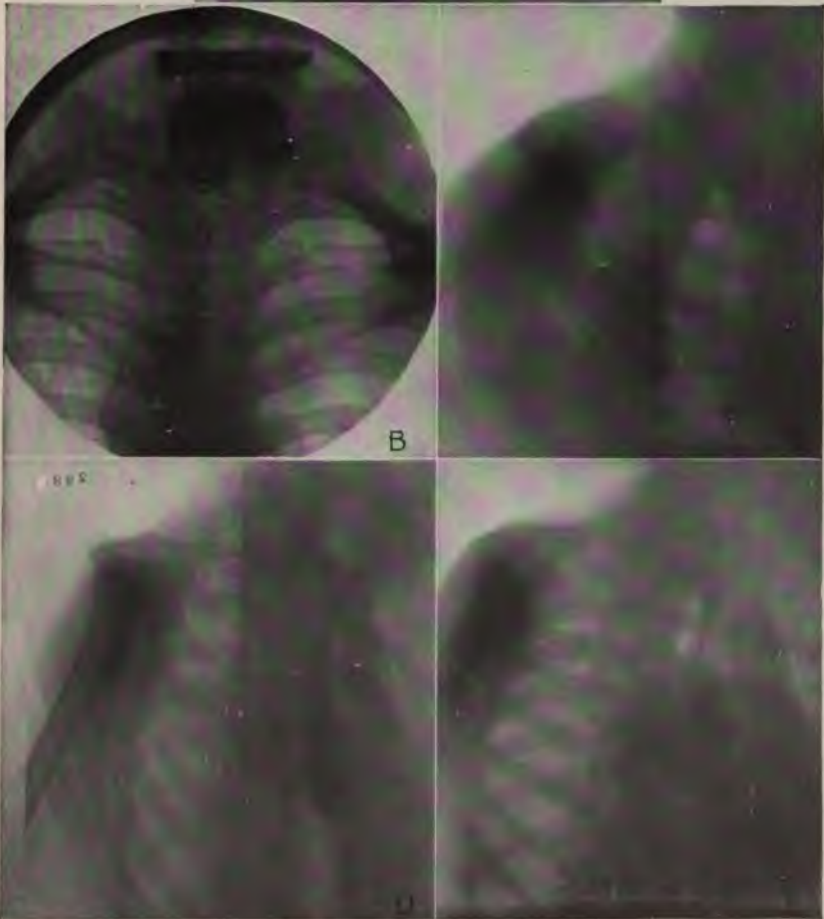
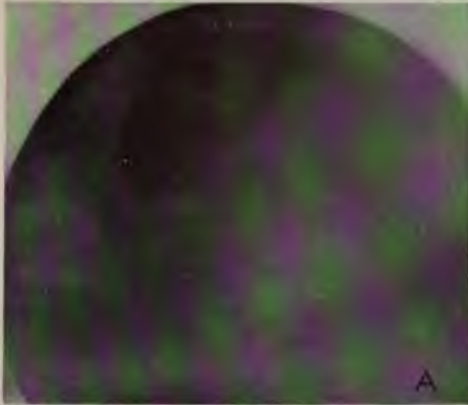
"1. *The Cardiac End.*—Because of the secure attachments of this portion of the stomach, it may be regarded as a fixed point and one that is practically never concerned otherwise in the mechanism of gastroptosis. Its position is on the left side of the tenth or eleventh dorsal vertebra. From the radiographic standpoint, its level as determined by any points on the anterior aspect of the body need not be considered.

"2. *The Pylorus.*—The position of this part of the stomach varies somewhat in normal individuals, even aside from its changeable location as influenced by different degrees of distention. Anatomically it may be authoritatively described as on a level with the first lumbar vertebra, or slightly lower, and just to the right of the median line; and normal variations in location may be measured from this point. Under the influence of distention, it may lie as far as two inches to the right of the midline. This movability is possible because the nearest firmly fixed point of attachment is practically that of the second portion of the duodenum to the spine, on the right side about the level of the first lumbar vertebra. The pylorus, being in front of the spine, of course lies somewhat more anterior than the cardiac opening. These anatomical facts are important in connection with the mechanism of gastroptosis. In some instances the skiagraph will show the slight dilatation of the *antrum pylori*, especially when this is made conspicuous by more or less of a constriction on its left side. This constriction must not be mistaken for the pylorus. In perhaps the majority of instances this structure and its appearance in the radiograph are either not present or are not very pronounced.

"3. *The Greater Curvature.*—The position of this most dependent portion of the stomach varies considerably, under normal conditions, both in different individuals and in the same individual with different degrees of distention; but, generally speaking, its lowest level should be above that

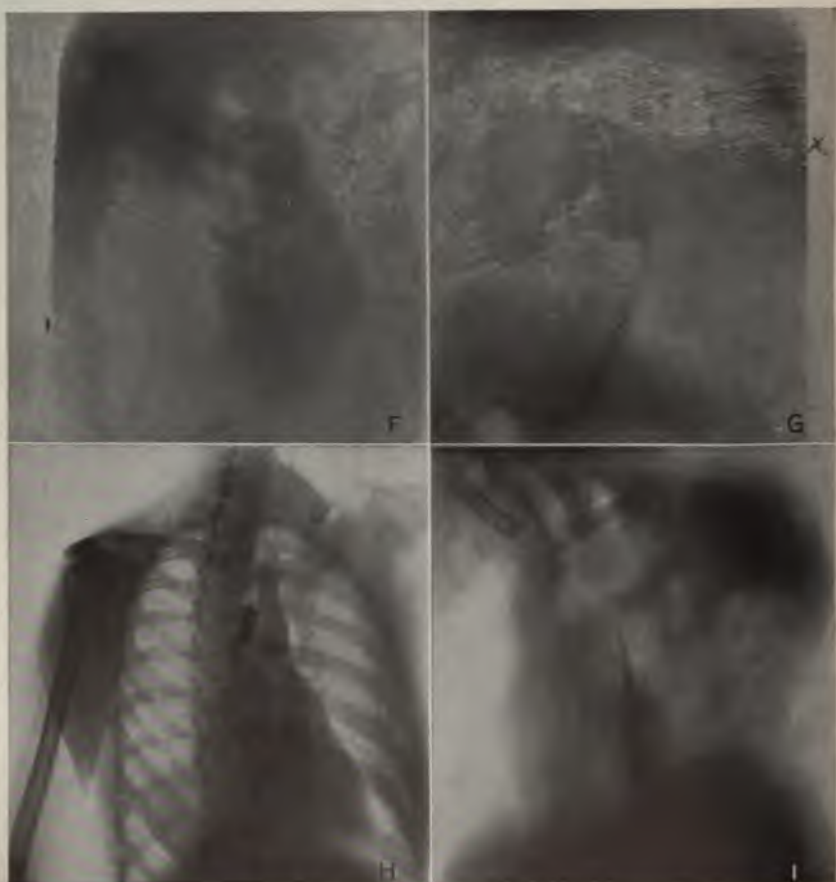
*"The Radiographic Examination of the Gastro-intestinal Tract from a practical standpoint, especially in connection with the diagnosis and treatment of Gastro-enteroptosis," by Henry H. Pancoast, M. D., International Clinics, vol. iii, Nineteenth Series.

FIG. 16b.



A. Esophageal diverticulum filled with bismuth paste. Note its clean-cut rounded lower border. B. Esophageal diverticulum filled with bismuth paste, its lower border is indented as though it rested upon some unyielding structure. C. Esophageal diverticulum filled with bismuth paste as seen in an oblique view. D. Bismuth paste lying above a stricture situated at the level of the eighth dorsal vertebra. The shadow suggests a low-situated diverticulum. Gastrostomy eighteen months ago. The patient has gained weight and remains well. Oblique view. E. Bismuth paste throwing a dumb-bell shaped shadow. The narrow bar represents the seat of the malignant stricture and is located behind the arch of the aorta. The widened part below is due to an accompanying spasm of the cardia. Oblique view. [Courtesy of Dr Charles Miner Cooper, of San Francisco.]

FIG. 16c.



F. Large esophageal sac containing a bismuth mixture lying above a cardiospasm. Oblique view. *G.* Wide bismuth streak somewhat similar to print. *E.* Malignant stricture is located at *X*. Oblique view. *H.* Large capsule containing bismuth temporarily arrested behind the arch of the aorta. Stomach-tube passed readily. No organic lesion present. Oblique view. *I.* Bismuth streak lying in esophagus above a cardiospasm secondary to carcinoma of the stomach. Oblique view. [Courtesy of Dr. Charles Miner Cooper, of San Francisco.]

of the normally situated umbilicus, or, better, that of the third lumbar vertebra.

"4. *Position of the Stomach.*—The position or general direction is somewhat variable normally, especially with different degrees of distention. The general direction in which the stomach lies, as recognized by anatomists and confirmed by the skiagraph, is, under natural conditions and in normal individuals, an oblique one, from left to right and behind forward, and tending more to a horizontal than to a vertical position. An empty stomach *hangs* (from the cardiac end) more nearly vertical than when full, due to the pyloric end falling by gravity. As it becomes filled, the first enlargement is said to be upward, backward, and to the left, and finally forward. In the upper part distention is in a backward direction and in the lower part forward. The pyloric end of the stomach moves further to the right, so that the antrum may be carried beyond the pylorus itself and as far as 5 cm. to the right of the median line.*

"5. *Shape.*—When the stomach is full, the *fundus* or highest portion of the organ will rise above the level of the cardiac opening, and, because it is the highest part, gas is very apt to be collected here, as the skiagraph shows. Under such circumstances, this is normally the widest portion of the stomach, which becomes more tubular as the pyloric end is approached. The greatest variations in shape are apt to be found in the pyloric extremity and just below the fundus and cardiac end.

"6. *The Lesser Curvature.*—Normally the lesser curvature runs obliquely downward and forward in almost a straight line from the cardiac end nearly to the pylorus, where its direction becomes upward and to the right.

"7. *The Gastrohepatic Ligament.*—The normal position of the stomach is maintained by the structures suspending it plus the upward pressure exerted by the abdominal walls through the other movable abdominal viscera. Its *suspension* is effected through the firm attachments at the cardiac end, assisted more or less by the lesser omentum and, indirectly, by the attachments of the second portion of the duodenum. The lesser omentum is attached along the entire length of the lesser curvature and the first portion of the duodenum, and above to the under surface of the liver. Its structure is not such as to withstand any unusual amount of strain, especially its middle portion, which is practically no more than a thin and delicate membrane."']

* Piersol's Human Anatomy.

SPECIAL SECTION

Diseases of the Œsophagus

Of the diseases of the œsophagus, the following are especially important to the general practitioner:

Acute and chronic catarrh and inflammation, ulcer, benign and malignant stenosis, partial and total dilatation.

The individual diseases may, but need not, stand in causal relation. For instance, catarrh and inflammatory conditions may cause an ulcer of the œsophagus; and from an ulcer either a carcinoma may develop, or else scars and contracture, which may give rise to secondary dilatation of the œsophagus.

In harmony with the plan and the limited space of this book, only the most frequent and important affections of the œsophagus will be discussed.

Cancer of the Œsophagus

General Remarks.—Cancer of the œsophagus is most frequent in elderly men who have never previously suffered from indigestion,—especially smokers and beer-drinkers. It occurs less frequently in women.

The portions of the œsophagus which have a predilection for cancer are those which offer special resistance to food being swallowed:

- a. The annular cartilage.
- b. The point at the bifurcation of the trachea.
- c. The hiatus of the œsophagus.
- d. The cardia.

The distance from the incisor teeth to the cardia is, on an average, 40 cm.; to the bifurcation-point, 26 to 27 cm.; and to the annular cartilage, 13 to 14 cm.

The higher the carcinoma is located in the œsophagus, the more difficult is its treatment for the physician, and the more painful to the patient.

Carcinomata seldom lead to complete clinical atresia of the œsophagus, and never to anatomical atresia. In the clinical course of cancer of the œsophagus, the passage of food through the œsophagus will often become easier through the breaking down of the obstructive tumor.

The effect of an organic stenosis is frequently aggravated by spasm of the musculature, which results from irritation of the mucous membrane above the stenosis.

The lumen of the œsophagus may also become completely obstructed by particles of food,—such as pieces of meat, white bread, cheese, etc.,—so that the physician has apparently to deal with an atresia of the œsophagus, in which the patient vomits everything.

In malignant stenosis of the œsophagus, the part above the stenosis first becomes hypertrophied, and later on dilated, so that stasis of the ingesta and lactic acid fermentation occur, just as in other forms of stenosis. Vomiting, especially after solid foods, takes place in every case; it occurs almost immediately after eating; while in stomach affections it occurs much later. Cachexia is not always a symptom.

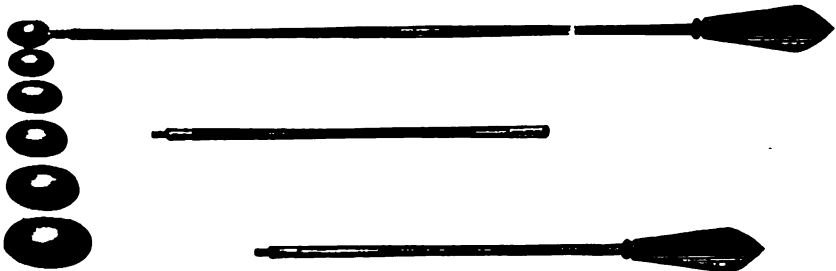
Diagnosis.—The recognition of this disease is relatively easy. The subjective symptoms are constant difficulty in swallowing, usually loss of appetite, and vomiting directly after deglutition. In the first stage of the disease, there is difficulty in swallowing solids only; while later on, even soft and semi-solid foods give trouble.

If such symptoms present themselves in elderly individuals who give no history of syphilis or of having swallowed caustics, the examiner should at once think of the possible existence of a malignant neoplasm.

Objective Symptoms.—The examiner should introduce a soft tube, size No. 10 [American No. 20 to No. 23], to ascertain whether it will meet with any obstruction. If it does, the examiner should use a Trousseau's bulb-headed bougie,

which consists of a whale-bone handle with olive-shaped ivory tips of various sizes. The largest tip should be used first to determine accurately the distance of the obstruction from the incisors. Since Trousseau's bougie is only slightly flexible, the physician will not so easily make a mistake in measuring the distance to the obstruction, as when using a soft-rubber tube which bends easily in passing through the pharynx and œsophagus. Before withdrawing the bougie, the examiner should mark the location of the incisors with his finger and thumb; and this distance should be measured, after the bougie is removed.

FIG. 17.



Trousseau's œsophageal bougie.

After the exact distance has been accurately determined, an œsophageal sound of 4 to 5 cm. diameter should be introduced, and the distance from the incisors to the obstruction measured. If, for instance, the distance as measured by Trousseau's bougie amounts to 23 cm., and to 26 cm. when measured by the œsophageal sound, the examiner can easily estimate the width of the strictured portion of the œsophagus, which information is very important in prescribing the diet.

Finally, the examiner should determine whether the smallest-sized olive-tip passes through the strictured portion into the stomach. If so, he can determine the location and the extent of the carcinomatous process by introducing and removing various-sized bougies.

Ordinarily blood, pus, and sometimes small portions of cancerous tissue will adhere to the sound or bougie, the examination of which makes the diagnosis easier.

The œsophagosopic examination will likewise assist in establishing the nature of the lesion. Its use, however, should generally be left to the specialist.

Other objective symptoms are sensitiveness of the sternum to percussion with the finger, unilateral vocal-cord paralysis, variations in the size of the pupils, and other symptoms caused by pressure of the cancer upon neighboring structures.

A detailed description of the deglutition-murmurs will not be given, because they are of only slight diagnostic importance. It should be remarked, however, that two sounds are normally produced by the deglutition-act. These are best heard over the cardia, by placing the stethoscope in the angle between the xiphoid process and the left costal arch. The first of these sounds is a stenosis-like murmur produced by contraction of the striated musculature of the pharynx, and the second, a pressure-murmur which occurs 10 or 15 seconds later. The latter is produced by contraction of the non-striated musculature of the œsophagus. In stenosis, the latter murmur is absent, or it occurs considerably later than normally.

Differential Diagnosis.—Cancer of the œsophagus must be differentiated from syphilitic stenosis, from hysterical œsophagismus, and from ulcer with secondary contraction, as well as from corrosions with cicatricial formation, tumors of the mediastinum, and aortic aneurism. The latter is of especial importance, lest sudden death should result from attempting to introduce the stomach-tube.

Complications of Carcinoma of the Œsophagus.—The formation of a fistula between the œsophagus and the trachea, or between the œsophagus and the mediastinum, is a serious complication. The physician will recognize a tracheal fistula very easily by severe attacks of coughing when liquids are swallowed.

Treatment.—The treatment of cancer of the œsophagus is divided into *medicinal*, *mechanical*, and *dietetic*. The physician should advise operation only in rare cases, such as extirpation of the carcinoma when it is located in the upper part of the œsophagus; and gastrotomy, when it occupies the lower portion.

Medicinal Treatment.—Potassium or sodium iodide should be given in every case, because of the possibility of syphilis

being present. One tablespoonful of a 6 : 200 solution should be given three times a day.

Remedies which relieve spasm of the œsophagus should also be given,—such as belladonna, atropine, eucaine, cocaine, morphine, or codeine.

The following prescriptions have proved valuable to me:

1. ℞ Tincturæ belladonnæ foliorum, gr. lxxx 5.0
Tincturæ valerianæ, ℥iiss 10.0
M. Sig.—Fifteen to twenty drops t.i.d.
2. ℞ Codeinæ phosphatis, gr. viii-xvi 0.5-1.0
Aquæ amygdalæ amaræ, ℥iv 15.0
M. Sig.—Fifteen to twenty drops t.i.d.
3. ℞ Tincturæ belladonnæ foliorum, gr. lxxx-℥iiss 5.0-10.0
Emulsi amygdalæ, q.s. ad ℥viss 200.0
M. Sig.—One tablespoonful several times daily before eating.
4. ℞ Eucainæ hydrochloridi, gr. v 0.3
or Cocainæ hydrochloridi, gr. xv 1.0
Aquæ destillatæ, ℥iiss 10.0
M. Sig.—To be used by the physician.

The physician should inject the eucaine or cocaine solution into the œsophagus with a long Nélaton catheter and an ordinary piston syringe, the long nose of which fits into the lumen of the catheter. One or two c.c. of the solution should be injected in this way, two or three times daily. Belladonna or atropine tablets containing one-half milligram [$\text{gr. } \frac{1}{16}$] may also be used to advantage.

Medicaments should be given before meals when the œsophagus is empty.

Mechanical Treatment.—This consists of washing out the œsophagus and introducing oil, according to the method of Rosenheim, and of dilating the œsophagus with hard conical bougies.

To wash out the œsophagus, the physician should use an ordinary soft stomach-tube, No. 8 [American No. 20], about 90 cm. long, the lower end of which contains two lateral openings. The tube should be introduced to the constricted portion of the œsophagus, and the stagnating food should be washed out in the following manner:

A small glass funnel, with a capacity of from 50 to 75 c.c., should be connected with the proximal end of the stomach-tube, and warm water should then be poured into it and the œsophagus thoroughly cleansed, by alternately raising and lowering the funnel, the greatest possible care being taken to remove all mucus and food-remnants. Following lavage, 30 c.c. of warm olive oil should be introduced. The deeper the cancer is situated, the more warm water and oil can be used. When the carcinoma occupies the upper part of the œsophagus, the lavage and oil-treatment are generally impossible. One hour after treatment, the patient may be allowed to eat.

In beginning treatment, the above procedure should be carried out daily, preferably before breakfast; and later on, every few days. Patients are considerably relieved by the lavage and oil-treatment and are, as a rule, after a short time, able to carry out the treatment alone.

Indeed, quite extraordinary results are obtained by the lavage and oil-treatment in this disease. Some patients who had previously been unable to swallow, and had vomited even water, recovered the function of deglutition and were able to swallow solids. (See Clinical Cases.) The explanation of this fact, as already mentioned, is, first, that food-remnants had become firmly wedged in the strictured portion of the œsophagus, and, second, that secondary spasms of the œsophagus had occurred. Both factors were removed by lavage and the oil-treatment.

Boas' lavage-sound, which has at its lower end a dilatable rubber balloon for closing against the cardia, may be used for lavage of the œsophagus. This can be dispensed with, however, because the rounded end of the ordinary stomach-tube so effectually closes the strictured portion of the œsophagus that water does not enter the stomach during the treatment.

Dilatation of the obstructed portion of the œsophagus and the introduction of permanent cannulæ were frequently attempted in the past. Both are now quite obsolete.

The principle of treatment at the present time, is to protect the diseased portion from mechanical injury as much as possible. Therefore, œsophageal bougies are only rarely used for therapeutic purposes.

Dietetic Treatment.—The physician should prescribe such foods as can pass the obstructed portion of the œsophagus, and

at the same time will sustain the strength of the patient. The following so-called "stenosis-fattening" diet should be given.

At 7:00	A.M.	Lavage and oil-treatment.
" 8:00	"	Tea, with 125 grams of cream.
" 9:00	"	250 grams of milk.
" 11:00	"	A soup made of flour, containing 125 grams of cream and butter.
" 1:00	P.M.	Bouillon with 1 or 2 tablespoonfuls of flour, and 1 or 2 yolks of eggs with butter.
" 4:00	"	Tea, with 125 grams of cream.
" 6:00	"	Any kind of soup, made from cereals or milk.
" 8:00	"	Bouillon with sago or flour and butter.

Besides the above, the patient may, if he desires, be given either wine, or wine with eggs, buttermilk or koumiss, fruit-juices diluted with mineral water, fruit and vanilla ice-cream, puro, sanato-gen, somatose, etc. If the stenosis is slight, semi-solids of all kinds, such as the finest purée of potato, spinach, carrots, raw eggs, etc., are indicated.

Besides the above, the physician should prescribe a half wineglassful of olive oil, one-half hour before the mid-day and evening meals, if the patient does not have a repugnance toward it. For patients who cannot use the oil, a cup of the milk of almonds, the preparation of which will be mentioned later, may be substituted. Such a diet not only maintains the strength of the patient, but may also cause an increase in weight if the patient takes the proper physical care of himself. I have personally observed, in cases of this kind, an increase of ten pounds or more.

If the œsophagus is very irritable, so that even fluids are vomited, resort should be had to the use of nutritive enemata (see below). Only in those rare cases in which the symptoms of the disease, in spite of the most careful treatment, become unmanageable, should the patient be referred to a surgeon for gastrotomy. (See Clinical Cases.)

CLINICAL CASES.

CASE 1.—B. B., a farmer, aged 50, for five months had difficulty in swallowing, but no pain until a few days previous. Semi-solids could be swallowed. Since then the patient had vomited everything, even water, and was extremely emaciated. There was complete obstruction in the œsophagus, 26 cm. from the incisors. The presence of a carcinoma, near the bifurcation, was assumed. In washing out the œsophagus, milk and raspberries were found in the lavage-water. Oil was introduced, and immediate improvement of the patient resulted. Liquids were swallowed without difficulty. Two days later, a repetition of the lavage and oil-treatment was made. Patient returned to his home and was instructed to take oil three times a day, before meals. Seven weeks later there was a gain of one and one-half pounds in weight. The patient was able to swallow zwieback, boiled pigeon, etc. Upon the advice of a "quack," he frequently used a mixture of castor oil and linseed oil with compound licorice powder. Patient died later from cachexia.

CASE 2.—Mrs. P., a widow, aged 76 years, had for several months had trouble in swallowing. She was brought to the polyclinic because she vomited everything, even water. Immediately after the first lavage and oil-treatment, the patient was able to swallow semi-solids. At first, treatment was given daily; later on, only once or twice a week. Three months afterwards, the patient died without atresia of the œsophagus having developed.

CASE 3.—Herman L., a farmer, aged 66 years, had for three weeks found difficulty in swallowing. Solids were vomited. The appetite was good. Weight 154 pounds. One and one-half years ago the patient had been kicked on the right side of his chest by a horse,—which the patient believed might be the cause of his present trouble. On examining the œsophagus, an obstruction was met, 36 to 38 cm. from the incisors, when Trousseau's bougie and the œsophageal sound respectively were used. The patient was given the "stenosis" diet, lavage and the oil-treatment. Atropine, belladonna, or cocaine were occasionally used. The patient gained six pounds in weight in one month. Two months later, the patient weighed 160 pounds. Three months afterwards, he weighed 151 pounds; and after six months, 127 pounds. In washing out the œsophagus, blood and stagnant masses of food were often seen in the lavage-water. Solids usually caused cramp-like pains, which were relieved by the use of atropine. Nutrient enemata were given from time to time. The quantity of urine was reduced to only 500 c.c. daily. Salicylic acid, if swallowed, gave a positive reaction in the urine, showing that total atresia of the œsophagus had not developed. The patient subsequently vomited all kinds of foods, with the exception of small quantities of milk of almonds. The patient was placed in a hospital, where he died, six and one-half months after the first examination and seven months after the appearance of the earliest symptom.

Ulcer of the Œsophagus

Ulceration of the œsophagus is, as a rule, rare; the most frequent forms of ulcer are tubercular, syphilitic, catarrhal, and peptic. Ulcers are also caused from caustics, and acute infectious diseases, such as diphtheria and scarlatina.

The œsophagus is, naturally, by reason of its many layers of stratified epithelium, not readily subject to infection and injury.

The symptoms of ulceration of the œsophagus consist in burning, boring, and sometimes cramp-like pains behind the sternum and in the back, after swallowing,—especially if the ulcer is situated at the cardia. These symptoms are intensified by eating solids.

Fissure and erosions, which occur especially at the cardia, may produce the same symptoms as ulceration of the œsophagus.

Ulcers may entirely heal, or may lead to sequelæ, the most important of which are spasm and cicatricial formations, with secondary dilatation of the œsophagus.

Treatment.—With the exception of syphilitic ulceration, —which of course requires the use of mercury and potassium iodide, the treatment of ulceration of the œsophagus is symptomatic. All mechanical irritation must be avoided; the diet, therefore, should be fluid or semi-fluid in character. Besides the narcotics which have been mentioned in discussing the treatment of cancer of the œsophagus,—silver nitrate, in solution 0.5 to 200.0 [grains viii to ounces vjss], should be given in tablespoonful doses three times daily, before meals.

In cases in which spasm is a troublesome symptom, it is well to employ belladonna preparations, milk of almonds, warm olive oil, or the injection of 3 c.c. of a 3 to 5 per cent. solution of cocaine or eucaine.

The diet, as in cancer, should consist of milk, cream, butter, soups, and foods in purée form. In obstinate cases, and those cases accompanied with much pain, rectal nourishment should be resorted to for the first week of treatment.

Hot applications will be found helpful only when the ulceration is located at the cardia.

The Silk-thread Method of Examining the Œsophagus

[Since much of the success in the diagnosis and treatment of diseases of the œsophagus depends upon the ability to pass instruments through the œsophagus, the recent method suggested by Mixer will be described:

The patient, several hours before examination, should swallow six or seven yards of silk thread. After the distal end has passed through the stomach and several coils of the intestine, the thread may be made taut by traction on the proximal end.

In the olive-tip of the bougie or the œsophageal sound a small hole is made, through which the thread should be passed, as shown in the accompanying illustration. The silk thus becomes a safe and accurate guide to the instrument to be introduced into the œsophagus.

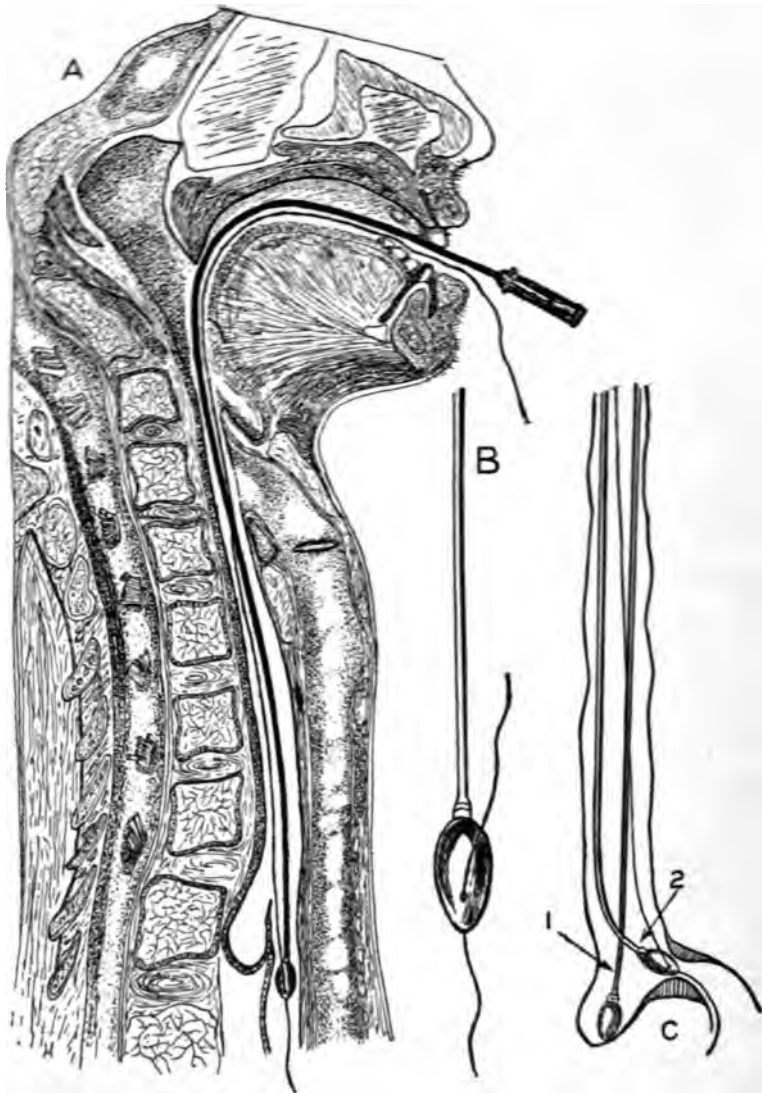
The advantages of a guided instrument over one introduced solely by touch are obvious. The tip of the œsophageal instrument must, when guided by the taut threads, follow the axis of the lumen of the œsophagus, and it avoids becoming pocketed; thus the danger of perforating the wall of the œsophagus is reduced to a minimum.

In addition to the obvious application of this method to exploring the œsophagus and to the treatment of carcinoma, cicatricial stenosis, and chronic cardiospasm, its value has been further emphasized by Plummer* in demonstrating the existence of a diverticulum, its point of origin, and its most dependent portion, as follows:

“The sound is first introduced into the diverticulum until obstruction is encountered; holding the sound in place, the thread is drawn taut. Traction on the thread will now lift the sound out of the œsophagus sufficiently far to bring the olive-tip to a level with the opening into the distal portion of the œsophagus. Until this point is reached the sound cannot be advanced without relaxing the thread.”]

* Jour. A. M. A., Feb. 25, 1911.

FIG. 17a.



A illustrates Mixer's method of using silk thread as a guide to esophageal instruments through the esophagus; **B**, olive tip of esophageal bougie threaded with silk thread; **C**, diagram showing esophageal diverticulum and danger from stiff staff (1), together with use of flexible staff (2) guided by silk thread, passing a carcinomatous cardia. [Drawn by Dr. J. R. Cowan.]

Krönig's method is worthy of mention, after the acute corrosion of the œsophagus and stomach by poisons. This author recommends the injection of 150 to 200 c.c. of warm olive oil into the œsophagus with a Nélaton catheter and piston syringe, before introducing a stomach-tube, to prevent laceration of the affected area.

In phosphorus poisoning, this procedure is contraindicated for the well-known reason that oil renders phosphorus soluble, and thereby increases the danger of phosphorus intoxication.

Benign Stenosis

(Including Strictures and Spasms)

The non-malignant strictures of the œsophagus are caused either by chronic ulcer, or by cicatrization after corrosions with acids, alkalies, and other caustics. Often several strictures are found after destruction of the œsophageal tissue by caustics.

In patients with excessive irritability of the nervous system,—particularly in hysteria,—spastic stenosis accompanies fissures, erosions, or ulcerations of the œsophagus.

The diagnosis of cicatricial stenosis is easily made from the anamnesis and the examination of the œsophagus. The physician should determine the degree of stenosis by the use of Trousseau's bougie, and should prescribe the diet of the patient accordingly.

Treatment is purely mechanical. The physician should pass a small-sized and later a large-sized bougie through the strictured portion of the œsophagus, into which oil has previously been introduced. The most suitable instrument is the hard, woven, conical English bougie, which is graded from 2 to 14 cm. in diameter. The lumen of the œsophagus in such stenosis is often exceedingly narrow and sometimes twisted and tortuous in its course. In such a case, the examiner will be unable to treat the condition in this way, and will be obliged to refer the patient to a surgeon. After an incision in the stomach has been made, the œsophagus can be dilated from below through an œsophagoscope.

The diagnosis of spastic stenosis is more difficult, and is only to be made after observing the patient for several weeks.

The spastic contraction of the œsophagus, which occurs in hysterical individuals, is of considerable practical importance. It is questionable whether these stenoses are entirely of a nervous character, as many think; or whether some organic lesion,—such as an erosion or fissure of the mucous surface of the œsophagus,—is the cause of the spasm. Spasm of the œsophagus may be compared to vaginismus, which occurs in hysterical women, with or without lesions of the hymen.

The following features are characteristic of the spastic stenosis of the œsophagus: (1) The condition of the patient is changeable; some days he can swallow all kinds of solid food without difficulty, while at other times even fluids will not pass. In fact, such patients, especially women, always swallow fluids more easily than solids. (2) In organic stenoses, only small-sized bougies can be introduced through the narrowest portion; while in spasm of the œsophagus, even large-sized sounds will enter the stomach if the examiner, after introducing the bougie up to the place of spasm, will wait a moment until relaxation of the spasm occurs. This renders the diagnosis of spastic stenosis certain.

Treatment.—The treatment is both general and local. The physician should prescribe baths and Scotch douches externally, and potassium bromide and belladonna in a valerian tea mixture internally. Local treatment should consist of introducing soft stomach-tubes of the largest size, which should be left in position as long as possible, up to fifteen minutes.

There are also, in addition to the above forms of stenosis, elastic and easily dilatable cicatrices of the œsophagus, that produce a condition between cicatricial and spastic stenosis. In this form, a large-sized bougie may be introduced without much difficulty.

CLINICAL CASES.

CASE 1.—Clara L., a dressmaker, 24 years of age, had previously suffered from pleurisy, chlorosis, and chronic pharyngitis, which last was treated with applications of nitrate of silver. Patient had suffered from much worry and excitement. One and one-half years ago, the patient began to have trouble in swallowing, with a gradual exacerbation of the symptom. She was obliged to drink water after eating, in order to assist the passage of food into the stomach. There were often cramp-like pains behind the sternum after swallowing. There were marked emaciation and frequent vomiting. The general health of the patient was changeable. Repeated examinations of the œsophagus showed the following:

Trousseau's bulb-headed bougie and a No. 10 or No. 11 [No. 20 American] soft stomach-tube was finally introduced into the stomach, after having encountered obstructions at 23 cm. and 37 cm., respectively, from the incisors. There was a normal amount of hydrochloric acid in the gastric juice. The œsophagus was not dilated. Before every introduction of the œsophageal sound, it was necessary to cocaineize the pharynx and to introduce oil into the œsophagus. It was impossible to make an examination with the œsophagoscope. The introduction of the sound revealed the presence of sensitive areas in the œsophagus. Fluids were more easily swallowed at certain times than at others. At other times, all swallowing was impossible, and everything was vomited. Upon one occasion, the patient ate mutton and ham-sandwiches without any trouble. The weight of the patient was almost stationary, with only slight variation.

Treatment.—Potassium bromide and atropine were administered internally, which gave considerable relief. In this case an exact diagnosis was impossible. We assumed the presence of erosions, which produced spastic contractions of the œsophagus, from irritation caused by the swallowing of the food. The mucous membrane of the œsophagus was hypersensitive, secondary to a general hysteria. The patient was not cured, and the after-history of the case is not known.

CASE 2.—Pauline B., 46 years old, the wife of a laboring man, suffered from strictures resulting from corrosions of the œsophagus. Five weeks before entering the clinic, the patient accidentally drank a solution of caustic soda. Difficulty in swallowing began immediately. At the beginning of the treatment, it was impossible to pass a bougie through the œsophagus. Gradually solid English conical-shaped bougies, sizes No. 4 to No. 11, could be introduced into the stomach, as also the sounds with olive-shaped tips. By the use of Trousseau's bougie, three strictured portions were found in the œsophagus, from 35 cm. to 40 cm. distant from the incisor teeth. The strictures were dilated daily, and the ability of the patient to swallow rapidly increased. Before each treatment, the patient was given 30 grams of olive oil to facilitate the introduction of the bougie and sound. Her weight

increased from 138 to 160 pounds. A 13 mm. sound now entered the stomach without any trouble. The prognosis was good. Secondary dilatation of the œsophagus was not liable to occur. The subcutaneous injection of thio-sinamin, 0.2 per dose, proved helpful.

CASE 3.—Frank M., a servant, 17 years of age, suffered from cicatricial spastic stenosis of the cardia, with secondary dilatation of the œsophagus.

The patient had trouble in swallowing for six months, "the food standing above the stomach." In order to swallow, the patient was obliged to resort to strong pressure with closed epiglottis after very deep inspiration. Vomiting was frequent. The patient was very emaciated and anæmic. There was a tubercular catarrh of both apices. Tubercle bacilli were found in the sputum. On introducing the stomach-tube, an obstruction was encountered at the cardia, which, after short hesitation, gave way. There was a feeling of a flexible scar imparted to the hand holding the stomach-tube, at this point. The œsophagus was very much dilated, having a capacity of one-quarter to one-half litre. The methylene blue test was positive. After frequent dilatation of the strictured portion and the adherence to a rational diet, there was an improvement in the symptoms and a general gain in weight from 95 to 106 pounds. The gastric contents showed free hydrochloric acid. The lung-affection was afterwards cured by sanatorium treatment. The patient was discharged and, after three months' treatment, was able to work. At present he introduces the bougies himself and is in a healthy condition. The cause of stenosis of the cardia, in this case, could not be determined, but we assumed that it was caused by a tubercular ulcer which had healed.

Dilatation of the Œsophagus (Diverticulum).

There are two forms of dilatation of the œsophagus: (1) Spindle-shaped, or total dilatation; (2) sack-like, or partial dilatation.

1. Spindle-shaped dilatation occurs in congenital muscular weakness, the so-called idiopathic dilatation,—although it is most probable that such dilatation is almost always the result of spastic, or cicatricial stenosis of the cardia, following ulcer or erosion. Frequently no organic stenosis is found at the autopsy of such cases. One must believe, therefore, that during the life of the patient a spastic stenosis had existed, which was not demonstrable at autopsy.

Treatment. The treatment of spindle-shaped dilatation of the œsophagus consists in lavage, dilatation of the constricted portion, and a "stenosis-diet." Recently the sub-

cutaneous injection of 0.2, or a 20 per cent. solution, of thio-sinamin twice a week, and continued about six months, has been suggested.

℞ Thiosinamin, ʒ iiss 10.0
 Glycerini,
 Aquæ destillatæ,
 (or Alcohol dil.), āā ʒv 20.0
 M. Sig.—To be used by the physician.

2. Sack-shaped dilatation, or diverticulum of the œsophagus, is a lateral bulging of the walls of the œsophagus, which is usually situated in its upper portion.

It is necessary to differentiate between pulsion and traction diverticuli.

Chronic Cardiospasm

[Although this condition might properly be discussed in the section on Diseases of the Stomach, we will consider the matter here because of its frequent association with dilatation of the œsophagus.

The cause of chronic cardiospasm is still unknown; some writers consider it a primary affection and others as secondary to an irritative lesion of the œsophagus or cardia.

Symptoms.—The symptoms of chronic cardiospasm may develop gradually or suddenly, with difficulty in swallowing. The dysphagia may be limited to a meal in the beginning of the trouble, or it may develop acutely and persist for several months or years.

At first solids and later liquids are swallowed with difficulty,—particularly when taken either very hot or very cold. A short time after eating, the patient experiences an impediment in deglutition, the food giving a sensation of not having entered the stomach, and he is obliged to drink copiously of water to assist the entrance. Otherwise, the food will be regurgitated immediately or several hours after eating.

Depending upon the duration and constancy of the cardiospasm, food is thus retained from a few hours to several days, which causes a secondary dilatation of the œsophagus. The time at which regurgitation occurs after eating depends largely

upon the amount of this dilatation. In the early stages, foods are regurgitated soon after eating, and in the later stages, when the œsophagus is widely dilated, foods may remain in the œsophagus 48 to 72 hours.

Normally, the œsophagus has a capacity of from 75 to 80 c.c. In severe cases of cardiospasm with secondary dilatation of the œsophagus, this may be increased to from 300 to 400 c.c.

The amount of food regurgitated varies from a mouthful to a half-pint or more.

The regurgitation of liquids and foods through the mouth and nose of the patient during the night, which occasions severe attacks of coughing and strangling, is a common and characteristic symptom, although some patients are not thus affected.

Most patients suffer from hunger, and in cases of long standing, there is always marked emaciation and loss of weight.

Aside from the feeling of obstruction to the food entering the stomach, the patient complains of subjective discomfort, spasmodic pain, burning and heaviness behind the lower third of the sternum. Coughing and other reflex disturbances are frequently evident.

Diagnosis and Differential Diagnosis.—Cardiospasm is differentiated from cicatricial stenoses and compression stenoses by mediastinal tumors, aortic aneurisms, etc., by the ability in cardiospasm to introduce a bougie or stomach-tube of large size into the stomach. When using the stomach-tube, it is often necessary to stiffen the tube with a wire stilette; and in all cases, after introducing the end of the tube or bougie to the cardia, firm pressure should be exerted on the bougie, after which the spasm of the cardia relaxes and the stomach-tube enters the stomach, as will be evidenced by the presence of free hydrochloric acid and the gastric ferments of the gastric juice.

Since cicatricial stenosis is usually caused by swallowing caustics, etc., rather than by ulceration of the œsophagus, the early history of the illness, and also the physical examination for aneurism of the aorta, etc., to exclude compression-stenosis, are always necessary adjuncts in the examination.

Hysterical œsophagismus is characterized by the general stigmata of hysteria and the inconstancy of the œsophageal symptoms,—the patient suffering from spasm of the œsophagus for a few meals,—which is alternated with an absence of all local symptoms for several weeks or months.

In contradistinction to these, the symptoms of chronic cardiospasm are more or less constant and are independent of the nervous condition of the patient; and the condition presents evidences of food-stasis and secondary dilatation of the œsophagus, which are absent in the former.

For the differential diagnosis between cardiospasm with secondary dilatation of the œsophagus and diverticuli, see below.

Radiographs are at times useful, showing in some cases a cylindrical dilatation of the œsophagus; while in other cases the findings are negative.

Treatment.—The treatment of chronic cardiospasm is mechanical or surgical. Since successful results are obtained by forcibly dilating the cardia with dilatable rubber bags, the mechanical treatment should be attempted in every case suffering from chronic cardiospasm.

This is easily accomplished by means of a dilatable rubber bag, such as a condom, fastened over the distal end of a small-sized, stiff-walled stomach-tube, or an especially contrived rubber bag introduced into the cardia by means of a wire stilette or bougie.

The rubber bag should be covered by a silk bag to control and limit its amount of distention during treatment.

A mercurial manometer is an essential part of the apparatus, by which the physician will be able to control the amount of pressure used in distending the cardia within safe limits,—namely, six or seven pounds.

The normal cardia cannot be safely stretched beyond a diameter of 3.5 cm. The silk bag which covers the rubber balloon should therefore have a maximum diameter, when fully dilated at a pressure of six or seven pounds, of about 3.5 cm. Early treatments should be given with smaller-

sized bags, these being gradually replaced with ones of larger sizes, each one varying from $\frac{1}{16}$ to $\frac{1}{2}$ of an inch in size, at each succeeding dilatation of the cardia.

Either air or water pressure may be used to distend the rubber bag.

FIG. 12.



Cardiospasm dilator and mercurial manometer.

The accompanying illustration shows the complete apparatus which was devised by the translator and successfully used in a case of chronic cardiospasm with secondary dilatation of the œsophagus of seven years' standing. (See Clinical Case.)]

Diverticulum.—Any portion of the œsophageal wall that possesses a congenital weakness of its musculature may become bulged until a sack-shaped diverticulum is finally formed.

Traction diverticuli are formed from a traction-force exerted from without,—most frequently by the retraction of cicatrized bronchial glands, by which the adherent portion of the œsophagus becomes displaced.

Symptoms of diverticuli of the œsophagus consist of difficulty in swallowing and of frequent vomiting.

To make a differential diagnosis between spindle-shaped and sack-like dilatations of the œsophagus, the patient should drink a glass of water, colored with methylene blue, after which the examiner, after introducing a stomach-tube, will obtain at first the blue-colored contents, and later if he introduces the tube still further he will overcome the slight resistance, and the stomach-tube will enter the stomach, when the unstained gastric contents will be obtained, showing the presence of hydrochloric acid.

The results of the above procedure prove the presence of a spindle-shaped dilatation; while if the tube cannot be introduced past the obstruction, a diverticulum should be diagnosed.

Treatment.—The treatment of diverticulum of the œsophagus is purely mechanical, and consists of lavage and dilatation of the œsophagus with a diverticulum-sound, which at its point is bent at an obtuse angle, like a prostate-sound. This will enter the stomach more easily than the ordinary sound; and the physician should, at the same time, avail himself of the opportunity of introducing nourishment, such as milk, etc., to prevent the emaciation of the patient.

CLINICAL CASES

1. *Chronic Cardiospasm*

[CASE 1.—Miss L., age 25. Mother and both grandmothers had suffered from stomach trouble. Her mother died from tuberculosis. The patient had suffered from dyspepsia all her life, occasionally experiencing severe burning pain in the epigastrium. Several years previous to her present illness, she had lived one year on malted milk and cereals, after which she had no digestive trouble until seven years ago the patient suddenly began to have difficulty in swallowing solids. She was soon unable to swallow either very hot, or very cold, foods or liquids. For the past four or five years, the patient had dysphagia during or after every meal. A few minutes after

beginning to eat, she would be obliged to drink several glassfuls of warm water "to wash the food down"; otherwise, what she had eaten would be regurgitated, immediately or several hours later. There had been occasional burning pain behind and at the lower third of the sternum, which was independent of eating. The patient had frequently been awakened at night by the regurgitation of irritating foods and liquids through the nose and mouth, which caused severe attacks of coughing and strangling. Patient had gradually lost in weight and nutrition, was extremely nervous, and suffered from insomnia, ravenous appetite, and constipation.

Physical Examination.—The patient was poorly nourished and weighed only 95 pounds. The greater curvature of the stomach was 2 in. below the umbilicus. The physical examination was otherwise negative.

Upon introducing an ordinary soft stomach-tube, resistance was encountered 16½ inches from the incisors. Food which had been eaten on the previous day was returned through the tube, and had an acid reaction. There was no free hydrochloric acid present. On one occasion, food eaten three days previously was removed from the œsophagus, and gave a strong reaction of lactic acid; the Boas-Oppler bacilli were present.

The capacity of the œsophagus was 350 c.c. Two skiagraphs were taken, which failed to be of any material assistance in the diagnosis.

After repeated attempts, the cardiospasm relaxed and the stomach-tube entered the stomach, the contents of which had a normal amount of free hydrochloric acid.

Treatment.—The cardia was stretched with a rubber bag dilator (see illustration and description of apparatus above), after which the patient had no trouble in swallowing for one week, when the treatment was repeated.

After six or seven treatments, the cardiospasm disappeared, food entered the stomach, and there was no difficulty in introducing the stomach-tube or bougie, although the patient still complained of some subjective disturbances in swallowing, doubtless due to the dilatation of the œsophagus,—the food entering the stomach largely from gravitation, rather than from the peristaltic action of the musculature of the œsophagus.

Six months after the first treatment, the patient had gained 24 pounds in weight, had practically no difficulty in swallowing, and her general health was greatly improved.]

2. *Hysterical Spasm of the Œsophagus*

CASE 2.—Mrs. Emma E., 26 years old, suffered from hysterical spasm of the œsophagus, with secondary dilatation.

For about one year, the patient had complained of cramp-like pains in the region of the xiphoid process, and of vomiting immediately after swallowing. These symptoms had gradually increased in severity until eight weeks previous, at which time the patient vomited about a pint of blood. She had lost 20 pounds in weight. She had been pregnant three

years previous. No menses for one year. The patient presented a classical case of hysteria. It was possible to introduce the largest-sized sound, after waiting a few moments to allow the spasm of the œsophagus to relax. The stomach-contents were normal, free hydrochloric acid being present, and the total acidity was 40. After several treatments had been given, the patient became jaundiced, and entered a hospital. According to the statement of the physician, a laparotomy was performed at the urgent request of the patient, and with permanently good results.

Foreign Bodies

Often coins, pieces of bone, fragments of meat, and especially false teeth, accidentally get into the œsophagus.

Foreign bodies of small size may be best removed by the well-known "coin-catcher" forceps; and those of larger size, with the œsophageal forceps of Rosenheim and the œsophagoscope, which would best be done by the specialist, or one familiar with its use.

It is necessary to recall the fact that patients, especially hysterical persons, frequently insist that they have swallowed teeth or other objects in their sleep, which they miss upon awakening in the morning. Often, through nervousness and anxiety, such patients complain of pain in the œsophagus. The introduction of a large, soft stomach-tube will usually prove the fears of the patient to be without foundation.

If a patient has actually swallowed a foreign body which has already entered the stomach, the physician should not administer laxatives, but instead should prescribe the so-called "potato-cure." The patient should live for several days almost exclusively on mashed potatoes, which should be made rich by the addition of cream and butter. Only bread and butter may be allowed in addition. This form of diet surrounds the foreign body with masses of cellulose, which facilitates its passage without injury to the intestinal wall. In case the bowels do not move, the physician should prescribe a high enema of oil.

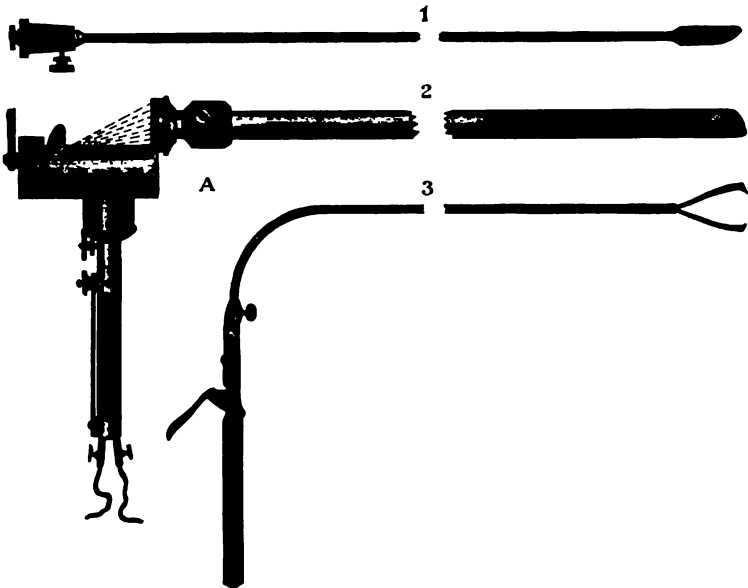
The physician should never neglect to make a digital examination of the rectum, in which a foreign body often remains impacted.

Rosenheim recommends, in every case, the administration of morphine to relax the musculature of the œsophagus and to allow the foreign body to pass into the stomach.

NEUROSES OF THE ŒSOPHAGUS

Uncomplicated neuroses of the œsophagus are rare. The neuroses most important to the general practitioner are nervous eructation and hyperæsthesia of the œsophagus, which occur most frequently in hysterical individuals.

FIG. 19.



1. Obturator. 2. Œsophagoscope. 3. Coin catcher and foreign body forceps.

Nervous eructation manifests itself by loud, explosive eructations which can be easily heard in an adjoining room, and are extremely annoying to both patient and friends. These eructations may be explained by the fact that the patient alternately swallows and eructates air. The attacks occur paroxysmally, about like whooping-cough. Usually no other objective symptoms of the disease are present, with the exception of signs of a general neurasthenia or hysteria.

I have observed that many patients are relieved of these explosive eructations by a sharp pressure against a circumscribed area of the epigastrium.

The diagnosis of nervous eructation is very easy if the patient has an attack in the presence of the physician. Otherwise, he is entirely dependent upon the history of the trouble in making the diagnosis.

The treatment is partially general, having in view the restoration of the nervous system to its normal tone; and partially suggestive, consisting of endofaradization of the œsophagus with a mild current. In addition to the above, the patient should generally be given one or two grams of sodium bromide in a cup of cold valerian tea night and morning, carbonic acid baths, massage of the entire body, and whenever possible a change of scene and climate.

The wedging of an ordinary cork between the upper and lower jaws,—a procedure recommended by Mathieu,—is often useful in the treatment of an attack, because the patient cannot swallow when his mouth is open. This should be done for one-half hour three times daily.

Hyperæsthesia of the Œsophagus

In hyperæsthesia of the œsophagus, deglutition, as well as the peristaltic waves of the œsophagus which follow the swallowing, are disagreeable to the patient. The sensation is described as a painful drawing feeling, beginning above and extending downward. Affections of this kind are usually very stubborn to treatment, and require a great deal of perseverance on the part of the physician to bring about a cure. The use of narcotics, milk of almonds, and the treatment of general neuroses, are indicated.

CLINICAL CASES

1. *Nervous Eructation*

CASE 1.—Mrs. M., 36 years old, the wife of a merchant, had for three years suffered from loud eructations when emotionally excited. When her mind was diverted from herself, she was always better. The patient was naturally much embarrassed by these eructations when attending to social

duties. Striking the epigastrium would give her relief. Endofaradization of the œsophagus, the use of bromide, and a sanatorium treatment had been ineffectually tried.

I prescribed valerian tea, with one or two grains of bromide of potassium, morning and evening: and 30 drops of the following mixture three times a day after meals, taken on sugar, and followed by absolute mental quiet.

R̄	Tincturæ belladonnæ foliorum, gr. lxxx	5.0
	Spiritus menthæ piperitæ, ʒ iiss	10.0
	Tincturæ valerianæ, ʒiv	15.0

During the following five months, the patient was very much relieved, at the end of which time, owing to overwork and the recurrence of an old parametritis, there was a return of the nervous eructations.

CASE 2.—Alvin W., 20 years old, a business man, had suffered from nervous eructations, together with sexual neurasthenia. After treatment with arsenic, and aqua amygdalæ amaræ, combined with constitutional treatment, baths, etc., the patient's condition improved.

2. *Neurosis of the Œsophagus*

CASE 3.—Agnes S., 25 years old, the wife of a working man, had, for two months following cessation of lactation, suffered occasional pain behind the sternum after swallowing solid foods. For three days, the pain had occurred even after using liquid foods. The entire œsophagus was painful and the attacks of pain lasted usually about two or three minutes. A sound could be introduced without much trouble, although it was painful to the patient. After treatment consisting of bromide and valerian tea, the difficulty disappeared.

3. *"Hysterical Spasms of the Œsophagus"*

CASE 4.—Wally B., a servant girl 28 years old, had suffered from cramp-like pains in the abdomen and sacral region, and from a drawing pain beginning at the upper and extending to the lower extremity of the œsophagus, occurring immediately after swallowing solids or liquids. These symptoms were relieved in about fifteen minutes by the patient's bending forward with pressure exerted upon the epigastrium. The patient had a sensation as if the food remained in the œsophagus instead of entering the stomach. Ten months prior to the beginning of the trouble, the patient had an accident, since which time she had been very excitable and nervous. Patient was examined only once, because she did not return for treatment.

FINAL REMARKS

In regard to the diagnostic and therapeutic peculiarities of the diseases of the œsophagus, many are of interest and

importance to the specialist only, such as varices, acute and chronic catarrh, infections, injuries, corrosions, phlegmona, etc. The physician is, therefore, referred to the well-known text-books of Rosenheim, Fleiner, Krauss, etc., for a full discussion of the subject, as a recital of all their details would overstep the limits of this book.

It will be pointed out here merely that there are dangers associated with the introduction of sounds into the œsophagus, —particularly hard, inflexible instruments, such as the œsophagoscope. Extreme caution must be urged, for a too-brusque manipulation has frequently caused perforation, suppurative mediastinitis, and even sudden death.

Diseases of the Stomach

CLINICAL REMARKS

Of the three functions of the stomach,—secretion, absorption, and motility,—the most important is motility. Absorption from the stomach is nil; water and other fluids are not absorbed until they enter the intestine; only a few of the salts, alcohol, and medicaments are taken up by the lymph-vessels of the stomach. Hence, from the practical standpoint, it is needless to discuss the absorptive ability of the stomach, so far as it is concerned in the nourishment of the human body.

The secretory functions of the stomach are not absolutely necessary to the existence of civilized man. The investigation of Von Noorden has proven that a person can feel perfectly well, and can be well-nourished, when there is a total absence of gastric juice. The intestine is able to maintain completely the nutrition of the body, so long as sufficient nourishment enters it from the stomach.

Since the ingenious experiments of Knud Faber, of Copenhagen, we are better informed concerning the physiological functions of the stomach. It serves less for the disinfection of the food than has previously been supposed,—as disinfection might have been accomplished equally well by an alkaline secretion. The gastric juice is much more concerned

with the digestion of bones and connective tissue, and with the breaking up and division of resistant carbohydrates, of vegetables, etc.

Such beasts of prey as tigers or snakes, which live exclusively on flesh-foods and bones, would soon die from perforation-peritonitis if it were not for the ability of the gastric juice,—which in carnivora is of double the strength it is in man,—to rob the ingestion of bones of danger to the animal. Civilized man might certainly exist without the aid of the gastric acids, since he has learned to select his food with the greatest care and to soften and make it more digestible by cooking it.

Indispensably necessary to the normal nutrition, however, is an undisturbed motility of the stomach, *i.e.*, the ability of the stomach to expel the chyme into the duodenum normally. The reader is referred to the description of the various tests of motility,—the test-dinner, the test-supper, the remnant-test, etc.,—in the foregoing General Section.

Practically speaking, the motor function of the stomach is seriously impaired only when there is mechanical obstruction at its outlet. The mechanical action of this function may be compared with that of the heart: as the left ventricle becomes hypertrophied and dilated in diseases of the aortic valves, that portion of the stomach, *i.e.*, the antrum pylorus, which lies behind an obstruction,—for instance, a cicatricial stenosis of the pylorus,—becomes hypertrophied and dilated. This is followed finally by dilatation of the entire stomach. The obstruction at the pylorus will at first be compensated exactly the same as in the case of the heart.

If, however, the obstruction is too marked, or if the demands upon the organ become too great, there occurs,—exactly as in disease of the heart,—a stage of disturbed compensation, *i.e.*, an insufficiency of its motility.

Every insufficiency, is, therefore, an obstruction of the pylorus in the stage of disturbed compensation.

Disturbances of motility caused by factors other than those of a mechanical nature are exceedingly rare,—occurring only after acute injuries, intoxications, etc. Sometimes the same factors that lower the general health of the patient,

such as neurasthenia, anæmia, and chronic malnutrition, impair the motility of the stomach; but this occurs only to a minimum degree, so that in such cases insufficiency of motility never follows.

For further details, the reader is referred to the chapter on Dilatation of the Stomach.

The position of the stomach is, generally speaking, unimportant, so far as diagnosis is concerned. The accurate determi-

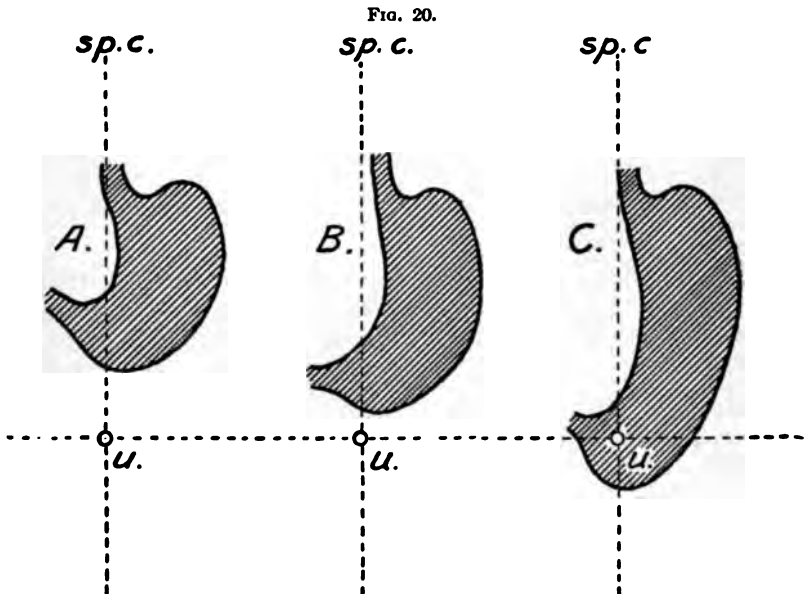


Diagram showing different positions of the stomach. C, typical vertical stomach; u, umbilicus; sp.c, vertebral column.

nation of the position of its greater curvature is of value only in locating tumors of the stomach or of the neighboring organs.

On the other hand, this is quite unimportant in differentiating between organic and functional affections of the stomach. As already mentioned, the greater portion of the stomach occupies a transverse position in the left hypochondrium, behind the left lobe of the liver, and in persons with *normal habitus*, only a small portion of it lies against the anterior abdominal wall. But in persons with *habitus enterop-*

ticus, the stomach stands almost vertical, with the greater portion of it lying against the anterior abdominal wall. The more emaciated and relaxed the abdominal wall is,—for instance, after pregnancy,—the more this will be the case.

The position of the lower border of the greater curvature of the stomach indicates, therefore, absolutely nothing concerning its motility, nor whether dilatation exists.

Splashing sounds in the epigastrium are only evidence of a relaxation of the abdominal walls, and of a considerable portion of the stomach lying in contact with the abdominal wall; they have no pathological significance, and have nothing at all to do with dilatation of the stomach, except when they occur in a fasting stomach.

Especial attention should be given to the *habitus*, because this has a marked bearing on the question as to whether an organic or a functional stomach-affection exists.

In general, functional stomach and intestinal diseases are found in persons with *habitus enteropticus*, while organic diseases of the digestive organs occur more frequently in persons with *normal habitus*. Of course, exceptions to these rules often occur; for instance, chlorotic ulcer is occasionally found in a woman with *habitus enteropticus*; and nervous dyspepsia, in patients who have *normal habitus*.

In doubtful cases, where the examiner does not know whether a neurosis of the stomach or a gastric catarrh or ulcer exists, he should satisfy himself as to the *habitus*; if an enteroptosis exists, he should not prescribe local measures to the stomach, but a general treatment. This precaution is especially needed in cases of young women up to the age of twenty, because it is at this period of life that a large number of patients are treated for ulcer who are really suffering from gastric neuroses, and *vice versa*.

It must be added here that quite a large number of patients have a combined functional and organic affection of the stomach. A functional dyspepsia may be associated with an organic disease of the digestive tract; for instance, with acid gastritis, intestinal catarrh, gall-stones, cancer, etc.

I take this opportunity to mention that cancer usually attacks those persons who, up to the time of their affection, have always had excellent digestion, excepting where the malignant affection has followed chronic ulcer. The probable reason for this fact is, that such persons have not made a careful choice of their diet (as persons suffering from poor digestion are obliged to do), and have for years eaten rich, indigestible foods, especially much raw fruit and coarse vegetables such as cabbage and turnips. This observation is equally as applicable to the parasitic as to the mechanical theory of the origin of carcinoma.

There is an intimate relationship between diseases of the stomach and those of the intestine. The recognition and knowledge of this association will prove of practical importance to diagnosis,—especially for the direction of the rational therapy.

Impaired gastric secretion, for instance, is very frequently the cause of chronic intestinal catarrh. In such a case, the gastric contents are not sufficiently chymified, and enter the intestine in this undigested state. In the course of a few years this causes chronic enterocolitis.

It is also true that intestinal catarrh,—whether associated with constipation or with diarrhœa,—very frequently produces gastric disturbances,—loss of appetite, neuroses of the stomach, eructation, distention and pressure in the abdomen,—as a result of the fermentation of food and the formation of gas in the coils of the intestines.

There exists, likewise, a close relationship between diseases of the digestive tract and those of other organs of the body. The general nutrition of the patient suffers after a long-continued disease of the digestive canal; but impairment of digestion is also caused by primary affections of the lungs, heart, spinal cord, kidneys, liver, and sexual organs.

It is often difficult to determine which is the primary and which is the secondary affection. For instance, in a patient who suffers from a catarrhal condition of the apex of one of the lungs, and from chronic dyspepsia, the physician is often at loss to know whether the chronic dyspepsia is the cause or the result of the lung-affection. In such cases, only continued observation of the patient will render the diagnosis positive.

PRELIMINARY REMARKS ON DIAGNOSIS

The chief task of the diagnostician consists in differentiating organic from functional disorders of the digestive tract. His success depends upon being able to make this diagnostic distinction correctly, for the entire treatment of the case will be governed thereby.

If the anamnesis has been rationally obtained, the examiner will usually be able at once to make the differentiation between organic and functional affections. In many cases, this is possible only after the physical and chemical examination; and in still other cases, the full diagnosis can be made only after continued observation of the patient.

Since this book is designed especially for the use of the general practitioner, only those methods are discussed, in detail, which do not require elaborate preparation and technic for their execution.

Unfortunately, the time has not yet passed, when every chronic stomach affection that has not been diagnosed "gastric ulcer," "cancer," or "dilatation of the stomach," is inaccurately classified under the general heading of "chronic catarrh of the stomach." Leube was the first to initiate a departure from this classification. He introduced the term, "nervous dyspepsia."

The fact should be strongly emphasized at the beginning of this discussion, that a large majority of stomach-affections are of a functional nature, and that the minority only are attributable to organic changes of the stomach.

Another frequent and incorrect diagnosis is that of "dilatation of the stomach." This diagnosis is very often and wrongly made, when splashing sounds are heard in the epigastrium and extend to below the umbilicus.

It is evident that in most of such cases there is only a displacement of the stomach downward,—a "gastroptosis," or the so-called "vertical" position of the stomach, caused by a relaxation of the abdominal walls, etc.

Acute dilatation of the stomach rarely occurs, as we shall see below.

A third very frequent diagnosis is "nervous cramps," or "contractions of the stomach."

In most of these cases, we have to do rather with gall-stone colic, intestinal colic, or with pylorospasm resulting from ulcer. Crampy or colicky pains of nervous origin practically never occur unless in the most severe cases of hysteria, or as the gastric crises of locomotor ataxia.

In general work, therefore, it is best not to make a diagnosis of "nervous contraction" or "spasms of the stomach."

One of the fundamentals in diagnosis is the consideration of the statement of the patients, as to whether they have actual pain or only pressure in the stomach. It is quite natural for a member of the laity to say that he has "pain," in speaking of any kind of discomfort; and only a very accurate examination will enable the physician to arrive at a correct conclusion as to the nature of the pathological conditions present.

It is on this account that patients should be made to describe their subjective symptoms with accuracy, since actual pain scarcely ever occurs in nervous or functional affections of the stomach and intestine. Functional disorders are accompanied by disagreeable sensations, such as pressure, distention, loss of appetite, nausea, etc., rather than by actual pain.

On the other hand, actual, severe, cramp-like, griping, burning, cutting, gnawing pains, which may radiate from the stomach to the back, to either side, upwards or downwards, are to be found almost exclusively in organic diseases of the stomach, intestine, or neighboring organs, such as the heart, spinal cord, kidneys, liver, gall-bladder, uterus, urinary bladder, or pancreas.

Actual pain, therefore, whether persistent or periodical, occurs almost exclusively in organic diseases.

Buch has proposed the term "*epigastralgia*" to designate paroxysms of pain which occur in the epigastrium. The use of this word should be encouraged, because the expression "*epigastralgia*" is not specific, while "*gastralgia*" specifically indicates that the location of pain is in the stomach.

We shall, therefore, in this book speak of "epigastralgia" when referring to cramp-like pain occurring in the epigastrium.

The diagnostic significance of epigastralgia is as follows:

In ulcer of the pylorus, epigastralgia occurs regularly at a certain time after eating, usually from one to four hours after the heavy meal of the day; rarely as early as thirty minutes after the meal, and never sooner.

Epigastralgia immediately after swallowing is usually caused by ulcer of the œsophagus or of the cardia. When it occurs a short time after eating, it is evidence of intestinal colic, but is considered by the patient as "stomach-ache" or "cramps."

Intestinal colic is generally independent of eating, while it is modified by the condition of the bowels and by the escape of gas. The pain is really due to flatulent colic.

Epigastralgia which occurs sporadically should always suggest the presence of cholelithiasis.

If the patient has only a feeling of pressure in the epigastrium, it is the duty of the physician to determine the time when it occurs and the kind of food that causes it. When pressure occurs only after eating solids and heavy articles of diet, it is, as a rule, due to chronic gastritis,—the popular so-called "chronic catarrh" of the stomach.

If the pressure is dependent rather upon the quantity than upon the quality of the food eaten, and if the pressure occurs after all foods,—for instance, after the patient has taken only a plate of soup,—a functional nervous stomach-affection exists.

If the patient suffers from pressure and distention when awakening in the morning, and if this pressure is not limited to the epigastrium but extends over the entire abdomen, there exists a chronic intestinal affection, which is the cause of the gaseous distention of the abdomen and the dyspeptic symptoms.

Concerning vomiting, the following may be noted: Vomiting which occurs immediately after swallowing suggests

that stenosis, dilatation, diverticulum of the œsophagus, or a disease of the cardia, exists. Reflex vomiting,—for instance, in hysteria, pregnancy, affections of the uterus, cerebral disease, peritonitis, etc.,—occurs almost always within the first ten minutes after the meal.

In primary stomach-affections, vomiting occurs some time after eating,—except in acute gastritis, when it occurs shortly after a meal.

It is necessary to differentiate vomiting from regurgitation, *i.e.*, the raising of the chyme simultaneously with eructation. Regurgitation is not associated with nausea or other discomfort, as in a case of vomiting; but the patient's mouth is filled with food from eructation, and he then expels it. Frequently patients, especially those who eat hastily, eructate their food as do the ruminating animals, *i.e.*, chew it and swallow it a second time; such patients are called "ruminants."

Outline of the Systematic Examination of a Patient Suffering from a Gastro-intestinal Affection

After obtaining an exhaustive anamnesis, which includes the family history, the personal history, the general symptoms, and the special complaints referable to the digestive canal, the physician should proceed with the examination.

He should determine whether *habitus enteropticus* exists, should ascertain the general nutrition, and the condition of the heart, lungs, etc., before examining the abdomen.

Inspection and palpation of the abdomen should first be made. Palpation should be made with the patient in the dorsal, right-side or left-side position,—sometimes in the upright position as in cases of pendulous abdomen; in diseases of the rectum, in the knee-elbow position.

The test-breakfast is to be given the patient only in a case where the diagnosis is not established by the anamnesis and the physical examination. The test-supper is to be given in the evening, and the stomach should be washed out the next morning before breakfast to determine whether stagnation of food exists. After this, the Boas-Ewald test-breakfast should be given and an hour later be removed from the stomach. The remnants obtained from the fasting stomach should be examined microscopically, and the test-breakfast chemically.

It is absolutely necessary to examine the fæces, both macroscopically and microscopically, in intestinal affections; and finally the urine should be examined for albumin and sugar.

SIGNIFICANCE OF COATING ON THE TONGUE

Most patients that suffer from chronic dyspepsia attach a great deal of importance to the appearance of their tongues. Many physicians also think they are able to form a conclusion as to the condition of the stomach from the thickness of the coating on the tongue. This is an error. A coated tongue and affections of the stomach are only indirectly related. The tongue is always coated if the patient does not chew his food, or if he masticates hurriedly; the reason for this being that mastication mechanically cleanses the tongue. For this reason the tongue is always heavily coated if there is no appetite, as in the case of acute diseases, while in chronic diseases, when the patient is masticating solids several times a day, the tongue will show scarcely any coating, though he may be suffering from either a functional or an organic disease of the stomach.*

INTRODUCTORY THERAPEUTIC REMARKS

In prescribing for a gastro-intestinal disorder, the physician should never neglect to give the patient a written diet-list. It is inexact and inadvisable to generalize in prescribing a patient's diet. He should be told what he must eat, rather than what he must not eat. The times for eating should also be definitely stated on the diet-list, as well as the time for mineral waters, medicines, enemata, baths, the hours of rest and exercise, and in short, all directions that will regulate the daily life of the patient.

It is always well to give as little medicine as possible, especially to patients belonging to the cultured classes of society. Where two different pharmaceutical effects are desired, the physician may best combine the medicament with some household remedy. For instance, he may give a bitter or potassium bromide with a soothing tea mixture; or he

*[Müller, in the "*Münchener Medizinische Wochenschrift*," 1900, No. 33, and Fuchs, in "Ueber den Zungenbelag und seine Bedeutung," Würzburg, 1898, were the first to make the observation that 62 per cent. of the healthy persons that they examined had coated tongues; and that caries of the teeth, stomatitis or catarrhal pharyngitis, etc., existed in 66 per cent. of young persons whose tongues were coated.]

may prescribe the medicine before eating and the household remedy, bicarbonate of soda, after the meal.

The physician should always avoid, so far as possible, overloading the patient with therapeutic procedures if he is obliged to continue his occupation. It is generally a mistake to forbid, too rigorously, beer, wine, tobacco, and other comforts and luxuries. The physician should be inflexible and strict with those patients only whose maladies are the result of their unhygienic manner of living, inebriety, overwork, irregular hours, overeating, etc.

He must, first of all, be sure that he will be able to treat the case successfully without institutional or clinical treatment. If he is in doubt, he should first institute ambulatory or office treatment; for instance, in the case of a patient who is suffering from ulcer of the stomach and who, on account of his poverty, is unable to choose his mode of living. It is always preferable, however, for such a case to enjoy the advantages of the rest-cure from the first.

In chronic nervous dyspepsia accompanied with marked emaciation, and where a general weakening of the entire constitution of the patient is responsible for the dyspepsia, the physician should advise sanatorium treatment for from four to six weeks, if possible, or a change of climate, because a large number of these patients are cured only when they are removed from conditions and surroundings which were the cause of the dyspepsia, and are transferred to more favorable conditions where they may have the advantages of the proper nourishment, rest, and change of scene.

A very large proportion of dyspeptics are sacrifices to the bad social conditions under which they live; too much work, too little recreation, improper nourishment, unhygienic dwellings, and the competition for bread,—while the better classes suffer from too many enervating pleasures.

The medical attendant in treating organic stomach and intestinal diseases should not direct all of his therapeutic measures against the local affection, but should at the same time treat the general condition.

Ordinarily a restricted diet, or in rare cases a total abstinence from food per os, is indicated in organic diseases of the stomach and intestine. Nervously exhausted individuals, however, usually require a nourishing and strengthening line of therapeutic measures. The physician, therefore, is obliged frequently to prescribe a combination of a nourishing and of a so-called "sparing" diet; for example, the diet must be suitable for a primary chronic catarrh of the stomach or intestine but must, at the same time, be sufficiently nourishing to maintain the strength and vigor of the patient. In such a case, therefore, the physician should prescribe a combined gastritis-fattening diet. Other examples might here be cited, but the subject will be dealt with in detail in the section on Dietetics.

There is only one chronic disease,—namely, gastric ulcer,—in which the diet from the beginning may contain fewer calories than are required to maintain the weight of the body. If a patient who is undergoing the rest-cure receives daily 35 to 40 calories per kilogram of body-weight, he will generally improve in nutrition.

It is well known that one gram of fat furnishes about 9 calories, and that one gram of albumin or one gram of carbohydrate furnishes about 4 calories. Cream contains, on an average, 20 per cent. of fat. In one litre of cream, therefore, there are 200 grams of fat, which are sufficient to furnish the entire daily food-requirements of a weak, bed-ridden patient. Milk, therefore, except in obesity, should be the basis upon which the complete diet of the patient is planned.

A. ORGANIC DISEASES OF THE STOMACH

Acute and Chronic Gastric Catarrh

Perhaps, of all stomach diseases, catarrh of the stomach is most frequently diagnosticated where it does not exist. If the physician is unable to make a correct diagnosis of a disturbance of digestion, he should be temporarily satisfied with the diagnosis "chronic dyspepsia," indicating merely that the patient is suffering from an affection which is accompanied by digestive derangements.

The diagnosis of chronic gastritis cannot be established until the examiner has ascertained that there is a permanent departure from the normal in the secretion of gastric juice, which is associated with pathological and anatomical alterations of the mucous membrane of the stomach. The same principle should guide the physician in cases of acute gastritis, which is very frequently confused with acute dyspepsia and reflex stomach-affections in neurotic individuals.

Acute Gastritis

Etiology.—The causes of acute gastritis are: overloading the stomach with indigestible food; poisoning by such tainted foods as sausage, pastry, meat, etc.; and infections.

Mycotic acute gastritis is that form of inflammation of the stomach generally called gastric fever. Its specific cause is not accurately known.

Gastritis caused by parasitic infections belongs to this form of stomach-inflammation.

Acute gastritis is most frequently caused by overloading the stomach in summer with fruit or cucumber salad, in combination with beer-drinking, and in winter by rich luncheons and dinners.

Enteritis is almost always associated with acute gastritis; constipation, rarely.

Acute inflammation of the stomach is produced by a much milder irritation in children than in adults.

It is scarcely necessary to mention that the presence of metallic and vegetable poisons in the stomach produces acute gastritis, which runs the same course as simple gastritis caused by other irritants. Mercury, acids, and alkalies, and medicaments such as the balsam of copaiba, extract of male fern, etc., are the most common irritants of this class.

Symptomatology.—The symptoms of acute gastritis consist of general and local subjective disturbances and general and local objective findings. The anamnesis shows that the patient has generally suffered one or two days from acute indigestion, after which the disease has set

in suddenly with nausea, vomiting, diarrhœa, lassitude, crampy pains, and chills.

Besides the foregoing appear the following symptoms, related specially to the digestive tract: pressure in the stomach, distention and a feeling of fulness in the epigastrium, gnawing pains after eating, especially solids; and in case the inflammatory process involves the intestine, crampy pains in the abdomen and diarrhœa occur.

In his objective examination, the physician will find the patient pale, with the appearance of emaciation, and often feverish. Sometimes there is herpes labialis and marked local sensitiveness to pressure over the epigastrium and abdomen.

Frequently jaundice and acute swelling of the liver and spleen are likewise found.

The secretion of gastric juice is diminished or totally lost, and the tongue is heavily coated.

Diagnosis.—The diagnosis of acute gastritis is usually easy, if there is a history of an alimentary derangement or toxic infection associated with intestinal disturbances. A differential diagnosis should always be made between acute gastritis and the large number of affections whose symptoms resemble those of acute gastritis; namely, peritonitis, appendicitis, incarcerated hernia, ileus, meningitis, scarlatina, and acute insufficiency of the stomach.

The symptoms of the gastric crises of tabes, of reflex vomiting in pregnancy, or of retroflexion of the uterus, may all closely resemble the gastric disturbances in acute gastritis. The physician will not be likely to make a mistake in the diagnosis, however, if he uses sufficient care in the examination of the patient, and if he keeps in mind the possibility of the presence of these other diseases.

Extremely important is the differentiation between acute gastritis and the acute nervous dyspepsia which frequently occurs in anæmic and neurasthenic patients, and is the first symptom of a chronic nervous affection of the stomach, as will be shown in the chapter on Gastric Neuroses.

This acute nervous dyspepsia runs its course without fever, herpes labialis, or diarrhœa. There is no history of such causative factors as errors in diet, etc. It manifests itself only by pressure in the stomach, a feeling of fulness, and loss of appetite.

Prognosis.—It is extremely rare for acute gastritis to result unfavorably, and then only when it is the outcome of a severe infection, as in acute yellow atrophy of the liver, Weil's disease, meat and sausage poisoning, and other intoxications.

Treatment.—The fundamental principles of the treatment of acute gastritis are the removal of the exciting cause, and the sparing of the inflamed organ. The physician should, therefore, carefully wash out the stomach if he is called to the case early, or he should administer an emetic, especially to children. The well-known tartar emetic with ipecac is suitable.

℞ Antimonii et potassi tartratis, gr. $\frac{3}{4}$ 0.05

Pulveris radices ipecacuanhæ, gr. xv 1.0

M. et ft. chartulæ No. iii.

Sig.—One powder every fifteen minutes until vomiting occurs.

For children, the physician should give, by preference, wine of antimony in doses of two to ten minims until vomiting results.

I give a laxative only in cases where the noxious material has already left the stomach, and where there is a high fever associated with constipation. The best laxative is castor oil. Calomel may be used for children.

Many physicians prescribe a laxative in every case of acute diarrhœa associated with vomiting. I consider this to be a mistake, because such treatment is unnecessarily weakening.

If the patient has no fever, or only a slight rise in temperature, after diarrhœa has continued for a few days, the physician should not administer a laxative, but should leave the cure of the diarrhœa to nature.

Opium should never be prescribed, since its use prevents the evacuation of the offending material, and necessarily prolongs the course of the infection. The use of belladonna or atropine is much more rational when there is an intense

irritability and hyperæsthesia of the intestinal tract. In the beginning of the disease, I prescribe the following mixture if nausea and vomiting are prominent symptoms:

℞ Acidi hydrochlorici, gtt. 16–24 1.0–1.5
 Aquæ menthæ piperitæ, ℥viss 200.0
 M. Sig.—One tablespoonful every hour.

As an after-treatment, I prescribe pure hydrochloric acid every two hours, 6 drops in a wineglassful of lukewarm water.

In this affection, I have found this mixture useful, to which, in some cases, I add 8.0 [ʒii] of the tincture of belladonna, together with menthol and valerian, as follows:

℞ Tincturæ belladonnæ foliorum,
 Spiritus menthæ piperitæ, āā ʒii āā 8.0
 Tincturæ valerianæ., ʒiv 16.0
 M. Sig.—Thirty drops in a cup of peppermint and valerian tea, three or four times daily.

Diet.—The dietetic treatment consists in the “starvation” diet. Nothing but peppermint tea, or black tea with cognac, and oatmeal gruel, should be given for the first two days of the illness. After nausea and vomiting have completely disappeared, the patient may be given beef tea, gruels, soups, and tea to which sweet cream has been added; and in case of diarrhœa, cocoa, and spiced wine which is prepared by cooking a red wine with cinnamon and cloves and diluting with water.

Solids should not be permitted until after the disappearance of diarrhœa; then gradually may be added rice broth, oatmeal porridge, stale white bread softened in liquids, and fresh butter; and later, pigeon broth, calves’ brain, and by degrees more solid foods, such as pike, perch, roast filet, veal, etc.

If the bowels have been constipated for a few days, light vegetables,—spinach, carrots, cauliflower, asparagus, and peas,—should be prescribed; and later, potatoes, bread, etc. Fruit should not be allowed for some time; nor acids for still longer.

Acute gastritis is entirely curable if the patient will adhere strictly to the proper diet; relapses, however, easily

occur if he assumes his ordinary habits of eating as soon as the first stormy symptoms of the disease have disappeared.

People who live at hotels and restaurants are especially exposed to this danger, as it is difficult for them to adhere to a rational diet.

It is proper to mention here, however, that at the present time there are dietetic restaurants in most of the large cities, to which the physician may send such patients.

Chronic Gastritis

General Remarks.—Formerly most of the chronic dyspepsias were called “chronic gastric catarrh”; but since Leube’s epoch-making work, only that gastric affection is called “chronic gastritis” in which there occurs the characteristic anatomical alterations of the mucosa.

Every chronic stomach-disease which the anamnesis shows not to be a case of ulcer, carcinoma, or dilatation of the stomach, should be designated at first as chronic dyspepsia. Further examination will determine whether an organic or a nervous-functional gastric affection exists.

Chronic gastritis is one of those diseases of the stomach in which no positive diagnosis can be made without examination of the secretions, because its subjective symptoms are so manifold and so frequently similar to those of other chronic affections of the stomach. By the anamnesis alone the physician can establish, as a rule, only a probable diagnosis; and besides, the test-breakfast is indispensable in differentiating between the various forms of chronic gastritis.

The anatomical changes in chronic gastritis are analogous to those of nephritis,* in which either the parenchymatous or interstitial tissues are involved.

The pathological process in gastritis rarely extends to the muscularis.

It is now a well-known fact that besides the usual diminution, or absence, of the gastric juice in gastritis, there are

* From a pathological and anatomical standpoint the classification is somewhat different, and approximately that of the nephritides, of which Hayem has given a practical classification.

cases in which there is an increase in the secretion of hydrochloric acid; indeed, it is even probable that there is an increased activity of the glandular structures in the first stages of all cases of chronic gastritis. This period of the disease rarely comes under the observation of the physician, for the reason that the symptoms are then usually latent.

FIG. 21.



Normal mucous membrane of the stomach (pylorus).*

FIG. 22.



Mucous membrane in interstitial and atrophic gastritis (alcoholic).*

In practical work, the following clinical forms of gastritis should be differentiated:

1. Acid and hyperacid gastritis (acid catarrh of stomach).
2. Subacid gastritis.
3. Anacid gastritis.
 - a. Catarrhal, or simple gastritis.
 - b. Interstitial gastritis.
 - c. Atrophic gastritis.
4. Stenotic gastritis or cirrhosis pylori.

* Specimens furnished through the courtesy of Dr. Ethel L. Leonard, Los Angeles, Cal.

The old view that stasis of the stomach-contents frequently occurs in chronic gastritis, is an error. On the contrary, the motility of the stomach in gastritis rather exceeds the normal, *i.e.*, the stomach propels the food into the intestine as soon after eating, or perhaps sooner, for the reason that normally the stomach must propel the food as well as its own secretions.

Stasis occurs only in stenotic gastritis; this form is exceedingly rare.

In gastritis, therefore, the secretory rather than the motor functions are impaired.

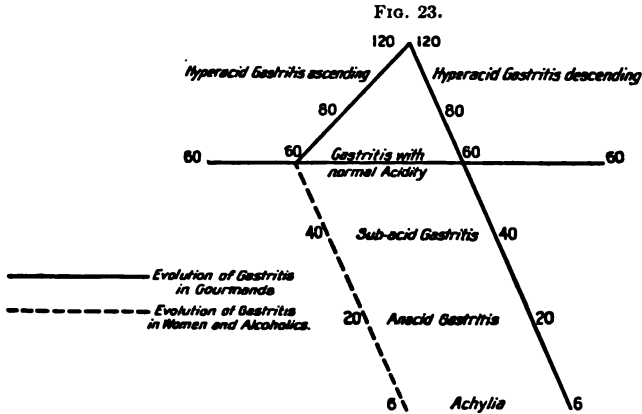


Diagram showing the development of the various forms of chronic gastritis.

The general nutrition of the patient suffers only when the appetite is lost, the motility disturbed by some complication, or the functions of the intestine become secondarily involved.

Etiology.—Chronic gastric catarrh arises, primarily, from the direct effects of injuries to the mucous membrane of the stomach; or, secondarily, as a complication of other diseases of the stomach or other organs of the body.

1. Primary chronic gastritis is produced from excesses in eating, drinking, and smoking; from the misuse of laxatives, especially of salines, such as Carlsbad salts; from continued improper mastication of food, irregular and hasty eating, or defective teeth; from insufficient nourish-

RELATIONS OF THE DOMESTIC CANAL

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irritation of the gastric mucosa has been caused by the stagnating food-contents of the stomach.

Symptomatology.—As in every other disease of the alimentary tract, there are present both general and local subjective symptoms, and both general and local objective findings.

1. The general subjective symptoms are lassitude, disinclination to work, and frequently loss of appetite or perversion of taste.

The local subjective symptom is pressure in the stomach, especially after eating solids,—which is a general symptom of all forms of gastritis. After the patient has taken soups or other liquids, except cold drinks, this pressure does not occur.

Pressure in the stomach is characteristic of gastritis, especially if it occur after the patient has eaten such foods as beef, hard bread, cabbage, cheese, hard-boiled eggs, fried potatoes, meats, etc.

Actual pain, as well as vomiting, rarely occurs in chronic acid gastritis. In advanced forms of atrophic gastritis, gnawing pains and vomiting usually occur several hours after indiscretions in diet.

In stenotic gastritis caused by hypertrophic stenosis of the pylorus, vomiting and pain set in regularly after errors in diet. Food-stasis occurs exclusively in this form of gastritis.

Pyrosis, so-called “heart-burn,” occurs in hyperacid gastritis.

2. The general objective findings are: Individuals suffering from chronic gastritis may be well or badly nourished, according to the amount of food they are able to take, which is in turn dependent upon the appetite, and upon whether they suffer much or little after eating. It has already been mentioned that nutrition does not suffer from deficient gastric digestion alone, but rather from a diminution in the amount of food which enters the body.

The majority of patients suffering from chronic gastritis are anæmic, under-nourished, and have the appearance of

being ill, although there are quite a large number of patients suffering from chronic gastritis that are well nourished.

The administration of the test-supper (see Special Section) will show that the motility of the stomach in gastritis is quite normal. The examination of the test-breakfast always shows characteristic deviations from the normal.

In hyperacid gastritis, the total acidity is increased, on the average, to 80, but in some cases it may reach to as high as 120.

The diagnosis of gastritis may be established if the patient gives the characteristic symptoms and etiology of the disease, even when the total acidity is normal, *i.e.*, T.A. 40 to 60 (*gastritis acida orthochlorica*).

In subacid gastritis, the total acidity amounts to less than 40. Free hydrochloric acid is still present, however, as will be shown by the blue reaction of red congo paper. The test-breakfast shows that the chymification of food is but little reduced. In this form of gastritis, the diagnosis is established only by the general *ensemble* of symptoms.

In an acid gastritis, free hydrochloric acid is entirely absent, congo paper is not colored blue, and the total acidity amounts to 20 or less. The production of ferments is diminished or entirely absent, as has been explained in the General Section.

All references to the total acidity of the gastric juice apply to the Boas-Ewald test-breakfast, which consists of 60 to 65 grams of dry white bread and 400 c.c. of water. Since white bread always contains practically the same proportion of albumen, the amount representing the total acidity in which free hydrochloric acid is present must always be approximately the same. In general, it may be said that free hydrochloric acid is secreted when the total acidity of the gastric juice amounts to 20 or more.

Atrophic gastritis exists when there is permanent cessation of the secretion of gastric juice. The total acidity amounts to from 5 to 8; in interstitial gastritis, from 10 to 16. In simple catarrhal gastritis, the total acidity amounts to from 16 up to the occurrence of the secretion of free hydrochloric acid. The diminished secretion of gastric juice in atrophic gastritis is accompanied by a corresponding decrease in the amount of rennin and pepsin. (See General Section.)

The less the test-breakfast is mixed with the gastric secretions, the less digested is its appearance. If there is total absence of gastric juice, the test-meal has the appearance of having been chewed and immediately eructated. This condition has been designated by Einhorn, "*achylia gastrica*."

The amount of mucus in the stomach-contents is subordinate to other signs, in making the diagnosis, for the reason that a pharyngitis almost always exists simultaneously.

The appearance of the tongue in chronic gastritis is entirely dependent upon the appetite, which, in some cases, is very good. The less the patient masticates his food, the more the tongue will be coated, because the latter does not receive the mechanical cleansing which results from mastication.

The vomiting of mucus early in the morning, so-called *vomitus matutinus*, occurs very frequently, as is well known, in alcoholic gastritis. Boas has shown, however, that this depends upon co-existing pharyngitis and œsophagitis; the large amount of mucus produced by catarrh of the pharynx, and the sputum, pass into the œsophagus during the sleep of the patient, and cause him to awaken early in the morning with tickling and irritation of the throat, spells of nausea, and usually vomiting of the swallowed mucus.

Only in rare cases does the mucus in the *matutinal* vomiting have its origin in the stomach itself.

Another objective symptom is sensitiveness to pressure in the epigastrium. This is never so localized and intense as in ulcer of the stomach, but is more diffuse. Pyrosis, which occurs in hyperacid gastritis, will be spoken of below.

Prognosis and Course.—The prognosis of chronic gastritis, so far as life is concerned, is very good, while the chances for complete recovery are poor. Most cases are clinically cured; that is to say, by adhering to a rational diet, such patients are freed from suffering and enjoy good health. The physician, however, is never able to guarantee the patient exemption from relapse, should errors in diet be made, for a sufferer with chronic gastritis must, in a measure, during his entire life, "cut the garment according to the cloth."

Complete restoration can result only if treatment is sought during the initial stages of the disease, *i.e.*, in hyperacid gastritis, subacid gastritis, or catarrhal gastritis, in which forms few or no interstitial alterations of the mucosa of the stomach have occurred.

Chronic gastritis may exist for years without symptoms, which will then appear gradually. Later in the disease, the intestine may become involved from the irritation to which it has been for a number of years subjected by the introduction of undigested food.

In other cases, the same etiological factors,—such as, for instance, the abuse of alcoholic stimulants and overeating,—may simultaneously produce an inflammation of the stomach and of the intestine. It is for this reason that a large number of patients suffer from gastritis and chronic diarrhœa at the same time; while in other cases, intestinal symptoms precede stomach-indigestion.

It should, therefore, be emphasized here that examination of the stomach-contents is absolutely essential in all cases where patients suffer from chronic diarrhœa, although they may not complain of trouble in the stomach after eating.

The nutrition in gastritis suffers very considerably when it is associated with diarrhœa, otherwise these patients are well nourished until there is a diminution of the appetite.

The prognosis of chronic gastritis is, therefore, dependent upon whether the patient is able to bring about a change in his usual customs and habits; whether he continues to smoke and drink; whether he persists in hasty and irregular eating; and whether, if poor, he has the advantages of a suitable dietary and sufficient rest.

Hyperacid gastritis gradually progresses into the subacid and anacid forms of the disease, if the *causa morbi* remains active.

Diagnosis.—The diagnosis of chronic gastritis is usually easy if the physician, in addition to the anamnesis and the physical examination, gives the test-meal. Diagnosis should be formed from the complaints of the patient and the findings

of the examination, but never from either of these alone, if the examiner would avoid being frequently led into error.

The most important subjective symptom is *pressure* which occurs after eating solids. Objectively, the most important diagnostic sign is a pathological alteration in the secretions of the stomach. Besides these, an etiological factor must be ascertained by the anamnesis.

Differential Diagnosis.—Gastric neuroses and functional dyspepsia are the most frequent stomach-affections to be differentiated from gastritis.

In these affections, the general statement may be made, that pressure occurs after eating any kind of food,—after liquids as well as solids,—and that the gastric secretions are normal, or else variable from day to day.

Besides this, gastric neuroses occur principally in persons with *habitus enteropticus*, while gastritis is found usually in persons with *normal habitus* (see above).

Hence the differential diagnosis is difficult only when, on account of nervous influences, the secretion of hydrochloric acid is also diminished.

The physician will be assisted in establishing an exact diagnosis by an accurate examination of the gastric ferments,—rennin and pepsin,—which, in neuroses, should be found present in normal amounts; and also by a consideration of the general condition and symptoms of the patient.

Gastritis is, as a rule, easily differentiated from ulcer of the stomach, because in ulcer the patient suffers from epigastralgia rather than from pressure. This epigastralgia sets in, as a rule, one or two hours after the principal meal, and the acidity of the gastric juice is almost always increased.

The differentiation will be difficult only when there are erosions or fissures of the pylorus in hyperacid gastritis. In such cases, likewise, burning or gnawing pains occur in the epigastrium some time after eating. In these cases, the physician is no longer concerned with pure gastritis, but with the combination of erosions or ulcer with gastritis. In general this is rare, and occurs only in patients who smoke to excess.

Gastritis is very easily differentiated from dilatation of the stomach, because in gastritis no stagnation of food occurs. Only in stenotic gastritis (*cirrhosis pylori*) does one find a combination of ectasia and chronic gastritis. The inflammatory process produces, in these cases, a hypertrophic stenosis of the pylorus, with secondary motor insufficiency and dilatation of the stomach.

It is seldom possible to differentiate gastritis from the initial stage of carcinoma. If the cancer is not located at the pylorus or at the cardia, no obstructive symptoms are present; and if no tumor is palpable, the physician will find objectively nothing more than the same evidences of achylia gastrica as occur in benign atrophy of the mucous membrane.

The subjective symptoms of the initial stage of carcinoma are also the same as the subjective symptoms of gastritis. Only by a microscopical examination of the stomach-contents, obtained several hours after eating, may the diagnostic points be learned for the differentiation of these doubtful cases. The presence of many pus- and blood-corpuscles in the stomach-contents is an evidence of cancer.

The failure of the Rhodankalium reaction in the saliva (appearance of a red color after adding one drop of ferric chloride), according to Schmidt, of Vienna, is an evidence of cancer.

The many varieties of gastritis are, as a rule, easily differentiated by the examination of the gastric juice and by making the ferment-tests (see page 29).

Treatment.—The treatment of chronic gastritis is: (1) hygienic; (2) dietetic; (3) medicinal; (4) mechanical; and (5) balneological.

1. *Hygienic.*—In alcoholic gastritis (hyperacid and anacid forms), drinking and smoking are to be especially limited, or, if possible, entirely prohibited for a long time.

When gastritis has originated from insufficient mastication, in consequence of defective teeth, the patient should be referred to a dentist. The great value of eating leisurely, and the disadvantages of hasty eating, are to be strongly impressed upon the patient.

Compression of the epigastric region by tight clothing must also be condemned.

If the disease is attributable to the misuse of saline laxatives, evacuation of the bowels should be obtained by substituting dietetic and mechanical measures.

2. *Dietetic*.—The dietetic treatment is similar in all forms of chronic gastritis. A few exceptions, which will be separately considered, are to be observed in acid gastritis. The dietetic treatment of gastritis is dependent upon the principle that the inflamed mucous surfaces should be spared as much as possible, and that the diet must be adapted to the altered functions of the gastric mucous membrane. Soft, pulpy foods, therefore, must predominate in the diet, while solids should be largely eliminated.

A. Diet in Subacid and Anacid Gastritis.—The following foods should be forbidden: hard bread, pumpernickel, and hardtack; coarse vegetables, like cabbage and fried potatoes; raw fruit, stewed acid fruits, such as currants or gooseberries, and fruits containing seeds; legumes and nuts, of milk products, hard cheese and sour milk; of meats, bacon, goose, duck, fat ham, mutton and pork; smoked fish, such as red herring and salmon; also hard-boiled eggs, mayonnaise, and all forms of fat except butter.

The following foods are allowed:

a. Soups in every form and consistency, beef tea, with the addition of eggs, cereals, noodles, macaroni, and soft vegetables; oatmeal, flour, milk, and bread soups, etc.

b. Rice, sago, millet, tapioca, oatmeal,—cooked in broth or milk; purée of potato, Brussels sprouts, spinach, carrots, green peas, asparagus, and cauliflower; fruit gelatins and sweet stewed fruit, such as apple sauce, plum sauce, strawberries and raspberries.

c. White bread, toasted white bread, zwieback, "Force," and in mild cases, small amounts of English white bread.

d. Milk, cream, and butter.

e. Chicken and pigeon,—boiled or broiled in butter; veal,—boiled or broiled medium rare; calves' brain and sweet-

bread; beef and ham free from fat, which may be roasted or grilled.

In severe cases, such as atrophic gastritis, only the most tender meats and lean fish, such as pike, perch, flounder, and shell-fish; roe, pheasant, partridge; but never hare, deer, nor any smoked game.

f. The following relishes and beverages are allowed: tea, small amounts of coffee, diluted wine, mineral water, with or without the addition of fruit juices; cocoa, chocolate, caviare, sardines, and spices.

g. Artificial foods: puro, sanatozen, somatose, meat jellies, meat juices, and calves'-foot jelly.

In the treatment of chronic gastritis, the condition of the bowels and the general health of the patient must be carefully taken into account. For instance, if constipation exists purées of fruits and vegetables, fruit juices and koumiss are to be prescribed. On the other hand, if diarrhœa or a tendency toward diarrhœa is present, all foods that stimulate peristalsis should be avoided and only those prescribed that have an astringent effect,—such as cocoa, red wine, huckleberry wine, etc.

Very frequently, in gastritis, it is necessary to combine the gastritis and the diarrhœa dietaries; or the gastritis-constipation and the gastritis-fattening dietaries. (Special diet-lists will be found in the Dietetic Outlines.)

B. Diet in Hyperacid Gastritis.—The diet in this form of gastric catarrh differs from the diet in chronic gastritis, in that all fats and spices, and other strongly irritating foods, as well as strong coffee, tobacco, and cold drinks,—such as beer, champagne, and white wine,—must be absolutely forbidden. Sweetmeats and rich dinners, especially for patients who have thus brought about acid gastric catarrh, should be avoided. Warm drinks are to be recommended, such as hot milk, warm Vichy water, etc., to relieve the burning pains and pyrosis of the stomach.

From the practical standpoint, the remaining therapeutic procedures in the different forms of gastritis should be separately considered:

I. Hyperacid Gastritis

(Acid Catarrh of the Stomach. Gastrite Hyperpeptique.)

3. Medicinal Treatment.—

a. Belladonna preparations are prescribed for the suppression of hypersecretion.

b. Bitters are used for the stimulation of the appetite.

c. Antacids should be symptomatically given after eating, to neutralize the acidity of the gastric juice.

Belladonna is to be given in the form of the extract, the tincture, or as atropine in solution or tablets.

Of the bitters, condurango bark is the most effective; either a teaspoonful of the decoction or of the fluid extract should be given before meals. Other bitters are the tinctures of rhubarb or gentian, the compound tincture of cinchona, the fluid extract of calamus, or bitter almond water, which may be given before meals, in doses of one-half to one teaspoonful. Resorcinol and creosote are also recommended.

The antacids should be prescribed according to the following principles:

1. If the bowels are normal, sodium salts, sodium citrate, bi-carbonate or phosphate should be given.

2. If constipation exists, magnesium salts,—calcined magnesium or magnesium-ammonium phosphate,—should be prescribed.

3. In diarrhoea, the salts of calcium,—calcium carbonate and calcium phosphate,—should be used.

As a rule, the following prescriptions are all I have needed:

1. ℞ Tincturæ belladonnæ foliorum, ℥ lxxx-ʒiiss 5.0-10.0
Tincturæ gentianæ,
(or calami, rhei, or cinchonæ), ʒi 30.0
M. Sig.—30 to 40 drops, 5 to 15 minutes before meals on sugar
or in a wineglassful of water.
2. ℞ Extracti belladonnæ foliorum, gr. iii-ivss 0.2-0.3
Sodii bicarbonatis,
Magnesii oxidi, āā, ʒv 20.0
M.ft.pulv. Sig.—One teaspoonful 2 or 3 times daily, 1 to 3
hours after meals for cramp-like or burning pains in the
epigastrium.

3. ℞ Extracti condurango fluidi, ℥iiss 50.0

Sig.—One teaspoonful t.i.d., 5 to 15 minutes before eating, for loss of appetite.

4. ℞ Solution argenti nitratis—gr. viiss : ℥viss 0.5 : 200.0

Sig.—One tablespoonful (porcelain) in a wineglassful of distilled water 15 minutes before eating, for pyrosis.

In acid gastritis, if, besides the usual pressure, there also occur burning pains in the epigastrium two or three hours after a heavy meal, the physician must always think of the possible complication of erosion and catarrh. If the pains are of a crampy nature, the erosion is most probably located at the pylorus. In such cases, the physician should prescribe belladonna combined with an alkali. (See above.)

In addition to these remedies, the following medicaments are very useful:

1. ℞ Bergmann's or Belloc's mastication tablets.

Sig.—One to three tablets after meals.

2. ℞ Extracti belladonnæ foliorum, gr. iiss 0.15

Bismuthi subnitrat̄is, ℥iv 15.0

M. Sig.—One knife-pointful three times daily after meals.

These "mastication tablets" should be chewed as thoroughly as possible and dissolved in the mouth; this will cause the patient to swallow a large amount of saliva, which will tend to neutralize the hyperacid gastric juice.

The Bergmann tablets are effective almost entirely through this mechanical effect of stimulating the secretion of saliva; while the Belloc tablets contain belladonna, charcoal, and magnesia.

The chewing of hard bread-crusts, or taking a hot drink about an hour after meals, relieves the pain by introducing an increased amount of saliva into the stomach and by diluting the gastric juice.

Medicaments for the relief of pain should always be given about one-half hour before the attack usually occurs.

4. *Mechanical Treatment.*—In acid gastritis, lavage is usually superfluous, unless stagnation of the stomach-contents occurs as a complication.

It must be said, however, that irrigation of the gastric mucous membrane with a 1 to 1000 solution of silver nitrate is decidedly beneficial in cases of acid gastritis complicated with erosions. Irrigations with a solution of sodium bicarbonate or Carlsbad salts are also recommended.

Bourget has recently advised lavage with a one per cent. solution of liquor ferri chloridi in stubborn cases of acid gastritis. One hundred c.c. of this solution are introduced and afterwards washed out with warm water.

The idea that the mucous membrane must be cleansed of its adherent mucus in every case of chronic gastritis is now obsolete.

The use of hot mud-poultices or Priessnitz compresses is recommended if erosions of the mucosa are suspected.

5. *Balneological Treatment.*—The physician should prescribe Carlsbad or Neuenahr water for patients who are strong and rugged, and Vichy for those who are delicate. These waters should always be taken hot, about 35° to 40° R. [110°–112° F.] The direct use of the water at the springs is most effective. As home treatment, these mineral waters may be given at the same temperature; while with patients of the poorer classes, it is advisable to prescribe either the natural spring-water salts or the artificially prepared salts dissolved in water. Three or four glasses, each containing 200 c.c. of water, should be given daily before meals,—one or two glasses early in the morning before breakfast, one glass at mid-day and one in the evening. This treatment should continue six or eight weeks.

II. Subacid and Anacid Gastritis

The (1) hygienic and (2) dietetic treatment has already been considered, and for the suitable dietary the reader is referred to the Dietetic outlines.

3. *Medicinal Treatment.*—In these forms of gastritis, actual pain almost never occurs, except after gross errors in diet. Narcotics and antacids are therefore not required, because hyperacidity does not exist.

On the other hand, bitters (see above) are more freely prescribed, for the reason that the appetite in these cases is generally much decreased.

As a rule, the use of hydrochloric acid, either alone or in combination with a bitter, should be in amounts proportionate to the atrophic process of the mucous membrane of the stomach.

The following prescriptions are suitable:

1. *Acidi hydrochlorici off.*, ℥i 30.0

Sig.—Eight to ten drops in a wineglassful of water three times daily immediately after meals. (In severe cases, repeat the dose in half an hour; and in total atrophy with enterocolitis, repeat the dose a third time.)

2. ℞ *Acidi hydrochlorici diluti*, ʒss 2.0
Tincturæ gentianæ (rhei, etc.), ℥i 30.0

Sig.—One-half teaspoonful three times daily.

3. ℞ All Bitters.

Sig.—One-half to one teaspoonful three times daily before meals.

In general practice, the following remedies are especially valuable in atrophic gastritis: Pepsin, papain in tablets of 0.3 to 0.5 [5 to 8 gr.], or pancreatin in knife-point doses. Recently the use of pancreon in tablets of one-half gram, or as a powder combined with sodium bicarbonate in knife-point doses, has been found beneficial.

Pepsin should be administered in combination with hydrochloric acid, because it is active only in an acid medium. The other preparations should be administered without hydrochloric acid, because of the well-known fact that, with the exception of papain, they are able to digest albumin only in an alkaline medium.

In the medical treatment, the examiner must very frequently take into consideration the condition of the intestine, because there is often a co-existing intestinal catarrh with diarrhœa or, more rarely, with constipation. For a detailed consideration of this subject, the reader is referred to the section on Enterocolitis.

4. *Mechanical Treatment.*—Lavage and irrigation of the mucous membrane of the stomach with normal alkaline solution is beneficial, but not absolutely necessary. A positive indication for lavage does not exist. Neither can favorable results be expected from electrical treatment, for the reason that motility in this form of gastritis is nearly always normal.

5. *Balneological Treatment.*—The sodium chloride mineral water of the Rakoczy spring at Kissingen, the Kochbrunnen of Weisbaden, and the Elizabeth spring at Homburg, as well as those at Baden Baden, Ems, etc. [Champion, Congress, and Hawthorn springs at Saratoga, N. Y., or Blue Lick springs, Ky.], are indicated in subacid or anacid gastritis. Whenever possible, the patient should be sent to one of these places to follow out the treatment, or, if necessary, he may drink the bottled waters at home. Patients who are in limited circumstances may, however, be given the artificially prepared salts, dissolved in warm water.

If this form of gastritis is associated with constipation, the water should be drunk slightly warmed. If there is a tendency toward diarrhœa, on the other hand, it should be drunk as hot as possible, and in smaller doses.

III. Stenotic Gastritis

This form of gastritis is exceedingly rare. It is caused by hypertrophy of the musculature of the pyloric end of the stomach, as a compensatory process brought about by the increased demands made upon the organ in atrophic gastritis; for it is evident that more muscular power is demanded of the stomach to propel foods not sufficiently chymified into the duodenum than foods which are well digested and mixed with an abundance of gastric juice.

Hypertrophy of the *pars pylorica* frequently simulates the symptoms of a tumor of the pylorus, since besides the thickening of this part of the stomach, there is,—in consequence of the hypertrophic stenosis of the pylorus,—stagnation of the stomach-contents, with lactic-acid fermentation.

In these cases, only by a long observation of the patient is the physician able to differentiate stenotic gastritis from cancer of the pylorus. (For further details concerning the differential diagnosis, the reader is referred to the chapter on Microscopic Examination of the Gastric Contents.)

Treatment.—The hygienic, dietetic, and mechanical treatments are the same as in stenosis of the pylorus. The physician is referred, therefore, to that subject for the details in the management of these cases. It need only be mentioned that in stenotic gastritis, a total atrophy of the gastric glands is present. Meats, therefore, should be prescribed in the form of purées only. This precaution is not needed in the other forms of benign stenosis of the pylorus, for the reason that in these the gastric juice is secreted in amounts sufficient to peptonize meat. All hard or coarse foods and, in fact, all foods not of a liquid or semi-liquid nature should be strictly forbidden.

Mechanical and Medicinal Treatment.—Olive oil, milk of almonds, hydrochloric acid, pepsin, and the bitters are to be prescribed as detailed in the chapter on Treatment of Ulcer of the Stomach, to which the physician is referred.

Balneological therapy is contraindicated, since this form of treatment would cause an overtaxing of an already dilated stomach.

In general, the treatment of stenotic gastritis is identical with that of cancer of the pylorus.

In severe forms, which have produced a high degree of stenosis, the physician is in duty bound to advise operation (gastro-enterostomy).

IV. Secondary Gastritis

The rational treatment of secondary gastritis is naturally that of the primary disease; for instance, in affections of the heart, digitalis should be used, etc., etc.

If the primary disease is incurable, the physician must treat the gastritis symptomatically, in the same way as he would treat gastritis of any other form. Especial emphasis should

be given to the great value of free diuresis and regular evacuation of the bowels in gastritis produced by passive congestion of the mucous membrane. Under this treatment, the gastric symptoms very frequently disappear.

In the following I will add the histories of a number of clinical cases, which will illustrate the various forms of gastritis:

CLINICAL CASES

1. Acid Gastritis

CASE 1.—F. A., a policeman, 25 years old, entered the clinic November 8, 1902. For four months he had suffered from severe pyrosis, most marked an hour and a half after meals; and from pressure and burning in the epigastrium, especially after eating fatty foods. He was very strong, rugged, and corpulent. The test-breakfast showed a marked increase in the hydrochloric acid of the stomach,—the total acidity being 114.

Treatment.—The patient was given a teaspoonful of Sprudel salts, dissolved in a glass of warm water, early in the morning before breakfast, and a teaspoonful of the following prescription twice daily, one hour after meals:

℞	Extracti belladonnæ foliorum, gr. ivss	0.25
	Magnesii oxidi,	
	Sodii bicarbonatis, ãã ʒviss	25.0

Smoking and drinking were forbidden. Under this treatment the symptoms disappeared entirely in ten months, when the total acidity was 70.

CASE 2.—Carl V., a laborer, 29 years old, entered the clinic December 31, 1902. For a year and a half or two years, the patient had suffered from pressure in the stomach, especially after drinking beer and eating coarse solids,—such as cabbage, rye bread, potatoes, etc. Soft foods and warm drinks, on the contrary, had produced no discomfort. Pressure in the stomach was so great at times that the patient sought relief by artificially produced vomiting. Appetite was good. Stools were dry and hard. The patient gave a history of excessive eating and drinking (ten to twelve steins daily), and smoking. Physical examination negative. Total acidity of the test-breakfast, 108.

Treatment.—This consisted in the administration of Carlsbad salts, belladonna, tincture of valerian, and a mild diet. Ten days later the patient was much improved, and the total acidity was 80. After one month's treatment, the pressure in the stomach had absolutely disappeared. In presenting the case three months later, the patient stated that he was entirely free from gastric discomforts.

2. *Subacid Gastritis*

CASE 1.—Carl J., a printer, 54 years old, entered the clinic October 14, 1902. For years the patient had suffered from pressure in the stomach, which was preceded for some time, by frequent vomiting of mucus in the morning. The patient had a tendency to diarrhea. There was a history of alcoholism. He was poorly nourished. Physical examination was negative. Total acidity, 24. There was only a weak reaction to rocco paper.

Treatment.—Rakoczy water, hydrochloric acid, and a puree diet, resulting in improvement.

CASE 2.—Emily H., 45 years old, the wife of a laborer, entered the clinic April 1st, 1903. She had suffered from stomach trouble for twenty years, with gastric pressure in the epigastrium from one to one and one-half or two hours after eating solids,—such as tough meats, potatoes, bread, cheese, etc. Of late she had suffered much from diarrhea, associated with crampy pains. There was always a tendency to vomiting. The teeth of the patient were in poor condition. She had undergone many privations, with irregular, impoverished meals. Total acidity of the test-breakfast, 34.

Treatment.—Rakoczy water, belladonna to combat the crampy pains, and a constipating diet. The improvement was only temporary, as after errors of diet,—for instance, after eating meats, etc.—the patient suffered again from pressure in the stomach, instantaneous diarrhea and distention of the abdomen.

3. *Anacid Gastritis*1. *Catarrhal Gastritis*

CASE 1.—Frederick B., a tailor, 31 years old, had for two years suffered from pressure in the stomach after eating solids, and had an inclination to diarrhoea. There had been an exacerbation of the symptoms for two weeks, after he had eaten currants. Patient's appetite was poor, except for highly seasoned foods. He was emaciated and pale. He had catarrh of the apex of the right lung. The greater curvature of the stomach reached to the umbilicus. The microscope showed the test-breakfast to be poorly digested. The total acidity was 20.

Treatment.—Kissingen water; a diet of semi-solids; and hydrochloric acid. Five weeks later, pressure in the stomach had almost entirely disappeared, and patient was discharged.

CASE 2. Herman B., a railroad laborer, after an accident about one year previous, had suffered from severe pressure in the stomach, loss of appetite, emaciation and constipation. There was a history of alcoholism. The total acidity of the test-breakfast was 20. Rennin was positive, giving a cake-like coagulation in a dilution of 1 to 80, and a flaky coagulation in a dilution of 1 to 160. Pepsin-digestion equaled 50 per cent.

After the use of Kissingen water for several months, with a semi-solid diet and hydrochloric acid, the patient was greatly improved in health.

2. Interstitial Gastritis

CASE 1.—August M., a laborer, 41 years old, had suffered from pressure in the stomach, especially after eating such hard foods as peas, beans, cabbage, cheese, and meats. After soups and liquids there was an absence of all symptoms. He had occasional diarrhoea. The appetite was poor. There was a history of alcoholism. Patient had a good physique, but was anæmic and emaciated. He had an ulcer of the rectum. Greater curvature of the stomach $\frac{3-4}{U}$. The total acidity was 14. Rennin-ferment was positive in a dilution of 1 to 20. Pepsin-digestion equaled 15 per cent.

After a treatment with Rakoczy water, hydrochloric acid, and suitable diet, patient slowly improved.

CASE 2.—Carl B., a teamster, 34 years old, had suffered from a feeling of fullness in the epigastrium and loss of appetite for seven years. He had never vomited. There was no history of alcoholism. On account of his occupation, he had eaten hastily and irregularly. He had had frequent diarrhoea. The total acidity was 15. The rennin-test was positive in a dilution of 1 to 40. There was no improvement; on the contrary, the total acidity diminished to 8, the inflammatory process gradually producing atrophy of the gastric mucosa.

3. Atrophic Gastritis

CASE 1.—Dr. H., an American physician, had for years eaten hastily and irregularly. He had used purgative remedies a great deal. There was always pressure in the stomach after meals. The test-breakfast was entirely achylous. The total acidity was 6. The lab and pepsin ferments were absent. After the rest-cure and the use of pancreon, and a gastritis-fattening laxative diet followed in a sanatorium, the symptoms entirely disappeared. The *achylia gastrica* was not improved.

CASE 2.—Therese B., a widow 67 years old, had for two years suffered from pressure in the stomach after eating solids, but experienced no discomfort after eating soups or liquids. There had been an inclination to diarrhoea, especially after taking cold. She had masticated insufficiently for years, because of having no teeth. Total acidity of the test-breakfast was 8. There were traces of rennin and pepsin.

Treatment.—Kissingen water, hydrochloric acid, and gastritis diet. A subjective clinical cure soon resulted.

CASE 3.—Selma S., a dressmaker, 40 years old, had for eight years suffered from stomach trouble, with frequent and irregular vomiting, which was not dependent upon meals. Bowels had been regular. The appetite was good. There was no gastric discomfort immediately after meals. During the menstrual period the vomiting was more severe. The patient had suffered privations for years, and had lived largely on coffee, bread, and

lard. She was very pale and emaciated. The physical examination was negative. The test-breakfast was entirely achylous. The total acidity was 8. There was no rennin nor pepsin.

Treatment.—Rakoczy water, hydrochloric acid, and semi-solid diet. After twenty days' treatment the patient was free from discomfort.

Ulcer of the Stomach and Duodenum

Clinical and Pathological Remarks.—An ulcer of the stomach represents a loss of substance in the mucous membrane, and varies in size from the head of a pin to the palm of the hand. It is generally situated on the lesser curvature, in the pyloric antrum, or in the pylorus; and, more rarely, in the other parts of the stomach.

Ulcers which are found outside of the stomach in the cardiac end of the œsophagus and in the duodenum are, because of their well-known etiology, also called "peptic" ulcers.

The above-mentioned breaks in the continuity of the mucous membrane vary in quality as well as in size. For instance, erosions of the *pars pylorica* occur (similar to erosions of the lips, nose, and mucous membrane of the mouth and rectum), which very frequently produce the same clinical phenomena as ulceration of the stomach.

Still further distinctions should be made in the pathology of ulcers, such as between the mucous ulcer occurring in chlorosis, the simple peptic ulcer without indurated edges, and the chronic indurated ulcer. Multiple ulcers may exist at the same time.

Etiology.—The etiology of ulceration of the stomach is so obscure that the exact cause is often impossible to establish; but in every individual case, the ability to do this would be most desirable, so that the therapy might be properly directed.

Aside from infectious diseases, such as tuberculosis and syphilis, there are two great etiological factors:

1. Disturbances of the circulation, which appear in chlorosis, at the beginning of menstruation, and at the climacterium or the cessation of the menses.

*[See pp. 272-274. It is now well known that the symptoms of ulcer of the stomach and the duodenum are so nearly alike that only exceptionally can they be clinically differentiated, and that ulcer of the duodenum is fully as common as ulcer of the stomach. The writer therefore takes the liberty of including ulcer of the duodenum in this chapter.]

FIG. 23a.



Stomach turned inside out, showing callous ulcer on anterior wall; pylorus normal. Photograph from Kaiserling specimen by Mr. Schapiro. [Courtesy of Dr. J. M. T. Finney, of Baltimore.]

FIG. 23b.



Sketch from callous ulcer in lesser curvature of stomach; pylorus free; gastrectomy; Billroth I. Drawing by Miss Hayes.

2. Mechanical influences.

Besides these, acid gastritis and syphilis are important etiological factors which demand special consideration in men.

Concerning the etiology of ulcer of the stomach, Rosenheim gives the following summary:

“The predisposing causal factor of ulceration of the stomach is a local reduction in the resistance of the walls of the stomach, caused by some disturbance in the circulation that weakens the resistance of the stomach-wall against the digestive power of the gastric juice.”

I agree with Rosenheim in that he, contrary to other authorities, does not assume hyperacidity to be the cause of ulcer, for the reason that normal as well as hyperacid gastric juice has the ability to digest the mucous membrane, the resistance of which has been weakened.

According to the above principles, therefore, most ulcers of the stomach may be classified, according to their etiology, in either the chlorotic or the climacteric group of ulcers, or as ulcers caused by mechanical or catarrhal influences.

Such a classification naturally explains why ulcers of the first group are most frequent in the female sex, and especially in young girls; and why ulcers of the second group usually affect men, especially those who have indulged in excessive eating, smoking and drinking, and particularly those whose occupation requires chronic pressure upon the epigastrium. To this last group belong shoemakers, locksmiths, street-cleaners, masons, bookkeepers and, in short, all those whose occupation calls for the pressure of solid objects against the epigastrium, or who sit in a bent position. The same bad effects may be attributed to corsets and tight bands around the body.

The assumption which was formerly so popular,—that ulcer was the result of chemicothermic influences, which partly explained the frequency of ulcer in cooks, for example,—is now seldom considered.

Ulcers may naturally be caused by the corrosive action of the various intoxications, especially ulceration of the œsophagus. These acute ulcers may become chronic.

Acute traumata also play a rôle in the development of ulceration of the stomach. Violence upon the epigastrium causes either a necrosis of the mucosa by pressure against the spinal vertebræ, the formation of hæmatoma, or from suggillation of the submucosa. In any of these instances, the gastric juice digests that portion of the mucosa whose resistance has been lowered by injury.

This form of ulcer may, under unfavorable conditions and improper treatment, become chronic and lead to cicatricial formation, as well as other complications and sequelæ, and even to carcinomata, as in the case of any other kind of ulcer.

Hyperchlorhydria, as such, never causes peptic ulcer.

It is very frequently rather the result of an ulcer of the pylorus, for the reason that the latter causes a spastic stenosis of the pylorus with food-retention, and a consequent irritation of the gastric glands.

Not until the mucous membrane of the stomach has been weakened in some way,—for example, by inflammatory processes, in acid gastritis,—may there be, besides the hyperchlorhydria, a development of erosions of the mucosa.

In comparison with the extreme frequency of hyperacidity, there are but few cases of ulcer. As an example, symptoms of ulcer never appear in cases of nervous hyperacidity, even if the latter should exist for decades.

In many cases it is very difficult to differentiate between actual ulcers and erosions or fissures of the mucosa. Concerning this, Boas says:

“Clinically, the view is thoroughly established that hemorrhagic erosions can produce exactly the same symptoms as ulcer, even fatal bleeding.”

In doubtful cases, therefore, treatment must always be that of ulcer.

Symptomatology.—1, Subjective; 2, Objective.

1. Patients complain of actual pain in the epigastrium which is of a crampy, cutting, boring, or burning character. It begins anteriorly and radiates along the sternum or around both sides of the body to as low as the sacrum or as high as the

left shoulder. The pain scarcely ever occurs immediately after swallowing, but from one-half hour to four hours after eating.

This symptom-complex should, according to Buch, be designated as epigastralgia rather than gastralgia, to prevent the assumption in the mind of the physician that the source of the pain is in the stomach.

Attacks of pain always occur at the same hour after eating in each case, although different patients may suffer at different intervals after eating,—for instance, in case “X,” one hour after meals; in case “Y,” two or three hours after; and in case “Z,” several hours after eating, when the stomach is empty, etc.

Epigastralgia occurring at a definite time after eating is the most positive symptom of gastric ulcer.

Gastric hemorrhage is even less diagnostic as a symptom, for the reason that it may occur as well in diseases of the liver, and in passive congestion in disturbances of the greater circulatory system; while gastric pain occurring at a definite time after meals occurs exclusively in ulcer of the stomach.

The intensity of the pain always depends upon the quality of the food eaten; the coarser the food, the more severe the pain. After liquid foods, there may be no pain; or there may even be, in slight cases, a mitigation of pain immediately after eating, because the food combines with and neutralizes the excessive amount of acid of the stomach.

In ulcer of the pylorus, pain does not occur, as a rule, for some time after eating,—from two to four hours; and is frequently accompanied by vomiting of the acid gastric juice, after which it is relieved. The patient sometimes artificially produces vomiting by tickling the pharynx with the finger in order to obtain this relief. These are the cases in which, in addition to the organic lesion of the pylorus, there occurs at the height of digestion a pylorospasm, as we will give in greater detail below.

Such attacks of pain cease after the acid contents of the stomach are vomited, which generally occurs in the evening

between 6:00 and 7:00 o'clock, and at night between 1:00 and 3:00 o'clock, at a time when there should be no food-remnants in the stomach. Frequently in these cases the ulcer is already partially cicatrized,—which sometimes causes the food-stasis.

If not rationally treated, many such cases sooner or later lead to a dilatation of the stomach, secondary to the pyloric stenosis. It would, therefore, be a great mistake to assume that pain occurring before eating was due to a gastric neurosis, and to conduct the treatment accordingly. As a result of such irrational therapy, a fatal hæmatemesis might occur.

The periodicity of an epigastralgia is also characteristic of ulcer. Patients may suffer for weeks at a time from gastralgia after eating, and then feel perfectly well for several months.

These periods of pain, for reasons which are unknown, very frequently occur in the spring and autumn. They are to be naturally explained by the fact that they are dependent upon the return of the ulcer, disappearing as soon as it is cured by suitable treatment, and returning if errors in diet are committed.

Menstruation and pregnancy also modify the pain of ulcer,—which fact is explained by the increased amount of blood in the pelvic organs at these times. The pains of ulcer are, in general, decreased in profuse menstruation and increased when there is a lessened menstrual flow; while in pregnancy, pain is sometimes entirely absent.

It is also worthy of mention that vicarious menstruation sometimes occurs from the stomach. Kuttner and other authors have pointed out that these cases represent a diagnostic predisposition to ulcer, as exhibited by the *locus minoris resistentiæ* in the mucous membrane of the stomach.

Only when a peptic ulcer is situated at the cardia does epigastralgia occur immediately after swallowing.

The appetite is, as a rule, quite good in ulcer-patients, but very frequently the fear of eating causes emaciation, which is inversely proportionate to the amount of food eaten.

The bowels are generally constipated in ulcer of the stomach.

Vomiting is not a common symptom, although it usually occurs in severe cases a few hours after eating, if the food is too irritating in character.

In regard to hæmatemesis and melæna: according to the statements of patients, these symptoms by no means occur in every case of ulcer, but, on the contrary, are relatively infrequent. The history of patients to the effect that they have vomited blood, or have passed tarry stools, is of pathological value only when the blood vomited is of a dark color, or when epigastralgia has preceded the vomiting for a long period.

Vomiting of blood without a preceding epigastralgia is typical, rather, of hemorrhage from passive hyperæmia of the gastric mucosa, or of cancer.

2. The objective symptoms include, first of all, hemorrhages,—provided that the physician has the opportunity to observe them; or the demonstration of occult blood in the vomitus or fæces, according to the method of Boas, which has been described in the General Section (see page 41).

The second objective symptom of ulcer is a circumscribed tenderness in the epigastrium.

To demonstrate this, the physician should exert strong pressure with the forefinger upon every part of the epigastrium, from the ensiform process to the umbilicus. From the statements, and from the facial expression of pain of the patient, the physician will usually locate the sensitive area.

The sensitive area to the left of the tenth dorsal vertebra, which was first pointed out by Boas, is also an important finding which helps to establish a positive diagnosis. Diffuse sensitiveness to pressure on the back is without significance.

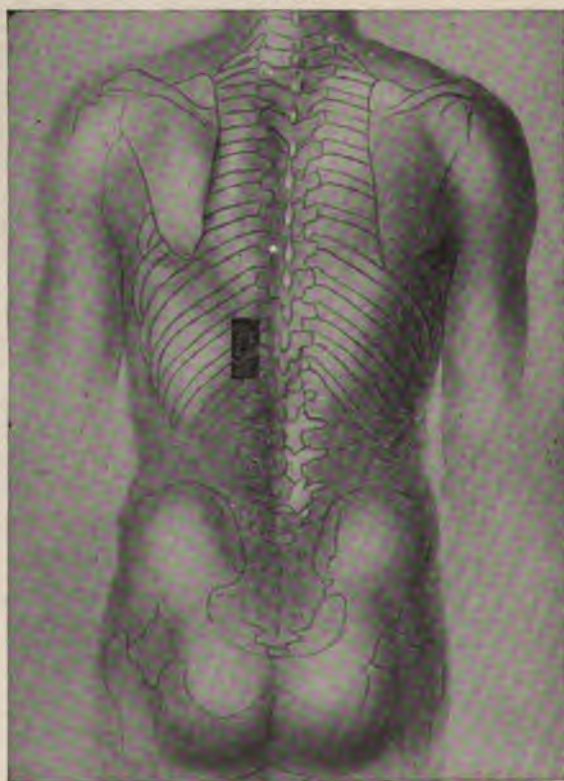
The third objective symptom is hyperacidity of the gastric juice, which occurs in most cases of *ulcus ventriculi*. After the Boas-Ewald test-breakfast, it amounts to from 70 to 100, and to considerably more after the test-dinner.

There are, however, a number of cases that have a normal acidity, especially recent cases,—which goes to prove, contrary to the assumption of many, that the ulcer is primary to the hyperchlorhydria and that it is also the cause of the epigastralgia.

A marked reduction of the total acidity of the Boas-Ewald test-breakfast, in cases of ulcer, should always awaken a suspicion of malignant degeneration of the ulcer.

Ulceration of the duodenum causes precisely the same symptoms as ulcer of the pylorus, so that an absolute differ-

FIG. 24.



Typical pressure point in gastric ulcer.

entiation is rarely possible. From a practical standpoint, however, this is not actually essential, because the treatment is the same in both diseases.

Jaundice, appearing in a case of probable ulcer, renders the diagnosis more certain.

Diagnosis.—In uncomplicated cases, the diagnosis of ulcer of the stomach from the symptomatology is usually very easy.

In women in the chlorotic or climacteric periods of life, the diagnosis of *ulcus chloroticum* and *climactericum* may always be made when epigastralgia occurs at a definite time after taking food, especially solids. These cases should be treated as ulcer, whether hæmatemesis has occurred or not.

Compression-ulcer, or *ulcus decubitale*, is diagnosed: (1) When the anamnesis gives an etiological factor; (2) when severe, cramp-like pains occur one to three hours after eating.

The diagnosis of catarrhal ulcer is made in drinkers, smokers, and gormands, who present the above symptoms.

The diagnosis of ulcer of the stomach is made certain if hæmatemesis and melæna occur, or if the analysis of the gastric juice shows hyperacidity.

The latter condition, in cases of chlorotic ulcer, cannot be determined, since it is unsafe to introduce the stomach-tube on account of the danger of perforation.

All other symptoms are entirely accessory and subordinate to the above, with the exception of localized points of tenderness in the epigastrium, and in the area to the left of the tenth to the twelfth dorsal vertebra.

Differential Diagnosis.—In the differential diagnosis, hemorrhage should be first considered. As already mentioned, hemorrhage from passive congestion in diseases of the heart, cirrhosis of the liver, vicarious menstruation from the gastric mucosa, and hæmatemesis in pulmonary affections, must be differentiated from the hemorrhage of peptic ulcer.

In connection with epigastralgia, we should especially consider the pain which occurs in three other affections:

1. *Angina Pectoris.*—The pain associated with this affection is frequently described by the patient as "stomach cramps." It occurs chiefly in advanced age, and in those with arteriosclerosis. The pain usually sets in after overloading the stomach, especially with flatulent foods; after using coffee or tobacco; or after over-exercise. The pain in this disease, however, radiates to the left arm behind the sternum and the region of the heart. It does not occur with regularity, as in ulcer, and is generally independent of the nature of the diet.

2. *Cholelithiasis.*—In cholelithiasis, epigastralgia is paroxysmal and sporadic. It comes on like a thunder-bolt from a clear sky; usually after

mental excitement or errors in diet. The anamnesis in this disease also shows that there has been no regularity in the attacks. Patients suffering from cholelithiasis often describe such attacks of pain as "stomach cramps." [See editorial note on dyspeptic symptoms of gall-bladder disease.]

3. *Intestinal Colic.*—The pain in intestinal colic is dependent upon the condition of the bowels. It occurs in constipation as well as in diarrhoea, and the pain is usually relieved by a movement of the bowels, or by the escape of gas. (See details in the section on Intestinal Diseases.) In patients who suffer from chronic gastritis and intestinal catarrh, intestinal colic sometimes occurs a short time after the partaking of indigestible food and cold drinks; it is produced reflexly and may easily be confused with the epigastralgia of ulcer. It persists, however, for a short time only and *is always associated with disturbances of the intestine.*

There are, in addition, a considerable number of other affections that must always be considered in the differential diagnosis of epigastralgia, such as pancreatic calculi, emboli of the blood-vessels of the mesentery, lead colic, etc. The limited space of this work will not permit a more detailed consideration of the diagnosis of these affections.

The vomiting which occurs in ulcer of the stomach must be frequently differentiated from nervous vomiting, and from that which accompanies the gastric crises of tabes dorsalis.

A great many other affections produce symptoms similar to ulcer, which explains why ulcer is so frequently diagnosed when it does not exist, and *vice versa.*

The most important diagnostic sign of gastric ulcer is the occurrence of severe, cramp-like, boring, or cutting pains in the epigastrium, which radiate to the sides and back and which appear regularly at a certain time after meals. This is the only symptom of ulcer that may not be simulated by other diseases.

Complications of Ulcer of the Stomach

1. *Perforation.*—This occurs but rarely, and then mostly in cases of chlorotic ulcer. It is for this reason that we advise the physician not to introduce the stomach-tube.

The danger of perforation is proportionate to the amount of food in the stomach at the time of perforation; therefore, the earlier it occurs after eating, the more urgent the need of surgical treatment.

Perforations which occur in the empty stomach, however, may be treated expectantly, for the reason that the empty stomach contains relatively few pathogenic microorganisms.*

[The improved surgical technic in the treatment of perforation of gastric and duodenal ulcer, and the remarkable success in this field of surgery, scarcely justify the dependence upon expectant treatment in any case. If perforation of an ulcer occurs, it becomes a surgical affection, and operation should be resorted to within twelve hours, if possible. In data collected by Musser, the mortality following 182 cases, in which operation was performed from one to twelve hours after perforation, was 26.3 per cent.; while the general mortality in 481 operations performed from one hour to four weeks after perforation, was 34.3 per cent.

In 55 cases without operation, the mortality was 54.5 per cent.†]

The most striking symptom of perforation is sudden abdominal pain.

2. *Pyloric Spasm*.—This is a very frequent complication of ulcer of the pylorus, and is caused in the same way as spasm of the *sphincter ani* in fissures of the anus.

Pyloric spasm causes motor insufficiency, hypersecretion of gastric juice, and dilatation of the stomach, as will be described below.

3. *Cicatricial Formation*.—If scars occupy the region of the pylorus, and are situated in the duodenum, they also produce motor insufficiency of the stomach, hypersecretion, and ectasia.

“Hour-glass stomach” also results from scar-formation [see Fig. 25].

4. *Perigastritis*.—If the ulcerative process extends to the serous coat of the stomach-wall, adhesions to neighboring organs result, *i.e.*, perigastritis. Such adhesions may impair

* Perforation of the empty stomach occurs, for instance, in chlorotic female servants who perform heavy labor, such as scrubbing, washing, cleaning windows, etc., early in the morning before breakfast.

† Musser.—Medical vs. Surgical Treatment of Gastric Ulcer.—“Transactions of the Congress of American Physicians and Surgeons,” 1907, Vol. vii.]

the motility of the *pars pylorica*, which in turn causes motor insufficiency and dilatation of the stomach.

Adhesions between the fundus of the stomach and the neighboring organs, as a rule, do not cause any symptoms of importance. Fistulæ between the stomach and the transverse colon, and the formation of subphrenic abscesses also result from perigastritis.

5. *Malignant Degeneration of Ulcer*.—Carcinomatous degeneration of ulcer often occurs in persons of advanced age. Ulcers of the pylorus and of the smaller curvature most frequently undergo malignant degeneration; and ulcers of the cardia, less frequently. Ulcers caused by acute traumata of the stomach may also undergo carcinomatous changes; such cancers are, therefore, of traumatic origin. Cases are naturally observed, however, in which there is no positive evidence of the origin of cancer after trauma.

I have arrived at the conclusion that relapses frequently occur unless after-treatment and prophylactic measures are strictly observed.

IV. Acute hemorrhage:

Rest in bed, application of ice-bags, swallowing of small pieces of ice, no food by mouth for two or three days, during which time nutrient enemata may be given. Iced milk may then be used and Leube's first diet-form may gradually be substituted.

Of medicaments: lead acetate and opium, 0.3 ($\frac{1}{2}$ gr.) of each, four times daily; stypticin, 0.3 ($\frac{1}{2}$ gr.), three times daily; and liquor ferri, three to five drops in oatmeal gruel.

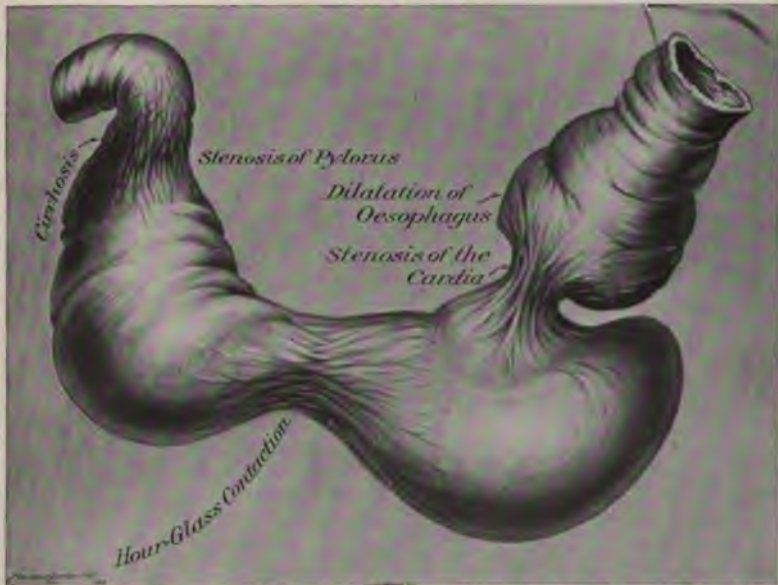
In very severe hemorrhages, a subcutaneous injection of gelatin should be given.

Hydrastinin and adrenalin may be tried internally.

The newest remedy for hemorrhage, according to Klempner, is estalin, an albumin preparation. Four or five tablets of estalin are dissolved in 100 c.c. of water and taken early in the morning on an empty stomach.

The further treatment of acute ulcer should be the same as that of chronic ulcer of the stomach.

FIG. 25.



Hour-glass contraction of the stomach, cicatricial stenosis of the pylorus and cardia with dilatation of the oesophagus, secondary to multiple round ulcer of the stomach. [Courtesy of W. A. Edwards, M.D., Los Angeles.]

Treatment

1. *Hygienic and Dietetic Treatment.*—First of all, the causes which were responsible for the development of ulcer should be removed. Corsets and skirt-bands are forbidden; and the clothing should be supported entirely from the shoulders. Occupations which require constant pressure upon the epigastrium, and sitting in a bent-over position, must be given up.

Diet: Leube's ulcer-diet is, at the present time, highly esteemed.

In the dietetic treatment of ulcer, four forms of food should be used; liquid, pappy, soft, and semi-solid. Each of these forms should be continued from seven to ten days.

In addition, it should be mentioned that in persistent cases of ulcer, a prolonged fast must be observed. The nourishment in these cases should be given in the form of nutritive enemata.

The following nutritive enema of Boas should be given three times daily:

One-quarter litre of milk at the body-temperature; the yolks of two eggs; one tablespoonful of white flour; one tablespoonful of red wine, and a pinch of table salt,—to be well mixed by stirring.

It is usually found that rectal nourishment cannot be continued indefinitely, as *intertrigo ani* is likely to occur.

The first of the above mentioned forms of diet should be prescribed while the patient is at absolute rest in bed, for the reason that this diet will not furnish a requisite number of calories of food for the maintenance of the body.

There are, naturally, severe cases of ulcer in which the individual forms of diet should be continued from two to three weeks, instead of the period mentioned above. As a rule, six meals should be given daily; two forenoon meals, a mid-day meal, two afternoon meals, and supper. Every patient, even the least intelligent, can easily follow out this treatment for himself.

1st Form.—The first form of diet should include the following foods: milk, milk and bread soups, tea with cream, or cocoa cooked with cream; the various cereals,—oatmeal, rice, wheat and corn-meal. Butter may be used with all foods. Patients of the better classes may, in addition to the above, use sanátogen, puro, malted milk, malted nuts, and the various artificial preparations of casein as substitutes for meat. In many cases very good results are obtained with the milk-diet,—two or three litres being used daily.

2nd Form.—In the second period of the diet, the patient may be given calves' brain, chicken and pigeon, as well as scraped ham; rice and sago in beef tea, various broths made from cereals, softened zwieback; and a liberal quantity of butter at every meal.

3rd Form.—Fillet, mutton chops broiled or cooked rare in butter, boiled veal, roast chicken and pigeon, soft eggs, and purées of potato, spinach, carrots, green peas, asparagus and cauliflower with butter, and white bread.

4th Form.—This form consists of light breads, grits, cereals, rice pudding; such fruit sauces as raspberry juice and cherries; deer, partridge, and lean fish,—such as pike, perch, and trout.

Sweet sauces prepared as purées may be used in this form, as well as in the second and third forms of diet.

When all of these forms are well borne by the patient, he may gradually be given the ordinary mixed diet. It is necessary, for several months, however, to avoid coarse breads, fried potatoes, acids, pastries, cabbage, cheese, goose, duck, fat pork, ham, bacon, eel, salmon, legumes, and in short, all hard, indigestible foods.

Small amounts of wine, slightly warmed and diluted with water, are allowed, as well as lemonade or raspberryade; while beer, and all other forms of alcohol, are interdicted.

There are still a large number of patients who, on account of social conditions, are unable to have the advantage of the rest-cure, to carry out the proper dietary. In these cases, ambulatory treatment must be given in order that they may retain their vocations, etc.

Patients undergoing an ambulatory treatment for ulcer, will, of course, become considerably reduced in weight during the first period of treatment.

2. *Medicothermal Treatment.*—Lavage is an unnecessary procedure in uncomplicated ulcer of the stomach, although

a few clinicians have attempted to control hemorrhage by lavaging the stomach with ice-water.

Applications and compresses have long been used externally. In acute exacerbation of ulcer, and in hemorrhage from the stomach, ice-compresses are indicated; while in chronic cases, hot applications, such as seed-meal poultices, etc., as well as thermal coils, offer good service.

The compresses should be applied during the entire day, as hot as possible, and replaced at night by a Priessnitz bandage. Should blistering occur from the hot applications, soothing salves and powders should be used.

The physician will determine whether the compresses have been properly applied if the skin of the epigastrium shows a brown coloration.

3. *Balneological Treatment.*—In all forms of benign ulceration of the stomach, Carlsbad, Neuenahr and Vichy waters are indicated. Whenever it is possible, the patient should be sent direct to these watering-places. If this is not practicable, these waters may be used at home at a temperature of about 35° R. [112° F.],—two glasses each containing about 200 c.c. in the morning, and one glass before the mid-day and one before the evening meal. Patients in poor circumstances may be given the genuine spring-water salts or the artificially prepared salts in the same manner. Vichy water and salts should be given to those with weak constitutions.

The mineral waters are to be used before meals, in order to affect directly the glands of the mucosa, rather than to neutralize the excessive acidity of the stomach, to accomplish which, alkalies should be given after meals.

If there is a suspicion of malignant degeneration of the ulcer, *i.e.*, if there are symptoms of ulcer combined with sub-acidity,—the mineral-water cure may be dispensed with.

4. *Medicinal Treatment.*—In the treatment of gastric ulcer, there are two drugs of especial value,—nitrate of silver and subnitrate of bismuth. As a general rule, the former should be given for acute chlorotic ulcer; and bismuth, in the other forms of ulcer, as per the following prescriptions:

1. ℞ Sol. argenti nitratis—gr. viiss: ℥viss 0.5:200.0
M. ad. vitr. nigr.

Sig.—One tablespoonful (porcelain) in a wineglassful of water, $\frac{1}{4}$ to $\frac{1}{2}$ hour before meals.

2. ℞ Bismuthi subnitratis, ℥iiiss 100.0

Sig.—One teaspoonful in a glass of warm water, stirred well, before breakfast. Lie on right side one-half hour after taking.

These drugs generally suffice in the treatment of patients who are able to take proper care of themselves.

If pain is not relieved by the above treatment, it is best to prescribe belladonna combined with bismuth or an alkali, one or two hours after eating, as follows:

1. ℞ Extracti belladonnæ foliorum, gr. iii-v 0.2-0.3
Magnesii oxidi,
Sodii bicarbonatis, āā, ℥vi 25.0

M. ft. Sig.—A teaspoonful one or two hours after meals, two or three times daily.

2. ℞ Extracti belladonnæ foliorum, gr. iii 0.2
Bismuthi subnitratis, ℥iv 15.0

M. Sig.—A knifepoint of the powder after meals.

If spasms of the pylorus complicate the clinical course of ulcer, from one-half to one wineglassful of olive oil should be given in the morning before breakfast, and from one to two teaspoonfuls before the mid-day and evening meals. The oil may be prescribed in the following manner to patients who have fastidious palates:

- ℞ Tincturæ belladonnæ foliorum, ℥i-iss 5.0- 6.0
Olei amygdalæ dulcis, ℥i-iss 30.0-40.0
Vitelli ovi unius or duo,
Aquæ destillatæ, q.s. ad ℥viss 200.0

M. ft. emulsio. Sig.—A tablespoonful before eating, t.i.d. (Hoppe, of Hanover.)

I have successfully treated many cases of ulcer by the olive-oil treatment after other measures had been exhausted, especially in patients who had not taken the rest-cure.*

* Good results from this oil-treatment, which I introduced, have been obtained in chronic ulcer, by Hoppe of Hanover, Wygodzinski of Beuthen, Van Lauwe of-Roulers, Walkow of Prag, Röder of Berlin, and many others.

To neutralize the hyperacidity of the gastric juice, the mastication tablets, mentioned on page 100, should be used immediately after eating,—as well as sodium bicarbonate or magnesium ammonium phosphate, one or two hours after eating. According to the experience of Bourget, the following prescriptions are suitable:

1. \mathcal{R} Sodii sulphatis,
 Sodii phosphatis, āā, gr. xxx 2.0
 Sodii bicarbonatis, ℥ii 8.0
 M. ft. pulv. No. x. Each powder should be dissolved
 in one litre of water.

The patient should drink 100 c.c. of the warmed solution, one or two hours after each meal.

2. \mathcal{R} Extracti belladonnæ foliorum, gr. iiss 0.1
 Magnesii oxidi, gr. lxxx 5.0
 Sacchari, ℥iiss 10.0
 Sodii citratis, ℥xi 40.0
 M. ft. pulv. Sig.—A teaspoonful t.i.d.

I have obtained very good results in the after-treatment of ulcer by this method. Of the various alkalies, bicarbonate of soda would be preferably used if the patient's bowels are regular; while the salts of magnesia should be used in case of constipation, and calcium salts for diarrhœa, just as in acid gastritis (see page 99).

5. *Surgical Treatment.*—Surgical procedures are to be resorted to in ulcer of the stomach in perforation and in persistent hemorrhage. On the other hand, surgical measures must very frequently be employed, as we shall see below, in the treatment of the various complications of ulcer, such as the removal of scar-tissue formation, and for the relief of the resulting complications.

OUTLINE OF THE TREATMENT OF ULCER OF THE STOMACH

I. Period of healing, about six weeks.

- A. Leube's rest and liquid-diet cure; when possible, combined with the use of Carlsbad water, or its salts, and suitable medication.

B. Ambulatory treatment, when Leube's ulcer-treatment is not feasible.

- a.* In chlorotic ulcer, silver nitrate from four to six weeks.
- b.* Subnitrate of bismuth from four to six weeks, in cases of chlorotic ulcer which have existed as long as a year, and also in the other forms of ulcer.
- c.* Olive-oil treatment in severe epigastralgia and hyperchlorhydria, for several weeks. Milk of almonds may be used in lieu of the oil-treatment. Silver nitrate and subnitrate of bismuth and the oil-treatment should be given before meals; and the remaining medicaments, particularly belladonna and antacids, after meals.

II. After-treatment, about forty days.

A. Mineral-water cures at Carlsbad or Vichy, or conducted at home. Three or four glasses of water should be taken daily for from four to six weeks, combined with a bland, non-irritating diet. In this period, the secondary acid gastritis should be largely cured.

B. Iron therapy in cases of chlorotic ulcer.

III. Prophylactic period; about two or three months.

For the prevention of the recurrence of ulcer, the use of milk of almonds before meals, three times daily, is indicated for a period of two or three months.

The milk of almonds is prepared as follows:

A tablespoonful of powdered sweet almonds is emulsified with one-quarter litre of hot water. When taken it should be warmed to 30° R. [100° F.]

Patients with less fastidious tastes may use, instead, three times daily before meals, one teaspoonful of linseed oil, to which one drop of the oil of mentha has been added; or one-half wineglassful of oil may be given in the morning before breakfast.

Appendix on the Treatment of Acute Hemorrhage

[Hemorrhage ceases through either vasoconstriction or the formation of a thrombus. Both of these are brought about by the resulting anemia and weakened action of the heart.

Stimulation of the heart and likewise measures used to overcome the depressed condition of the patient are therefore contraindicated. Absolute bodily and mental rest should be secured. Morphine is often most helpful in keeping the patient quiet and free from worry.

Gastric peristalsis should be reduced. To this end, the patient should be kept on his back with an ice-bag over the epigastrium. All food and drink should be forbidden during the hemorrhage and for several days after it has ceased. Nutrient enemata should not be used, because of the ability of rectal feedings to produce peristalsis of the stomach.

Personal experience leads us to place greater reliance upon bismuth subnitrate than upon styptics and haemostatics by the mouth. Matthes* and Nannyn† have shown that bismuth accumulates in and adheres to the ulcer base and thus forms a protecting coating to the ulcer.

In our hands the employment of subcutaneous injections of serum has been followed with most promising results in conjunction with the treatment outlined above. Cessation of hemorrhage occurred in all the five cases treated. Of these, three were of moderate severity; the other two, apparently hopeless.

In the first two cases antidiphtheritic serum in doses of 2000 units was used. In the other three cases normal horse serum was substituted, in doses of 15 c.c. repeated in three to twelve hours. Kaufmann‡ strongly recommends the use of lavage in gastric hemorrhage.]

CLINICAL CASES

1. *Chlorotic Ulcer*

CASE 1.—Louise L., 19 years old, had suffered from violent gnawing, boring and burning epigastralgia, which radiated to the back, a half hour after eating solids. The pain continued for about one hour. It did not occur

* *Centralbl. f. innere Med.*, 1894. † *Deutsch. med. Woch.*, 1898.

‡ [*Amer. Jour. Med. Sciences*, June, 1910.]

after taking liquids. Lying on the left side increased the pain, while the right-side position lessened it. There was a point in the epigastrium excessively sensitive to pressure. The patient was chlorotic. The appetite was good, but the patient was afraid to eat on account of the resulting pain.

Treatment with Leube's ulcer-diet and bicarbonate of soda produced a permanent cure.

CASE 2.—Elsie G., a servant, 32 years old, had been chlorotic for the past four or five years. During this time she had periodical attacks of crampy, colic-like pain in the epigastrium. For about four weeks the patient had suffered from epigastralgia, which radiated to the left shoulder. The attacks of pain occurred one hour after the mid-day and evening meals. She had a good appetite. Physical examination revealed points of excessive tenderness below the xiphoid process and posteriorly to the left of the ninth dorsal vertebra.

2. *Climacteric Gastric Ulcer*

CASE 1.—Augusta P., a widow 49 years old, soon after the cessation of menstruation, began to suffer from hæmatemesis, melæna, and regularly occurring epigastralgia one hour after a meal, especially of solids. Painful pressure-points anteriorly and posteriorly. Total acidity, 88.

CASE 2.—Adeline K., a laboring woman, 51 years old, had passed the menopause eight years previous, since which time she had suffered from epigastralgia one hour after eating; had had frequent vomiting, and one attack of hæmatemesis. Total acidity, 102.

CASE 3.—Henrietta S., a cook 50 years old, who, previous to twenty years ago, had suffered from chlorosis and "stomach-cramps," but had remained healthy until the menopause. Five months later, the patient had experienced typical attacks of epigastralgia. Upon one occasion she vomited blood until she became unconscious. Melæna followed. There was no hyperchlorhydria.

3. *Pressure Ulcer, or Ulcera Decubitalia*

CASE 1.—August K., a basket-maker, 52 years old, had suffered from epigastralgia two or three hours after the principal meal of the day, for the past two or three years. Upon one occasion there was melæna followed by unconsciousness. The attacks of epigastralgia were relieved by sodium bicarbonate and warm drinks. For several years, the patient's occupation had demanded that he sit in a bent position, with heavy pressure exerted against the epigastric region. The total acidity was 90.

Cure resulted from rest in bed, the ulcer-diet, and the use of bicarbonate of soda and milk of almonds.

CASE 2.—Richard S., a shoemaker, 52 years old, had in his occupation subjected the epigastrium to heavy pressure ever since he was a young man. Eleven years previous to this time, the patient began to suffer from his

stomach. The first symptoms were epigastralgia and hæmatemesis. He resumed his work and there was temporary improvement. One year ago, he began to suffer from gnawing, cramp-like pains in the epigastrium four hours after meals, which were relieved by liquids. The appetite was good. He was unable to have rest during the treatment.

The patient was put on an ulcer-diet and was given from two to three tablespoonfuls of olive oil before meals. There was an immediate improvement, and he did not suffer from acid eructations during the night. Eight days after commencing the oil-treatment, epigastralgia had ceased, in spite of the fact that the patient had continued his occupation. After errors in diet and after having given up the use of the oil, on account of the hot weather, there was a return of the ulcer-symptoms, which again immediately disappeared after the re-establishment of the oil-treatment.*

4. *Ulcers and Erosions Following Acid Gastritis*

CASE 1.—Leopold B., a merchant, 35 years old, gave a history of excesses in eating, smoking, and the use of alcohol. He had a good appetite and regular bowel-movements. For thirteen months he had suffered from violent attacks of epigastralgia one hour after light meals, and two to three hours after heavy meals, which were always immediately controlled by drinking warm milk. No improvement followed treatment with Carlsbad salts, belladonna and antacids. Total acidity of the test-breakfast was 125.

The oil-treatment was then instituted, the patient taking one-half wineglassful in the morning, and a tablespoonful before luncheon and dinner. Following this, there was immediate relief. The patient was free from pain for six weeks, when there was a return of the symptoms after a meal containing Irish stew and griddle-cakes. After beginning the oil-cure again, the symptoms disappeared. The after-cure was carried out at Carlsbad.

Appendix

EROSIONS AND FISSURES OF THE PYLORUS.—As has already been mentioned, erosions and fissures may occur in the mucous membrane of the stomach, just as in the mouth, lips, nose, cardia, and anus, which present clinical symptoms very similar to those of ulcer. These are not merely hypothetically present, but may be anatomically demonstrated. They are located chiefly in the *pars pylorica*, or directly within the circumference of the pylorus. Proportionate to their minuteness, they have a correspondingly greater tendency to heal

* I could tabulate a long list of ulcer-cases among shoemakers, locksmiths, basket-makers, masons, etc.

than ulcers of the stomach. Surgeons, especially, have demonstrated that erosions of the pylorus are frequently the causes of pyloric spasm, with secondary dilatation of the stomach.

Etiology.—Fissures and erosions of the gastric mucosa are caused by the same factors as ulcers: on the one hand, chlorosis and circulatory disturbances; on the other, mechanical factors,—such as pressure exerted from without, and thermal influences. They occur, not infrequently, as complications of acute infectious fevers, and they are especially frequent in chronic acid gastritis caused by excesses in eating, drinking, and smoking. (See above.)

Symptoms.—The most important symptom of erosions and fissures is a burning, drawing, and often cramp-like pain, which is felt some little time after eating. Patients, as a rule, experience relief immediately after the introduction of food into the stomach, or there may be a complete disappearance of the pain until from one to three hours after the meal, at which time gnawing, tormenting, burning pains recommence in the epigastrium.

There is extreme sensitiveness to pressure, especially in smokers, which is frequently so intense as to result in actual paroxysms of colic, which are not relieved until the patient vomits, either naturally or artificially, or unless he takes milk or an alkali to neutralize the excessive acidity of the stomach.

While in ulcer, pain occurs, as a rule, only after eating solids, the symptoms of erosion arise some little time after foods of any kind, even liquids, have entered the stomach. Pain is especially likely to appear after the enjoyment of a heavy cigar, or cold drinks such as beer and wine. Cases which have been cured relapse very frequently through just such errors.

The physician may assume the location of the pathological lesions to be extra-pyloric when the epigastralgia is only of a burning character. If, on the other hand, the attacks are of a cramp-like nature, the location of the affection is usually in the pylorus.

The eructation of acid fluids several hours after eating, at the time when the stomach should be quite empty,—there-

fore late in the afternoon or at night,—is a frequent symptom of erosion. All such patients suffer from pyrosis.

Diagnosis.—The clinical differentiation between ulcer and erosions of the stomach is often very difficult and sometimes impossible. It is made only *ex juvantibus*. Erosion of the stomach may be assumed, as a rule, if pain occurs several hours after eating, and is relieved by introducing any kind of food into the stomach, even a piece of bread. This does not occur in actual ulceration of the stomach.

The estimation of the total acidity offers no criterion by which erosion may be separated from ulcer, since in the former the secretion is almost always above normal. The increased acidity is caused by two factors: In the first place, from the irritation of the glandular structures of the stomach caused by food stasis, resulting from spasm of the pylorus, two or three hours after meals; and secondly, the hyperchlorhýdria occurring in acid gastritis, which may precede the erosion or be simultaneous with it, as the result of the inflammatory process of the mucous membrane.

Hemorrhages also occur in erosions of the stomach, just as in ulcer, and may lead to a fatal termination. Many cases have been reported in the literature where erosions of the gastric mucous membrane were scarcely demonstrable, and yet were the cause of fatal hæmatemesis.

Complications.—When the erosion is situated directly in the pylorus, and causes pyloric spasm, hypersecretion and dilatation of the stomach will result, for the same reasons as in ulcer of the pylorus.

Although these complications are caused more frequently by cicatricial stenosis of the pylorus, we shall see below that dilatation occurring as a result of pylorospasm is by no means rare.

Scar-formation and perforation never result from erosions or fissures of the stomach, and there is not the same tendency toward malignant degeneration as in ulcer.

Treatment.—The treatment is etiological and symptomatic.

The etiological treatment deals with the removal of the factors which have caused the disease, especially smoking, cold drinks, and excesses in eating, particularly meat. Compression of the epigastrium should be avoided, such as is caused by wearing tight clothing, abdominal bands, or any factor through which pressure of hard objects is brought to bear against the epigastrium, as occurs in various occupations.

Chlorotic girls demand, first of all, treatment of chlorosis, such as could be obtained by a stay at a chalybeate spring, such as Flinsberg, Pymont, Schlangenbad, etc.

Patients who suffer from erosions and fissures caused by acid gastritis, should be sent to such a watering-place as Carlsbad, Neuenahr, or Vichy, where they may receive the treatment specifically suitable to their condition; or they may use the bottled water or the artificial salts in their homes.

In persistent cases of erosions or fissures, the mineral water should be used uninterruptedly for from three to six months.

For further details concerning these cases, the reader is referred to the chapter on Acid Gastritis.

Erosions or fissures which are not caused by acid gastritis should be treated as light cases of ulcer.

The treatment may be ambulatory, consisting of a bland, non-irritating diet and the use of antacids and olive oil. For this purpose, the physician should prescribe one-half to one wineglassful of olive oil at a temperature of 30° R. [100° F.] early in the morning before breakfast, and a tablespoonful before luncheon and dinner. In all cases suffering from epigastralgia during the night, the oil should also be given in the evening before retiring.

The clinical records of patients given at the end of the chapter demonstrate that in persistent epigastralgia, when all other treatments have proved ineffectual, the use of olive oil has resulted in relief and final recovery.

The use of oil would be less applicable in those cases of erosions in which the lesion was not situated at the pylorus and in which, therefore, the patient did not suffer from epigastralgia, but only from the burning sensation in the epigastrium.

For those who have a repugnance toward the use of the oil, the milk of almonds, which they can prepare at home, may be substituted (see page 124).

The symptomatic treatment of erosions and fissures consists in the administration of an antacid before meals, such as bicarbonate of soda, magnesium salts, etc., in teaspoonful doses, with or without the addition of the extract of belladonna.

Bergmann's or Belloc's mastication tablets, one to three after eating, are also helpful.

Great relief is obtained from the symptoms by the thorough mastication of hard bread-crusts after meals, whereby a large quantity of saliva is secreted and swallowed, which tends to neutralize the excessive acidity of the gastric juice.

CLINICAL CASES

CASE 1.—Mr. S., a business man, 35 years old, had suffered periodically for five years from pressure and burning in the epigastrium after eating. Very late in the afternoon, he had cramp-like pains. The stools were regular. He had lost 14 pounds in weight. The patient traced his affection back to a period when he indulged in "over-nourishment." There had been frequent vomiting of acid liquids and food. The physical examination was negative. The test-breakfast, upon removal, contained much fluid, and its total acidity was 80. Remnants of ham which had been eaten the evening before were found.

The treatment consisted in the ulcer-diet, the use of milk of almonds three times daily before eating, and belladonna combined with an alkali three times a day, two hours before eating. It was impossible for the patient to go to bed for treatment. Ten days later he returned to the clinic, having suffered no pain and having gained one and one-half pounds in weight. After one month of treatment, he had gained three pounds, and had been entirely free from pain, except on one occasion when, after partaking of cakes and coffee, he had suffered from a burning sensation in the stomach. He had not been using any medication. The use of milk of almonds was advised, and later on Vichy water. Six months later the patient had gained six pounds in weight.

Clinical Diagnosis.—Acid gastritis, with erosions of the fundus and pylorus. Hyperchlorhydria, with occasional spasm of the pylorus, which led to temporary retention of food.

CASE 2.—Alphonse M., a merchant, 38 years old, was a heavy smoker, eater, and drinker. He was obese. For four or five years the patient had

suffered from severe pyrosis and burning pains in the stomach. For two or three years, he had had cramp-like pains in the epigastrium and behind the sternum quite frequently.

Treatment.—Oil was prescribed in the morning before breakfast, and mastication tablets and an alkali after meals. Four weeks later, the patient reported that he still had occasional cramp-like pains. Then Vichy water, belladonna in pill form, and later on, milk of almonds, were prescribed, which caused the disappearance of the symptoms. On account of frequent errors in diet, the patient still suffered occasionally from heartburn.

CASE 3.—Mr. R., a merchant, 27 years old, was a heavy smoker. The patient had suffered periodically for a year and a half, from cramp-like pains in the stomach, two or three hours after meals, which were always relieved by eating again. He had always had a hearty appetite.

Treatment.—Half a wineglassful of olive oil was prescribed in the morning and a cup of milk of almonds at noon and in the evening before eating. Belladonna, combined with an alkali, was given twice daily after meals. The patient was immediately free from discomfort in the stomach. The after-treatment consisted in the use of Vichy water. Permanent cure resulted.

CASE 4.—Mr. M., a business man, 43 years old, was a very heavy smoker, using twelve to fourteen cigars daily; a heavy eater, and obese. For four or five years the patient had suffered from burning in the epigastrium after heavy meals. Temporary improvement had followed two mineral-water "cures" at Carlsbad. The physical examination was negative.

The patient was given a bland, non-irritating diet, Vichy water, and the mastication tablets. He remained free from discomfort unless he indulged in smoking, the use of cold beer, greasy foods, heavy meats,—goose, etc.,—which, in every instance, caused a return of the burning pain in the stomach.

After another course of treatment at Carlsbad, and with a continued careful mode of living, the patient remained well.

CASE 5.—Inspector K., 39 years old, and very obese, in his history disclosed excesses in beer-drinking, eating, and smoking. For several weeks, the patient had suffered from burning and pressure in the epigastrium and oesophagus two or three hours after eating. Directly after meals, he would be free from discomfort. Total acidity of the test-breakfast, 112. Meteorism. Thirty-two c.c. of gastric juice, with a total acidity of 80, were obtained from the fasting stomach.

A complete clinical cure was effected by the use of Carlsbad salts, two or three teaspoonfuls daily before eating; and by giving up beer, tobacco, and heavy, greasy foods.

Clinical Diagnosis.—Acid gastritis, with erosions of the mucosa (burning pains), not located at the pylorus, since epigastralgia was not a symptom; and also hypersecretion caused by the irritation of the digestive glands.

CLOSING REMARKS

I am very well aware that often an exact diagnosis of erosions of the stomach cannot be made, beyond a probability.

The existence of erosions and fissures of the pylorus is denied by many, in spite of which, for practical purposes, I should like to maintain the above-mentioned facts. At all events, I do not think that simple hyperchlorhydria, as such, in the absence of an anatomical lesion,—for instance, a gastric neurosis,—produces burning and cramp-like pains in the epigastrium. When these symptoms are present, an organic affection of the stomach or of a neighboring organ should always be thought of, and the therapeutic measures directed accordingly.

Carcinoma of the Stomach

General Remarks.—The etiology, the pathological anatomy, the occurrence, frequency, hereditary influences, age-limits, etc., of cancer of the stomach, will not be discussed here. We shall consider only the significance and the relationship of gastric ulcer and traumata to gastric carcinoma.

Malignant degeneration of chronic ulcer is quite frequent, especially in patients of advanced years. Beside the ulcer, the cicatricial formation of ulcer frequently gives rise to the development of cancer. The well-known carcinomatous ulcer, the symptomatology of which will be considered in detail later on, begins in this way.

Cancer attacks individuals who have not previously suffered from stomach trouble or, as has already been mentioned, persons who have previously had ulcer. As a rule, patients suffering from other chronic stomach-affections are exempt.

Concerning carcinomata, it may be said with certainty that acute, as well as chronic, injury exerts a decided influence in the development of gastric carcinoma. As a rule, the evolution of such a process is as follows: As a result of an injury to the stomach, a pressure-necrosis with an ulceration of the mucosa occurs, which later undergoes a carcinomatous degeneration.

I emphasize this, for the reason that frequently [in Germany] the expert testimony of the physician must establish whether a carcinoma of the stomach is the result of traumatism or not.

It is possible to trace the origin of a cancer to trauma, if the first symptoms of malignant disease of the stomach occur within a year or a year and a half after injury,—the patient having previously had good

FIG. 26.



Carcinomatous degeneration of an ulcer of the pylorus. [Courtesy of Dr. Stanley P. Black, of the Hendryx Laboratory, University of California College of Medicine, Los Angeles Department.]

digestion, and the injury having affected the region of the stomach itself; in such a case, the physician may often state that it is his conviction that trauma has been an etiological factor in the production of the cancer. On the other hand, it would not be possible to associate an injury received several years previously, especially to some other part of the body, with a subsequent carcinoma of the stomach.

General Symptomatology and Diagnosis.—Cancer sometimes develops acutely, but as a rule, almost always slowly and without warning, beginning with loss of appetite, repugnance toward meats, feeling of nausea, lassitude, lack of

desire to work, increasing weakness, emaciation, anæmia, and cachexia.

The tongue is always coated, proportionate to the poorness of mastication and the diminished amount of food eaten. Later on, pressure in the epigastrium occurs, especially after eating hard foods, just as in chronic gastritis. And still later on occur cramp-like pains, depending upon whether the carcinomatous lesion is located at the pylorus, or not.

In these cases, there is vomiting,—the vomitus, on account of the mixture of the food with blood, presenting a black-brownish, “coffee-ground” appearance.

In the terminal stage of cancer of the stomach,—when cachexia is marked,—fever, hydræmia, and with these albuminuria and œdema of the ankles occur.

The physician must always keep in mind the fact, however, that in individual cases the appetite may be retained for a long time; and especially that the patient may not experience a repugnance toward meat; and above all, that frequently in carcinoma, vomiting is not a symptom. These are the cases in which neither the inlet nor the outlet of the stomach is involved. Likewise, hæmatemesis or melæna may never occur.

When the cancer involves the pylorus, symptoms of pyloric obstruction, with stagnation of the stomach-contents, naturally occur. Whether gastrectasis follows malignant obstruction of the pylorus or not, depends largely upon the appetite. Patients with good appetites, who eat freely and vomit little, are the ones most likely to suffer from secondary dilatation of the stomach; while, on the other hand, there often occurs a contraction of the entire stomach in those patients who eat little, and especially if the food is vomited. Atrophy of the stomach is especially frequent in carcinoma of the cardia.

The secretion of gastric juice in cancer of the stomach is, as a rule, totally lost, so that from the clinical standpoint the findings are exactly those of atrophic gastritis. Hydrochloric acid, rennin, and pepsin are almost, or completely, absent. The test-breakfast furnishes the picture of *achylia gastrica*.

An exception to these findings occurs in carcinoma resulting from malignant degeneration of an ulcer, in which free hydrochloric acid may be demonstrable up to the end of life.

Lactic acid is found only in those cases of cancer in which there is stagnation of the stomach-contents, resulting from carcinoma of the pylorus, as soon as the atrophy of the mucous membrane has progressed far enough so that measurable amounts of hydrochloric acid are no longer secreted.

Uffelmann's [or Strauss's] lactic acid tests are, therefore, not positive in all cases of cancer of the stomach, because not all such give rise to food-stagnation; and besides, the motility of the stomach may be normal if the cancer does not involve the pylorus.

The Boas-Ewald test-meal has a total acidity of from 6 to 8 in cases of carcinoma unassociated with food-stasis. But if there is stagnation of food, the total acidity is higher, for the reason that the fermentation acids,—especially lactic and acetic acids,—are also present.

The bowel-movements are usually sluggish, corresponding to the lessened consumption of food. Diarrhœa occurs only if a complication develops, such as a fistula between the stomach and the colon.

Diagnosis.—In the beginning of the affection, diagnosis is very difficult; and in many cases, only a probable diagnosis can be made. Naturally, the diagnosis becomes quite positive if a large, irregular tumor can be palpated in the epigastrium. There are, however, many cases of cancer in which no tumor can be felt during the entire life of the patient. This occurs most frequently in men who have *normal habitus*, with a wide costal angle and firm abdominal walls. In these cases, if the tumor is not situated in the left hypochondrium behind the ribs, it will usually be hidden behind the left lobe of the liver and so closely adherent to the latter that it cannot project below the liver-edge far enough to be subject to palpation.

In case the physician is able to palpate a tumor, he must, first of all, determine whether it is hard, knotty, and irregular, or whether it is smooth, and if he can outline its borders.

Benign tumors of the epigastrium,—such as cysts, distended gall-bladders, and hypertrophy of the pylorus,—are, as a rule, smooth and not very hard.

It is important, above all, to determine the respiratory movability of the tumor; whether it is fixed, *i.e.*, whether it rises and falls during respiration. In case it rises during expiration, it is very probable that the tumor is adherent, especially to the liver. Tumors which are limited to the stomach are usually stationary. In the latter cases, surgery offers better chances for cure than in the former; and the physician should, therefore, advise early operative procedures.

Close attention should, of course, be given to the degree of sensitiveness to pressure of such tumors, and the physician must never neglect to examine closely the liver and the regional lymph glands of the groin and clavicle for possible metastases.

Differential Diagnosis.—Tumors in the epigastrium, in the majority of cases, are carcinomatous. There are, however, also benign tumors of the stomach, pancreas, and liver, such as cysts, polyps, gummata, concretions, and hydatids; and besides these, the physician must always keep in mind the possible existence of malignant tumors of the neighboring organs, such as the pancreas, colon, liver, and the retroperitoneal lymph glands, although these, on the whole, are quite rare.

DIAGNOSIS OF CARCINOMA OF THE STOMACH BEFORE IT IS POSSIBLE TO LOCALIZE THE TUMOR BY PALPATION

Carcinomata of the stomach, from the standpoint of practical diagnosis, are divided into three large groups: pyloric, cardiac, and extra-ostial.

Each of these groups presents such characteristic signs and symptoms that their differentiation is proportionately easy.

Cancer usually has its origin in some point of the lesser curvature, which agrees with the hypothesis of the mechanical theory of the etiology of cancer, because the lesser curvature is most exposed to mechanical, thermal, and chemical injuries from the swallowed ingesta.

The accompanying illustration (Fig. 27) explains the development and progress of carcinoma of the stomach.

Assuming that the tumor begins at a point in the lesser curvature, the proliferation of the cancer may extend in three different directions: first, toward the pylorus, which happens most frequently; second, toward the anterior or the posterior wall of the stomach; third, toward the cardia, which is relatively the most infrequent of the three. It is self-evident

FIG. 27.

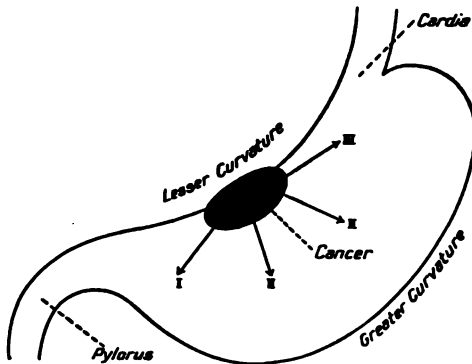


Diagram showing the development and progress of cancer of the stomach.

that there are many cases of carcinomata in which the lesion involves, primarily, the pylorus, its neighborhood, or the cardia.

It is very easy to point out how these forms develop quite different and characteristic symptoms.

1. *The Tumor Beginning at or Proliferating toward the Pylorus.*

In these cases, stagnation of the stomach-contents is the dominating feature of the clinical picture.

Food-stasis manifests itself by the vomiting of large quantities of food, and especially of food which the patient has eaten on preceding days. For instance, when the patient vomits such food as rice, fruit, or remnants of vegetables, which he states he has eaten several days previously, the diagnosis of stasis, and therefore of narrowing of the stomach outlet, may be made. The diagnosis of stasis will be more

certain if the physician is able, by the use of the stomach-tube, to obtain food-remnants from the stomach of the patient early in the morning before breakfast.

a. Stagnating Foods which Contain Free Hydrochloric Acid.—In these cases, there exists either a benign obstruction or an obstruction caused by a carcinomatous degeneration of chronic ulcer. Sometimes the differential diagnosis between these is only possible by long clinical observation. As a rule, in obstructions due to carcinomatous ulcer, there is a lessened or rapid diminution in the amount of hydrochloric acid secreted; while in benign stenosis, there is an increase in the amount of hydrochloric acid.

In both conditions, a microscopical examination will show the presence of sarcinæ and yeast-cells.

In primary carcinoma of the pylorus, hydrochloric acid will also be found in the stagnating contents of the stomach.

b. Stagnating Stomach-Contents which Contain Lactic Acid, but no Free Hydrochloric Acid.—In these cases congo paper shows only a weak, dark coloration, but never the blue tone given by free hydrochloric acid. The lactic-acid test is positive (see above).

Microscopically, sarcinæ are absent, but the field of the microscope is overrun with the long, thread-like Oppler-Boas bacilli.

In rare cases both bacilli and sarcinæ are present.

Stagnating stomach-contents containing lactic acid are obtained almost exclusively from patients suffering from carcinoma of the pylorus, or carcinoma of some of the neighboring organs, which, from pressure, narrows the stomach-outlet. An exception to these is the stenotic gastritis of Boas, a form of chronic catarrh of the stomach, which has already been discussed in the chapter on Chronic Gastritis. Stenotic gastritis is extremely rare, and, so far as diagnosis is concerned, demands little consideration, and for treatment scarcely any, because this form of gastritis, just as carcinoma of the pylorus, requires resection, or gastro-enterostomy, etc., if the life of the patient is to be prolonged.

Summary.—If, in a suspected case, a tumor is palpable and remnants of old food are obtained from the fasting stomach, the physician may assume, with the greatest probability, the presence of carcinoma of the pylorus or *pars pylorica*, especially if the contents of the stomach show either lactic-acid fermentation, as in primary carcinoma, or considerable diminution in the secretion of hydrochloric acid, as in carcinomatous ulcer.

Such cases should be, as early as possible, referred to the surgeon, who, after opening the abdominal cavity, will decide which operation or procedure is indicated.

II. *Carcinomata Developing Extra-ostially, Producing Therefore no Symptoms of Stenosis at the Pylorus or Cardia*

In these cases, as a glance at the diagram will show, no obstruction at the pylorus exists, therefore there is an absence of symptoms of stasis or motor insufficiency of the stomach.

The findings of the test-breakfast can scarcely be differentiated from the contents obtained from the stomach in atrophic gastritis. In both, hydrochloric acid, rennin and pepsin are nearly or completely absent. The test-breakfast is achylous.

The microscopical examination of the material obtained from the fasting stomach usually gives, however, suggestive points in regard to the lesion, viz., the presence of large numbers of red and white blood-corpuscles; sometimes also of amœba, infusoria and fetid material, besides the sputa, histological constituents of the mucous membrane of the mouth and œsophagus, such as epithelia, etc.

Therefore, in suspected cases, in which there have been progressive cachexia, loss of appetite, pressure in the stomach, though with no stagnation of the stomach-contents, and where *achylia gastrica* is present, the physician should examine the contents obtained from the fasting stomach with the greatest care. As a rule, only a few cubic centimetres will be obtained from the stomach in introducing the stomach-tube, and these contents should be blown out of the end of the stomach-tube into a receptacle for examination.

Mistakes are also possible here, for the reason that blood- and pus-corpuses also occur in benign atrophic gastritis, though not in so great numbers. In malignant cases, the pus can usually be seen macroscopically.

The Rhodankalium reaction of the saliva is also said to be absent in carcinoma (see page 96).

According to Boas, the examination of the fæces for occult blood is very important in all such cases. If the examiner finds a positive test for occult blood in the fæces of a patient with achylia, who has for three days been on a hæmoglobin-free diet, it is in the highest degree probable that a latent extra-ostial carcinoma of the stomach exists. In the examination for occult blood,—the technic of which is given on pages 41 and 252,—it is scarcely necessary to mention that it is essential to exclude the origin of the blood from hemorrhoids, etc.

III. *Carcinomata Developing at the Cardia or Proliferating toward It*

In these cases, difficulty in swallowing always occurs, in addition to the general symptoms of cancer.

Upon introducing the stomach-tube, an obstruction is encountered about 40 cm. from the incisors. On being removed, the tube is frequently covered with blood and fetid pus.

In these cases, stagnation of the stomach-contents and lactic-acid fermentation are absent, for the same reasons as in extra-ostial carcinomata.

Stasis of food within the œsophagus with lactic-acid fermentation may, however, occur.

A tumor of the cardia can rarely be palpated, because of its position behind the liver and the costal cartilages.

A close clinical observation of all these symptoms makes it possible for us to follow, accurately, the progress and development of cancer of the stomach, even in those cases in which we are unable to palpate a tumor.

It is self-evident, however, that there will always be cases in which the symptoms are only those of *achylia gastrica*

and general cachexia, when the diagnosis of cancer cannot be established beyond a certain probability.

With the application of these diagnostic principles, we have shown, therefore, that even in cases in which a tumor is not palpable it is relatively easy—first, to make a diagnosis

FIG. 28.



Cancer of the cardia producing stenosis. [Courtesy of Dr. Stanley P. Black, of the Hendryx Laboratory, University of California College of Medicine, Los Angeles Department.]

of gastric cancer as such; and second, to determine its location, the knowledge of which is always essential to the internist in establishing the correct indication for medical treatment or surgical interference.

If the tumor is palpable in the epigastrium, the physician can determine, by the distention of the stomach with gas or air, whether it belongs to the anterior or the posterior wall of the stomach, or whether it lies behind the stomach. Tumors

of the anterior wall of the stomach become more distinct after distention, while those of the posterior wall entirely disappear.

To inflate the stomach, the physician should use, by preference, a thin stomach-tube with a diameter of 8 or 9 millimetres, with an ordinary inflating bulb. Distention of the stomach with the well-known effervescent powders should be avoided, for the reason that the carbon dioxide gas generates so suddenly and violently that syncope and perforation of the stomach-wall might easily occur.

THE CLINICAL COURSE OF CANCER OF THE STOMACH

Carcinoma of the stomach generally causes death from exhaustion within one or two years. Carcinoma of the pylorus causes a fatal termination sooner, on account of the resulting obstruction at the pylorus, which prevents the chyme from entering the intestine. Emaciation in these cases is, therefore, more rapid, and death naturally occurs much earlier. Sudden and fatal termination may also result from severe hemorrhage.

The clinical symptoms of some cases of cancer of the stomach are so latent, and so few of a localized nature appear, that the disease closely resembles progressive pernicious anæmia. The autopsy findings alone will establish the diagnosis.

COMPLICATIONS OF CANCER OF THE STOMACH

Apart from metastases into the liver and the regional lymph-glands, and adhesions with neighboring organs, which almost invariably occur in carcinoma of the fundus of the stomach, fistulæ sometimes form between the greater curvature and the transverse colon. With this complication, either feculant vomiting or a lenteric diarrhœa occurs. The formation of secondary abscesses in the peritoneum with external perforation is sometimes observed, as well as subphrenic abscesses. We have sufficiently emphasized the fact that secondary dilatation of the stomach frequently results from cancer of the pylorus.

TREATMENT OF CANCER OF THE STOMACH

a. Internal Treatment.—The internal therapy of carcinoma of the stomach is not so ineffective as might appear, considering the malignant nature of the affection. Although we are not in a position in any sense to bring about a cure or to lessen its progressive tendency, we are, nevertheless, able at the present time to remove or lessen the suffering of the patient and considerably to prolong life by maintaining the physical strength of the patient, provided his financial condition permits of his having the best care and treatment.

The treatment is *dietetic, mechanical and medicinal*, and should be directed entirely according to the location of the lesion.

Dietetic Treatment.—In carcinoma of the pylorus, if the resulting stenosis is not already of sufficient severity to demand operation, the diet must be adapted to the degree of obstruction, in order to prevent the patient from starvation. It should, therefore, be of liquid or semi-solid consistency, and rich in liquid fats. (Butter, cream and olive oil.)

In carcinomata not involving the pyloric region, the treatment will not differ from that of atrophic gastritis.

In these cases, an operation is generally useless,—not only useless, but a surgical error, since the attempt at a radical removal of the cancer is usually hopeless in such conditions.

When the motility of the stomach is quite normal, excellent results are obtained through dietetic measures, the patient still being able to enjoy many of the pleasures of the table. An increase in weight of from 10 to 20 pounds by adherence to a rational diet is not unusual, even after a positive diagnosis of cancer has been made. I have seen such a result in several cases. For instance, a recent patient, after a few months of treatment and a rational diet, was able to indulge in such pastimes as hunting. Of course, such improvement was only temporary, continuing at the very longest for from six to nine months, when the progress of the disease and cachexia again took place.

The dietary in such cases should be directed about as follows:

- 7:00 A.M. Milk soup, cooked with cream and butter. Biscuits with butter.
 9:15 " Tea and cream, butter-rolls, scraped ham and a soft egg.
 12:00 M. Rice broth or soup; purée of spinach, carrots, or peas; chopped chicken, boiled calves' brain or fish; and some sweet fruit-sauce.
 3:00 P.M. Cocoa with cream, and butter-cakes.
 5:30 " A cereal soup or broth, containing much butter.
 7:15 " Tea with plenty of cream, scraped ham, and butter-rolls.

The art of the chef will be taxed to arrange suitable variations in the diet. For instance,—lean fish, cooked in butter, makes a pleasing substitute in the well-known repugnance of cancer-patients toward meats.

In carcinoma of the cardia, the semi-solid and liquid forms of diet should be given, as in cancer of the pylorus. A gain in weight is no more to be expected here than in cancer of the pylorus, because the patient cannot be properly nourished.

Mechanical Treatment.—Mechanical treatment is to be resorted to only in carcinoma of the pylorus. The stomach should be washed out every morning, after which 75 to 100 c.c. of warm olive or almond oil should be introduced. If the stenosis is not of a high degree, the stagnation of the contents of the stomach will soon be lessened by this treatment, provided the diet is adapted to the degree of stenosis present.

The most important indications to be fulfilled by lavage and the oil-treatment are the relief of pyloric spasm, boring pains in the stomach, and offensive eructations,—by which changes the appetite of the patient is often greatly improved.

Cardiac and extra-ostial carcinomata require no mechanical treatment, especially since former attempts,—to dilate malignant stenosis of the cardia and to introduce a permanent cannula,—are no longer resorted to.

Medicinal Treatment.—The medicinal treatment has in view, first of all, the increasing of the appetite, the improving of the digestion, and the relief of the suffering.

These indications are accomplished, as a rule, by the use of the following prescriptions:

1. ℞ Extracti condurango fluidi, ℥ii 60.0
Sig.—One-half to one teaspoonful before meals, t.i.d.
2. ℞ Extracti cinchonæ fluidi, ℥i 30.0
Sig.—Twenty drops t.i.d.
3. ℞ Tincturæ belladonnæ foliorum, ℥iiss 10.0
Tincturæ gentianæ, ℥xi 40.0
M. Sig.—One-half teaspoonful before meals, t.i.d., in carcinoma of the pylorus.
4. ℞ Acidi hydrochlorici diluti, ℥iiss 10.0
Tincturæ rhei, ℥v 20.0
M. Sig.—Thirty drops in a wineglassful of water after eating.

The artificially prepared foods,—such as somatose, eucasin, puro, Valentine's meat-juice, sanato-gen, etc.,—are satisfactory substitutes for meat. Three or four teaspoonfuls of any of the above should be given daily, preferably cooked in milk or soup. The various infant-foods are also valuable.

In general practice, I frequently prescribe pancreon, just as in benign atrophy of the mucous membrane.

b. Surgical Treatment.—Three surgical procedures should be considered,—namely, gastrotomy, resection of the pylorus, and gastro-enterostomy.

Gastrotomy should be performed in carcinoma of the cardia or of the lower portion of the œsophagus, when the cancer has caused almost complete atresia and the patient vomits everything that is eaten, including liquids.

In extra-ostial carcinomata, operative procedures are generally contraindicated, for the reason that the life of the patient is maintained equally as long by internal treatment; furthermore, cancers which do not involve either orifice of the stomach are not often recognized at a time when total extirpation is possible.

The proper domain of the surgeon is carcinoma of the pylorus,—which, unfortunately, is too often not operated on early enough, at a time when radical removal is possible.

The physician is in duty bound to consider operation in every case of cancer of the stomach in which there is stagnation of the stomach-contents with lactic-acid fermentation. By so doing, he will avoid merited censure for culpable delay and negligence.

It is unfortunate that patients so frequently refuse operative measures until internal treatment,—such as lavage, etc.,—have proved ineffective, when it is often too late.

It should always be left to the decision of the surgeon, after he has opened the abdominal cavity, whether he will perform a radical operation,—such as resection,—or a gastro-enterostomy, as a palliative measure. If the tumor has not proliferated, and no metastases into the liver and lymph-glands have occurred, resection should be attempted; otherwise, gastro-enterostomy is the proper procedure.

It is now well known that such patients, if they survive the operation, often increase in weight from 30 to 40 pounds within a few months, and even live several years without gastric discomfort. Cases have been reported in which no return of the symptoms occurred five or six years following operation.

[Both Kocher's and Robson's mortality in gastrectomy, up to the present time, is 15 per cent.; while the Mayos have a mortality of only 10 per cent. In their last twenty-five cases of gastrectomy, there was only one death.

Robson has recently collected data on 27 cases of gastrectomies, of which 10 were living at periods of 8, 7, 6, and down to 2 years after operation.*

In view of the fact that such results are being obtained by the surgical treatment of gastric carcinoma, it would appear that the internist who fails to give his patient the advantage of early operation is assuming an unwarranted responsibility.

Early diagnosis and good surgery are the requisites in the treatment of cancer of the stomach.]

*[Keen's "Surgery," 1907.]

CLINICAL CASES

Extra-ostial Carcinoma

CASE 1.—Von M., an editor, 50 years old, had for five or six years suffered from dyspepsia which was diagnosed as "atrophic gastritis." The mineral water "cure" at Kissingen had proved highly beneficial, and the patient had remained in good health until eight months ago, since which time he had experienced loss of appetite, pressure in the stomach, no pain, occasional vomiting, and emaciation. Tumor was not palpable. There was extreme emaciation. The fasting stomach contained blood and pus, but no food. The patient was put to bed, and he improved on a purée diet rich in butter, and the use of hydrochloric acid. He gained in weight from 152 to 167 pounds, was able to resume his work and even to enjoy the sport of hunting. One year later, however, the patient died from cachexia.

CASE 2.—Bertha H., a housekeeper, 49 years old, had been sick with "catarrh of the stomach," jaundice, loss of appetite, diarrhoea, and gradual aggravation of the symptoms for one year. At the time of examination, the patient had severe gnawing and cramp-like pains in the epigastrium after eating. She was markedly emaciated and cachectic. No tumor was palpable. The fasting stomach contained mucus and pus-corpules. The test-breakfast was achylous, the total acidity being 5.

The treatment consisted of a purée form of diet, rich in butter; and the use of hydrochloric acid. During the following month, the patient improved and increased 20 pounds in weight; but died seventeen months later from cachexia, at which time a tumor was palpable.

Carcinoma of the Pylorus

CASE 1.—Ernst S., a merchant, 55 years old, had been healthy until five weeks before the first symptom, since which time he had had a poor appetite and had suffered from frequent vomiting after eating solid foods. The stagnating stomach-contents,—for instance, grapes, which had been eaten a few days before,—were also vomited at times. The bowels were regular. He had suffered from pressure and a gnawing sensation in the epigastrium after eating solids. Previous to his illness, the patient had always had good digestion. The physical examination showed that the patient was a strongly-built man. He was sallow and emaciated. No tumor was palpable. The greater curvature extended to the level of the umbilicus. Stagnating foods were obtained from the stomach which had an odor of hydrogen sulphide gas. Free hydrochloric acid and also *sarcinæ* were present. The total acidity was 52. Lactic acid was absent.

The treatment consisted of a suitable diet, the use of *condurango*, and lavage of the stomach. After ten days, there was no stasis of food, and pain had disappeared. Free hydrochloric acid was present. No tumor

was palpable. Six weeks later, the patient had increased seven pounds in weight. He remained in good condition on a purée diet without lavage treatment, and resumed his occupation. Two months later, the test-supper was given and lavage in the morning showed that there was stagnation of the stomach-contents, with lactic-acid fermentation. Oppler-Boas bacilli and a few sarcinæ were present. During the next four weeks, the patient increased three pounds in weight. During the summer, after indulging in errors in diet, he suffered from diarrhœa and lost ten pounds in one week, after which he improved again and gained six pounds in weight. While travelling and taking his meals in restaurants, he ate a meal of veal cutlets, returned to his home ill, and died within two weeks,—just eleven months after commencing treatment.

There was atresia of the pylorus. A tumor, after considerable emaciation had occurred, was palpable.

Carcinomatous Ulcer

CASE 1.—Ernst H., a laborer, 58 years old, had had hæmatemesis, preceded and followed by cramp-like pains in the epigastrium, with vomiting. He had remained well until two weeks previous. The present illness began with pain in the stomach, vomiting, and icterus. The patient was emaciated and cachectic. A tumor, the size of the fist, was palpated in the epigastrium. There was no stagnation of the stomach-contents.

CASE 2.—Carl T., a teamster, 52 years old, had suffered three years previous from epigastralgia, hæmatemesis, gastrosuccorrhœa, and hyperchlorhydria. (Total acidity was 90.) Symptoms had disappeared through dieting and the oil-treatment. Four weeks ago, the patient suffered a relapse, with stagnation of the stomach-contents and vomiting. At first, lavage and the oil-treatment were beneficial. In the course of the following six or eight weeks, the hyperacidity of the gastric juice passed into subacidity. Sarcinæ, which had been present, were then absent. Patient at first refused to undergo an operation, and died six days after surgical treatment was finally resorted to.

The autopsy showed the presence of a carcinomatous ulcer of the pylorus.

CASE 3.—Ernst P., an inspector, 44 years old, had had periodical attacks of epigastralgia for twenty years, usually in the spring and autumn. Three years previous, patient had melæna. For six months past, he had suffered constantly from gnawing and cramp-like pains in the epigastrium, which were especially severe after eating solids. No tumor was palpable. Blood, pus, and mucus were obtained from the fasting stomach. The test-breakfast was entirely achylous. The patient was cachectic.

CASE 4.—Emma S., a laboring woman, 37 years old, had had symptoms of gastric ulcer,—gnawing, cramp-like pains, vomiting of blood, and heartburn,—for fifteen years. She had been temporarily relieved by Leube's

ulcer-cure. A cicatrization of the ulcer had occurred, which caused food-stasis. Gastro-enterostomy was performed, which was followed by a disappearance of all symptoms for two or three years, patient gaining considerably in weight. But after this period, a tumor, as large as two fists, gradually developed behind the laparotomy cicatrix. She died later from cachexia.

Epigastric Hernia

The epigastric herniæ are found in the linea alba, varying in size from a pea to a hazel-nut. These herniæ usually consist of only the fatty tissues of either the greater or the lesser omentum. It is very rare for a coil of the intestine to be a part of such a hernia.

Epigastric herniæ result from direct blows against the abdomen, lifting heavy weights, or subjecting the abdominal muscles to sudden tension, or severe coughing spells. The fissure occurring in the fascia is always transverse, never vertical.

Symptoms.—The most prominent symptom of epigastric hernia is the occurrence of severe pain when lifting, coughing, sneezing, straining, etc. This pain is caused by strangulation of the omentum, and generally disappears when the patient assumes a recumbent position. Frequently these herniæ produce no symptoms.

Objectively, the physician can diagnose the hernia very easily if he directs the patient to cough during the examination.

Diagnosis.—The diagnosis of epigastric herniæ is usually very easy, if the physician has in mind the possibility of the occurrence of such herniæ.

The affection may be confused with other kinds of herniæ, attacks of colic, appendicitis, and particularly ulcer of the stomach, especially when in epigastric hernia the lesser omentum becomes incarcerated in a fissure of the fascia in the neighborhood of the pylorus. In this condition, the pains, which are similar to those of ulcer, occur regularly two or three hours after eating, at a time when the omentum is subject to the greatest traction and disturbance from the active movement of the pylorus. Careful inspection, however, will usually prevent confusion in the differential diagnosis of the two affections.

Treatment.—The physician should first reduce the hernia and then apply a hernia bandage, or adhesive plaster, as in fracture of the ribs, using care to avoid strong tension of the abdominal muscles. It may be necessary to give morphine to prevent attacks of coughing. Naturally, irreducible herniæ are frequently encountered, from which relief can be obtained only by surgical treatment.

CLINICAL CASES

CASE 1.—Otto G., a merchant, 30 years old, had suffered for six or seven weeks from pains in the region of the stomach, especially after lifting, bending, or reaching high. Nothing that the patient ate disagreed with him. There was a small gastric hernia, which was treated by bandaging and the application of iodine, and a cure resulted.

CASE 2.—Mr. O., a shipping clerk, 40 years old, had suffered for two years from violent pains in the region of the stomach, about two hours after eating. The pains always disappeared if he assumed a recumbent position. The patient had hyperchlorhydria, the total acidity of the test-breakfast being 70. Two epigastric herniæ, about the size of peas, were found.

The subsequent history of the case is unknown, as the patient did not return to the clinic,—having been advised to undergo a surgical operation.

Gastrectasis

(Stenosis of the Pylorus, Mechanical Insufficiency, Vitium Pylori or Duodeni)

Definition.—At the present time, we understand the expression, “dilatation of the stomach,” to mean that form of gastric disturbance in which the stomach is unable to empty itself of its contents, with a resulting persistent stagnation of food. The location of the greater curvature is, in itself, irrelevant in the diagnosis of dilatation of the stomach. The question is not as to the size of the stomach, but only as to its motor function.

The term “gastrectasis” originated at a time when physicians had not learned to recognize the initial stage of the affection, but only its final stage,—dilatation of the organ,—and this was considered the most significant symptom of the disease. When we use the expression, “dilatation of the stomach,” therefore, we must from the outset be clear that we mean only the symptom of an actual disease, rather than a disease *per se*.

To make the condition quite clear, a comparison of the stomach with the heart is very applicable; for just as acute dilatation of the ventricles of the heart may arise from valvular insufficiency, so acute dilatation of the stomach may occur from overloading this organ, as a result of errors in diet, or from paralysis of its nerve-muscular apparatus.

On the other hand, chronic dilatation of the stomach is, without exception, the result of an obstruction at the pylorus or duodenum, just as hypertrophy and dilatation of the ventricle result from valvular affections. Hence the primary factor is always an obstruction which causes stagnation of the food, this in turn producing dilatation of the stomach.

Every dilatation of the stomach is, therefore, a *vitium pylori* or *duodeni* (obstruction), in the stage of disturbed compensation.

As has already been mentioned, it is necessary to differentiate between acute and chronic forms of motor insufficiency of the stomach. Acute dilatation is extremely rare and, in general, corresponds to acute gastritis after indigestion, or to ileus which is located high up in the intestine. Its details, therefore, will be described in the chapters on these affections.

Etiology.—The cause of actual dilatation of the stomach is a mechanical obstruction at the stomach-outlet, the so-called *vitium pylori*. The assumption of the existence of primary muscular weakness of the stomach, as a cause of chronic dilatation, has now been quite generally abandoned.

Apart from malignant stenosis of the pylorus, with secondary gastrectasis, which has been considered in detail in the foregoing chapter on Carcinoma of the Stomach, there are two general groups of a benign nature that cause a narrowing of the stomach-outlet, the accurate understanding and knowledge of which are indispensable to a clear recognition and treatment of this affection.

The first group includes those causal factors which produce an organic and irreparable change of the entire *pars pylorica*, or of the pylorus itself.

These alterations may be caused by pathological lesions from within, such as cicatricial contraction of the pylorus following ulcer; or from without, such as perigastritis, cholelithiasis, adhesions with the pancreas, liver, and the anterior abdominal wall, and finally compression-stenosis and the kinking of the duodenum in enteroptosis.

The second group includes those causative factors that have produced a reparable, functional stenosis of the pylorus. Of these, spasm of the pylorus is most important, which occurs in fissures, erosions, small ulcers, and scars of the pylorus. It is never observed in neuroses.

A transitory narrowing of the stomach-outlet, which gives rise to a temporary dilatation of the stomach, is sometimes the result of inflammatory swelling of the tissues of the pylorus surrounding an ulcer.

Likewise, acute traumata of the epigastrium may, by resulting ulceration of the pylorus, lead to stenosis and ultimate gastrectasia. Such a trauma causes either a necrosis of the mucosa or the formation of a hæmatoma between the mucosa and the muscularis.

From the digestion of the necrotic areas, an ulcer results which may lead to a mechanical obstruction of the stomach-outlet, either from spasm of the pylorus or from the formation of scar-tissue in the pylorus.

Obstruction of the stomach-outlet with dilatation of the organ is also caused by peritoneal adhesions around the pylorus, following traumatism to the epigastrium. Ectasia of traumatic origin is, however, of rather rare occurrence.

The diseases which ultimately lead to gastrectasia are, in the order of their frequency, the following:

Ulcer of the pylorus and of the antrum of the pylorus, erosions and fissures, perigastric adhesions, duodenal ulcer, gall-stones with pericholecystitis, enteroptosis, gastric hernia, traumata, and foreign bodies which have been swallowed and which obstruct the stomach-outlet. It is self-evident that a swelling of any kind within the pylorus, malignant or benign, as well as the enlargement of adjacent organs which

may compress the stomach-outlet,—such as the liver, gall-bladder, pancreas, and duodenum,—may be capable of causing dilatation of the stomach.

We have therefore, etiologically, two forms of gastrectasis, according to whether the obstructions are *irreparable or organic*, and *reparable or functional*.

In both forms, apart from malignant cases, hyperchlorhydria and hypersecretion are almost always present, provided the disease has already existed long enough for the gastric glands to have been subjected to sufficient irritation from the stagnation of the stomach-contents. Hyperchlorhydria associated with stenosis of the pylorus is, therefore, never the cause of gastrectasis, but the result of it, with the exception of the above-mentioned acid gastritis associated with erosions of the pylorus.

The spastic forms of gastrectasis, which often run an intermittent course, are worthy of special mention; for just as often as there is a recurrence of the ulcers or erosions of the pylorus, just so often will occur inflammatory swelling and spastic stenosis of the pylorus, which cause motor insufficiency of the stomach. Thus, patients who once or twice during every year, especially in the spring or autumn, suffer a few weeks from dilatation of the stomach will be relieved of the dilatation as soon as the lesion of the pylorus is cured, by adherence to suitable treatment and diet; and will remain free from the trouble for several months, until there is a recurrence of the erosion or ulcer from errors in diet or from some mechanical cause.

It should be mentioned here, that stenoses resulting from organic lesions are frequently aggravated by spasm of the pylorus; for instance, pyloric spasm results from inflammation and irritation of the old cicatrix of an ulcer.

Symptoms.—The most significant symptoms obtained in the anamnesis of patients suffering from gastrectasis is copious vomiting, which in severe cases occurs daily, and in light cases only now and then.

The vomiting of food which has been eaten on one of the preceding days, is characteristic of dilatation of the stomach.

FIG. 28a.



FIG. 28b.



FIG. 28a.—Radiograph of stomach of an adult female showing an extreme degree of gastropnoia with dilatation and retention, and associated with a general visceropnoia. The retention at this time was probably due to the dilatation and not to obstruction, although the latter was no doubt the result of a mechanical obstruction that existed at a previous period, when the patient suffered severely from gastric disturbances, but from which she was entirely free when this examination was made. The accepted explanation of her relief from gastric symptoms was that, through the agency of adhesions following an operation for gall-stones, the traction kink, resulting from the gastropnoia and causing the obstruction and subsequent dilatation, was straightened out. FIG. 28b shows the colon in Fig. 28a and made eighteen hours later, showing an extreme ptosis of the entire structure, especially the transverse colon, but commensurate with the degree of gastropnoia. [Courtesy of Dr. H. K. Hancock.]

FIG. 28b.—Radiograph of colon of same case as shown in Fig. 28a and made eighteen hours later, showing an extreme ptosis of the entire structure, especially the transverse colon, but commensurate with the degree of gastropnoia. [Courtesy of Dr. H. K. Hancock.]

FIG. 28c.



Radiograph of stomach of adult female, showing a moderate degree of dilatation, due, supposedly, to some obstruction in the region of the pylorus, possibly the result of adhesions. Although the stomach appears to be ptosed, it still maintains nearly a normal oblique position, and the low position of the greater curvature is due to the dilatation rather than to a gastropotosis. The radiograph was made soon after a full meal. Note that none of the bismuth has entered the pyloric extremity. [Courtesy of Dr. H. K. Pancoast.]

FIG. 28d.

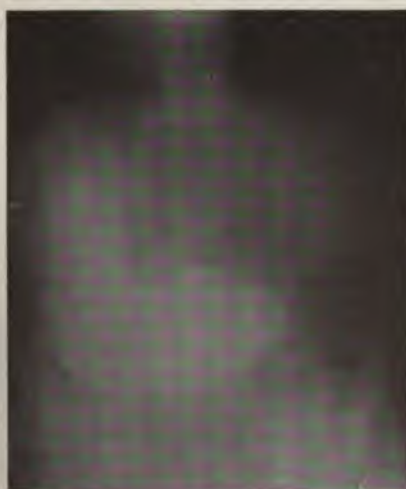


FIG. 28e.



FIG. 28d.—Dilated, dislocated stomach secondary to pyloric stenosis. [Courtesy of Dr. Charles Miner Cooper, of San Francisco.]
FIG. 28e.—The same case as Fig. 28d four hours later, showing food retention. [Courtesy of Dr. Charles Miner Cooper, of San Francisco.]

It sometimes happens that fruits, cereals, and vegetables, especially grapes, raisins, rice, and other heavy ingesta which easily sink to the bottom, are not vomited for several weeks after they are eaten. In mild cases, sometimes only a sour fluid (gastric juice) is vomited several hours after meals,—therefore late in the afternoon or at night. These are the cases caused by a slight cicatricial stenosis, in which there is only a relative stenosis of the pylorus. In order to obtain relief, these patients frequently produce artificial vomiting by tickling the palate with the finger.

After vomiting, the patients with gastrectasia usually feel very well and eat with a good appetite until the stomach is again over-filled, which induces vomiting anew.

The subjective symptoms that most frequently annoy the patient with ectasia are gnawing, cramp-like, burning, boring pains in the epigastrium, similar to those in ulcer, which are relieved only when the patient either naturally or artificially empties the stomach of its contents. Other subjective disturbances are heartburn, the feeling of fulness, and constant distention of the abdomen, except immediately after vomiting or lavage.

The appetite in benign ectasia is generally good, although the nutrition of the patient usually suffers considerably because of his being afraid to eat. (Constipation and general emaciation set in for the same reason.) In addition to this, the assimilation of food is much impaired because it is not propelled into the duodenum normally. This is the chief factor in producing impairment of nutrition. Patients suffering from ectasia are frequently seen emaciated almost to mere skeletons, so that the physician at first thinks, naturally, that he has cancer to deal with.

The decrease in weight of the patient in ectasia must be ascribed in part to the deprivation of the organism of water; and the thirst, corresponding to the diminished absorption of water, is usually very great.

In extreme stages of gastrectasis, where a high degree of drying of the tissues has occurred, there frequently develops

the symptom-complex of *tetany*, a neurosis characterized by tonic spasms of the extremities, usually resulting in death. A portion of the fatal cases of gastrectasis is to be attributed to this affection.

In gastrectasis there is almost always a diminution in the amount of urine secreted. The higher the degree of pyloric obstruction, the smaller the amount of urine secreted,—a fact which is sufficiently explained by the physiological fact that water is not absorbed in appreciable amounts from the stomach. The amount of urine secreted is, therefore, a direct measure of the degree of the obstruction at the pylorus.

In carcinoma of the pylorus, in which a complete clinical atresia often occurs, the amount of urine secreted in twenty-four hours does not exceed 400 to 500 c.c.

Objective Symptoms.—The external demonstrable signs of ectasia are the low position of the greater curvature of the stomach, and the “stomach-stiffenings,” first defined by Boas, which are increased peristaltic waves of the stomach running from the cardia to the pylorus, externally perceived on the abdominal wall. The “stomach-stiffenings” are an absolute symptom of stenosis of the pylorus, and are very easily recognized, because such a patient usually has a very thin and relaxed abdominal wall, and the wall of the stomach lies in almost direct apposition to the skin covering the abdominal wall.

The low position of the greater curvature, which the examiner will usually recognize by means of Obrastzow’s method (see General Section, page 11), often leads the inexperienced into error, because of the fact that the low position of the greater curvature also occurs in ptosis and in the vertical position of the stomach, and in megalogastria,—the so-called physiologically enlarged stomach,—as well as in the case of large eaters and heavy drinkers.

The significance of the splashing sounds in the epigastrium below the umbilicus is often misinterpreted as indicating dilatation, because they occur quite as frequently in gastrop-tosis and associated conditions, the details of which are considered in the chapter on Atony of the Stomach.

Since the splashing sounds may be produced by heavy palpation when only small quantities of secretion are present in the fasting stomach, it is evident how slight a value this symptom possesses in estimating the degree of stagnation of the stomach-contents.

The use of the stomach-tube and an examination of the fasting stomach furnish the only absolute proof of the presence of dilatation of the stomach. If remnants of food are found in repeated examinations by this method, gastrectasis may be diagnosed.

If no food-remnants are obtained from the fasting stomach, dilatation may be excluded from the diagnosis,—whether the greater curvature stands above or below the umbilicus.

If considerable amounts of gastric juice,—for instance, 40 to 50 c.c.,—can be obtained from the fasting stomach, the examiner may assume the presence of hypersecretion,—which will be considered in detail in a special chapter.

In benign stenosis of the pylorus, hydrochloric acid is always present; and in almost all cases, there are both hyperchlorhydria and hypersecretion,—the result of increased irritation of the gastric glands from the stagnation of food. Occasionally the physician will find a normal or a subacid gastric juice, when stagnation has existed so long that the functional ability of the gastric glands has become exhausted from over-activity.

In gastrectasis, the total acidity of the contents removed from the fasting stomach usually exceeds 100, since, in addition to the normal acids of the stomach, there are present the acids resulting from fermentation and those introduced with the food, especially sarcolactic acid. Total acidities amounting to from 150 to 160 are not at all rare.

In malignant stenosis of the pylorus, free hydrochloric acid is not found in the stagnating contents of the stomach; fermentation-acids only are present, especially lactic acid. In the early stages of a primary carcinoma of the pylorus, free hydrochloric acid is also encountered.

If the examiner finds a stenosis of the pylorus in which there is a diminished hydrochloric acid secretion in the stag-

nating food, and the anamnesis points to the presence of an ulcer, this combination of symptoms should always awaken his suspicion of a malignant degeneration of the ulcer.

Such a patient should, as already mentioned, be referred to the surgeon at the earliest possible moment.

In benign stenosis, *sarcinæ* and yeast-cells are always microscopically present, while in malignant stenosis there are always enormous numbers of lactic acid bacilli, besides yeast-cells.

For further details see the chapter on Microscopical Examination of the Contents of the Stomach.

Diagnosis.—The diagnosis of dilatation of the stomach is very easy. It is much more difficult to determine which form of dilatation is present in an individual case.

If stagnating foods are obtained from the fasting stomach, it is certain that there is a mechanical obstruction of the pylorus; and if the greater curvature of the stomach lies below the umbilicus, this obstruction has caused, in addition to food-stasis, an enlargement of the stomach.

Unless the patient states definitely in the anamnesis that he has frequently vomited food eaten one or several days before, the clinician can never make a diagnosis of gastrectasis before he has introduced the stomach-tube into the fasting stomach and has demonstrated thereby that food-stasis exists.

To determine the character of the obstruction is often very difficult. If the occurrence of dilatation has been preceded by periodical epigastralgia (see chapter on Ulcer), and if, besides this, hæmatemesis has been observed, it is extremely probable that a cicatrized ulcer of the pylorus is the cause of the gastrectasis.

If gall-stone colic with icterus, or an injury to the epigastrium, can be clearly established, the diagnostician will naturally think of the presence of adhesions from perigastritis which compress the pyloric outlet.

If the dilatation has existed only a short time, in an otherwise previously healthy individual, a malignant neoplasm of, or near, the pylorus should be suspected, especially

FIG. 29.



Gastrectasia secondary to ulcer of the pylorus. The stomach-stiffenings were easily recognized in this case. [Courtesy of Dr. W. W. Hitchcock, Los Angeles.]

if examination shows that there is a diminished secretion of hydrochloric acid.

Gastrectasis due to spasm of the pylorus should always be thought of, if colicky pains occur regularly at certain periods of the day, especially four to six hours after meals, at five or six o'clock in the afternoon and from one to three o'clock at night.

An exact diagnosis of the etiology of dilatation of the stomach will usually require a prolonged clinical observation of the case.

Slight or latent cases of relative stenosis of the pylorus are recognized by the administration of the test-supper (see page 35).

Differential Diagnosis.—No other affection can be easily confused with chronic dilatation of the stomach, if the examiner has obtained stagnating food from the fasting stomach.

A low position of the greater curvature, as already mentioned, is equally frequent in enteroptosis, in vertical position of the stomach and in megalogastria. If the physician gives the test-supper and finds the stomach empty in the morning before breakfast, gastrectasis may be eliminated from the diagnosis.

Acute gastrectasia, which is a form of ileus, high up in the bowel, results from sudden kinking of the duodenum, incarceration of a gall-stone, and paralysis of the stomach following laparotomies and abdominal injuries.

Acute dilatation may be confused with the dyspeptic symptoms of acute gastritis. The low position of the greater curvature best protects the examiner from confusion in the differential diagnosis of these two diseases.

Prognosis.—The prognosis of gastrectasis depends entirely upon the nature of the original disease.

Gastrectasis due to chronic pylorospasm offers a favorable prognosis, since an absolute cure is possible, the stomach regaining its normal motor power.

On the other hand, chronic ectasia caused by organic obstruction at the pylorus can only be relatively cured, that is, the patient must occasionally have lavage treatment and use a stenosis-diet, *i.e.*, a semi-solid diet rich in fats.

An absolute cure can be expected only through surgical intervention.

The prognosis of gastrectasis must be very guarded in every case until the physician is convinced of the nature of the obstruction. The greater the stagnation of food, and the smaller the amount of urine secreted, the poorer are the chances for recovery. The prognosis is always bad if symptoms of tetany are present.

Treatment.—The indications for treatment in the different forms of dilatation are as follows:

In the spastic form of ectasia, the object of treatment should be to reduce the inflammatory swelling of the pylorus, or to heal the erosion or ulcer. If the treatment is successful in these, the pylorospasm relaxes and the gastrectasis disappears of itself.

In dilatation of the stomach due to organic stenosis, on the other hand, the task of the physician should be to reduce the obstruction of the pylorus to the stage of compensation, on the principle that every dilatation due to obstruction represents a gastric disturbance in the stage of disturbed compensation.

The treatment is (1) *Dietetic*, (2) *Mechanical*, (3) *Medicinal*, and finally (4) *Surgical*.

1. *Diet.*—The diet should be suitable to the anatomical conditions present, the food being of such a consistency as will pass through a sieve, the perforations of which are about the size of a knitting-needle, so that it can readily pass through the narrowed stomach-outlet. It must, therefore, be liquid or semi-liquid, and should be as rich in fats as possible, so as to contain the sufficient number of calories for the maintenance of the body.

Only after advanced improvement has taken place will it be safe for the physician to enlarge the dietary to foods of pulpy and semi-solid consistency.

Meats and albuminous foods need not be given in a finely divided form, because the gastric secretions are usually present in amounts sufficient for normal chymification.

Only in the malignant forms of stenosis of the pylorus need the food be given in a liquid or semi-liquid form, because in these, gastric secretion is deficient.

Of foods suitable in gastrectasis, the following should be especially mentioned: cream, butter, olive oil, milk, buttermilk, meat soups, raw eggs, scraped beefsteak, beef juice, meat-gelatins, purées of potatoes, carrots, peas, spinach, and also apple and orange sauces; and for drinks,—wine or fruit juices diluted with mineral water.

Detailed diet-lists will be found in the Dietetic Outlines.

2. *Mechanical Treatment.*—The mechanical treatment of gastrectasia consists in lavage of the fasting stomach, which should be continued daily, until it no longer contains stagnating food. In the beginning, the treatment should be given daily, then twice or three times a week, and finally only once a week. The patient may soon be able to lavage the stomach himself. Two or three litres of pure lukewarm water, about 30° R. [100° F.], are required in each treatment.

The addition of medicinal substances to the lavage water is quite superfluous.

After the lavage, from 50 to 100 c.c. of warm olive oil should be introduced into the stomach, or if preferable, the patient may drink the oil, in order that the narrowed, roughened and fissured portion of the mucosa may be lubricated. Besides its usefulness in this direction, the oil also effectively reduces hyperchlorhydria, and at the same time increases the number of calories furnished the body.

3. *Medicinal Treatment.*—Especially deserving mention are silver nitrate, bismuth, the alkalies, and atropine.

Remedies such as bismuth, silver nitrate and atropine, which are directed toward the removal of the etiological factors, should be given before meals; while such drugs as antacids, whose effect is purely symptomatic, should be given after eating.

As a rule, for the treatment of spasm of the pylorus, I first administer the oil-treatment; and later, give a teaspoonful of bismuth in the morning on the fasting stomach,

just as in ulcer; and at noon and in the evening, one-half hour before meal-time, a $\frac{1}{2}$ milligram [gr. $\frac{1}{170}$] tablet of atropine sulphate.

Boas has recently recommended the use of ten drops of a one per mille solution of eumydrin, instead of atropine.

One or two hours after meals, a teaspoonful of magnesia usta, magnesium carbonate, magnesium ammonio-phosphate, bicarbonate of soda, or Vichy salts, should be given. When indicated, the physician may prescribe the extract of belladonna mixed with the alkalies in powder form.

4. *Surgical Treatment.* In case the internal treatment is ineffectual, if in spite of the stenosis-diet, stagnation of the stomach-contents still persists, and the daily amount of urine secreted amounts to only 500 or 600 c.c., and if the strength of the patient is gradually failing, the physician should advise surgical treatment.

The operator, after opening the abdominal cavity, should decide whether pyloroplasty, resection of the pylorus, or gastroenterostomy is indicated.

As a rule, the latter will usually be the most suitable.

The clinician must be all the more ready to advise operation, if the stenosis of the pylorus is of a malignant nature.

If the operation is successful, the patient often takes a new lease of life, and an increase of from forty to fifty pounds in weight in a comparatively short time is frequently observed.

Congenital Hypertrophic Stenosis of the Pylorus

In addition to the above forms of gastrectasis, one other should be mentioned,—congenital hypertrophic stenosis of the pylorus with secondary gastrectasis.

This condition manifests itself soon after birth, by the most persistent vomiting and dilatation of the stomach. A cure is to be expected only through surgical methods.

[The clinical course of congenital hypertrophic stenosis may extend over a period of many years, into adult life.

The most characteristic symptom is the copious vomiting of food eaten several days previous.

After the stomach is emptied and relieved of its stagnating contents, the patient is in good health and without any gastric discomfort.

These attacks of vomiting appear at more or less regular intervals, varying in point of time from a few days to several weeks or months.

Corresponding to the degree of stenosis present, there is impairment of the general health and nutrition of the patient.

Lavage, for removing the stagnating stomach-contents, and the administration of alkalies, belladonna, etc., for the hyperacidity which is usually present, are suitable as palliative treatment in cases presenting infrequent symptoms of the disorder.]

Acute Dilatation of the Stomach

[Acute motor insufficiency—accompanied by distention of the stomach—occurs so frequently that a discussion of its clinical features should be introduced.

The causation of acute dilatation has not been satisfactorily explained. It is well known that mild degrees of acute dilatation may occur as a result of indiscretions in eating and drinking; after severe infectious diseases (pneumonia, scarlatina, typhoid); as a result of traumatism to the abdomen; after toxæmias from various causes; during convalescence from chronic ailments; a severe form with a high mortality occurs after operations—particularly following laparotomies in which manipulation of the viscera, shock, and prolonged use of an anæsthetic are prominent factors.

Several clinical types of acute dilatation have been described, but we shall discuss here only the postoperative form of the disease, which will serve in the symptomatology and treatment of all the other forms.

The views most generally held as to the mechanism of acute postoperative dilatation are as follows:—

1. That acute dilatation results from obstruction of the

duodenum by the root of the mesentery and the superior mesenteric vessels, due to the sinking of the collapsed and empty coils of the intestine into the pelvis.

2. That it is a primary functional disturbance of the stomach, and that this distended organ forces the intestine downward, thereby producing traction on the mesentery and obstruction of the duodenum.

3. That the dilatation is the result of severe toxæmia.

Symptoms.—The symptoms of all forms of acute dilatation are similar, varying only in degree.

In the postoperative form, the symptoms may not develop until several days have elapsed after operation. Then occur sudden abdominal distention, pain, tenderness, and excessive vomiting with its accompanying thirst, scanty urine, and collapse.

The vomiting is frequent and profuse, the vomitus consisting at first of the gastric contents, ferments, hydrochloric acid, and bile, and later it becomes thin and watery. It may be of normal color, later becoming brownish or black, and occasionally containing blood. The odor may be sour or foul, but is rarely feculent.

The general symptoms are those of collapse—rapid and weak pulse, frequent respiration, a clammy skin, cold perspiration, and subnormal temperature. Death may occur within a few days.

Physical Examination.—Distention of the abdomen, usually of the left and lower portion. Splashing sounds at the level of the umbilicus may be detected if much gas is present in the stomach.

Percussion will show resonance or tympany in proportion to the amount of fluid present. Peristaltic waves of the stomach are rarely observed.

Prognosis.—The prognosis must in all cases be carefully guarded. In severe and typical cases the death-rate exceeds 70 per cent.

Treatment.—*Prophylaxis.*—In all cases undergoing lap-

FIG. 29a.



Acute dilatation of stomach after gastroduodenostomy. Photograph from Kaiserling specimen by Schapiro. [Courtesy of Dr. J. M. T. Finney, of Baltimore.]

rotomies where atony of the stomach is suspected, greater care should be taken in the administration of food after operation.

Rapidity in operation, besides a minimum amount of manipulation and a minimum quantity of anæsthesia, is important.

In every case of suspected acute dilatation, lavage should be immediately performed and should be repeated every two or three hours in severe types.

No foods nor liquids should be given by mouth. If the condition continues for several days, thirst may be allayed by nutrient enemata or by hypodermoclysis.

Peristalsis of the intestine should be promoted as early as possible. A quickly acting hydragogue, such as elaterin in half-grain doses, or a saline cathartic, may be given by mouth or introduced through the stomach tube before its removal after lavage. A high enema of from four to six ounces of a saturated solution of magnesium sulphate is to be commended.

Atropine should be given hypodermically to relieve pylorospasm and to control secretion into the stomach.

Strychnine (gr. 1/30) and eserine (gr. 1/100) should be given hypodermically to promote stimulation of the heart, respiration, and the musculature of the bowels.

The next most important therapeutic measure is postural treatment. Any one of the following positions may be used as seems best suited to the individual case.

1. Semi-oblique or half-reclining position.
2. Elevation of the foot of the bed.
3. Left or right lateral position.
4. Abdominal position, the patient lying on the abdomen.
5. The knee-elbow position.

Surgical Treatment.—Operations have not generally proved successful. Those attempted have been: the stomach opened and evacuated, and gastro-enterostomy; gastric fistula; relief of the suspected kink of the duodenojejunal junction.]

CLINICAL CASES

1. *Cicatricial Stenosis of the Pylorus with Gastrectasis*

CASE 1.—Emily A., a dairyman's wife, 40 years old, suffered from cicatricial stenosis of the pylorus following ulcer, with secondary extreme dilatation of the stomach accompanied by symptoms of tetany. The oil-treatment was given, which was followed by marked improvement in a very short time. Patient gained 30 pounds in weight in two months. At the end of treatment, her total increase in weight was 45 pounds.

A relative cure of the stenosis resulted, that is, the patient enjoyed good health and suffered no inconvenience while she continued to use the stenosis-diet and the oil-treatment.

October 9, 1901: The patient had previously suffered from chlorosis, at which period she suffered also from cardialgia for two or three weeks at a time. In 1894 she had vomited blood, with melæna, and a second time in 1897. Between these attacks of hæmatemesis, she had suffered frequently from cardialgia.

At that time an operation had been advised, which was declined. The patient made quite marked improvement until one and one-half years ago, since which time she had copious vomiting, with frequent gastric hemorrhages. At this time the hemorrhages were occurring about every eight to ten days, and for the past eight months had appeared once or several times daily. There were extreme emaciation, œdema, and mild symptoms of tetany. Patient was urgently advised by several different physicians to undergo operation, but refused. The stomach was washed out several times.

Physical Examination.—Patient was extremely debilitated and as pale as wax. She weighed only 81 pounds. Œdema of the lower extremities extended to the calf of the leg. The abdomen was very much relaxed and strong splashing sounds as low as the cæcum could be produced. At the right of the median line, just below the liver, in the region of the gall-bladder, a hard, irregular tumor as thick as the thumb was palpable. This was thought to be the pylorus. The urine contained some albumin. The greater curvature of the stomach extended to within two finger-breadths above the symphysis. Enormous quantities of material were obtained from the fasting stomach, which contained a great deal of free acid, sarcinæ, and yeast-cells. During the lavage, the patient had a slight attack of tetany. She was put on absolute rest in bed, with liquid diet, enemata, and the introduction of oil following the lavage.

October 11th: Condition of the patient was much improved. The gnawing and cramp-like pains in the abdomen had entirely disappeared. 150 c.c. of oil were introduced.

October 12th: Patient had no pain. There was a spontaneous, soft, **ll**-formed stool. There were no eructations, and the thirst was less;

no gastric discomfort of any kind. There were only a few globules of oil obtained from the stomach in the morning before breakfast. 120 c.c. of oil were introduced.

October 13th: Patient had another slight attack of tetany, which was less severe.

October 14th to 17th: The patient was absolutely free from pain, and the bowel movements were regular. Treatment continued and dietary increased; she was even given chicken, wine soup, and grits.

October 23rd: In the meantime, the patient had performed the lavage and oil-treatment at home. Every evening before retiring she had drunk 100 c.c. of oil. Small remnants of food were still obtained from the fasting stomach, which contained sarcinæ and yeast-cells. No other attacks of tetany had occurred. The abdomen of the patient was soft, a slight œdema of the legs was still present, and only traces of albumin were found in the urine. Patient was allowed to eat chicken, filet, and purée of potatoes with butter.

November 1st: The patient weighed 104 pounds, having gained 17 pounds in four weeks. Œdema had disappeared, from which fact we know that the actual increase in weight was greater than the apparent. The appetite was good. The greater curvature of the stomach was three to four finger-breadths below the umbilicus. The right border of the stomach extended 10 cm. beyond the median line. The adiposis panniculus seemed considerably thicker. The patient had no repugnance toward the continued use of the oil. Diet now consisted of tender meats, eggs, milk, cream, and white bread. She was instructed to wash out her stomach every second day.

November 8th: Only a very few remnants of food,—consisting mostly of rice, fruit-seeds, etc.,—were obtained from the fasting stomach. The general health of the patient was very good.

November 14th: Sarcinæ, yeast-cells, muscle-fibres, and other remnants of food were obtained from the fasting stomach. Total acidity of the gastric juice, 105; free hydrochloric acid, 68.

December 11th: Patient weighed 111 pounds, which was a gain of 30 pounds within two months. She was allowed to leave her bed.

January 3, 1902: Greater curvature of the stomach was at the level of the umbilicus. General health of the patient was good.

December 17, 1902: The patient weighed 126 pounds, an increase of 45 pounds. Examination showed that she was in quite good condition, although lavage and the oil-treatment are necessary from time to time.

2. *Traumatic Ectusia*

Wm. B., a locksmith, 24 years old, had had previous good health until he received a severe contusion of the epigastrium in falling, after which he suffered from symptoms similar to those of ulcer, followed a few weeks later by typical signs of gastrectasis or motor insufficiency of the second degree. There were stagnation of the ingesta, copious vomiting, hyper-

chlorhydria, a great number of sarcinæ and yeast-cells in the contents obtained from the fasting stomach. In addition, patient suffered from violent cramp-like pain in the epigastrium, which occurred regularly at a certain time of day, and was usually accompanied by vomiting. He was given the ordinary treatment for dilatation of the stomach,—lavage, etc.,—which failed to give any improvement; but instead, he continued to grow worse. He therefore gave up lavage-treatment and sought relief by artificially producing vomiting by irritating the palate with the finger; every three or four days he would produce vomiting as thoroughly as possible in this way. One evening, on the advice of an acquaintance, after having thus emptied his stomach, he drank a glass of linseed oil,—which he continued to use three times daily for several weeks. According to the statement of the patient, the results were quite astonishing. Epigastralgia ceased immediately and there was only one recurrence of vomiting. After several months of this treatment, the patient had regained normal health. He was able to eat all kinds of food without any discomfort and was able to perform the same heavy, manual labor as before his illness. The fasting stomach was always found to be free from food and contained no secretions. The motor insufficiency was, therefore, completely cured.

3 *Spastic Stenosis of the Pylorus*

Leopold K., 28 years old, an engineer from Mexico, had suffered from severe epigastralgia and vomiting of blood five years previous. He had been given the "ulcer-cure," after which he had remained well for two years. He then suffered from a recurrence of the ulcer, accompanied by copious vomiting, heartburn, and cramp-like pain, occurring especially at night. Relief from epigastralgia was obtained by the use of alkalies. He was repeatedly advised to undergo an operation.

Physical Examination.—Patient was extremely emaciated, his weight being only 106 pounds. Food-remnants and sarcinæ were obtained from the fasting stomach. There was hyperchlorhydria, and the total acidity was 100.

Treatment.—In the beginning of treatment, the stomach was washed out daily, then two or three times a week, and then only once. One hundred c.c. of olive oil were given every morning. At the beginning of treatment, the patient was placed on an absolute liquid diet, and later on semi-solids. Alkalies with atropine were given after meals. One month later, pain and stagnation had entirely disappeared, and the patient had increased in weight to 120 pounds. He returned to Mexico cured.

4. *Operated Case*

Mrs. K., 60 years old, had suffered from gastric ulcer for 30 years. She had vomited blood several times, and for several years had suffered from food-stagnation so that lavage was a necessity. In this case, the internal therapy, including the oil-treatment, was unsuccessful. She was, therefore,

advised to have a gastro-enterostomy, which resulted in a complete cure. At the operation the lumen of the pylorus was found to be contracted to the size of a lead-pencil.

Perigastritis

Etiology.—As has been shown in the previous chapter, perigastritis results chiefly from an extension of ulceration of the mucosa to the serous coat of the stomach-wall, or from acute and chronic trauma to the stomach region, or finally from inflammatory processes of the serous coats of neighboring organs,—especially the gall-bladder in cholelithiasis and empyema. Peritoneal adhesions and bands are formed by these inflammatory processes, just as in diseases of the uterus and its adnexæ. In ulcer of the duodenum, periduodenitis naturally arises in the same way.

Symptoms.—The symptoms of perigastritis may be latent for years, and may become active only after some sudden twist or movement of the body. Sometimes, however, an exacerbation of the inflammatory process occurs, which causes the persistent, boring, stabbing pain in the epigastrium aggravated by movements of the body and especially by distention of the abdominal wall, coughing, sneezing, pressing, lifting of heavy weights, or bending the body backwards. In addition to these symptoms, forceful downward pressure upon the costal cartilages is, according to Pariser, especially painful.

Diagnosis.—A diagnosis of perigastritis can never be made beyond a probability; and a positive diagnosis, never. In persons who have been injured, symptoms are often described which may be attributable to perigastritis; and it is necessary to add that such a history would open the door freely to simulation in a person desiring to obtain damages after injury.

Prognosis.—As already mentioned in the previous chapter, perigastritis frequently gives rise to gastrectasis. Bands of adhesion constrict either the pylorus or the duodenum, or interfere with the normal peristaltic movements of the *pars pylorica*, in such a way that the function of expelling the contents of the stomach into the duodenum is interfered with.

Treatment.—The treatment of an acute exacerbation of perigastritis is identical with that of acute circumscribed peritonitis,—namely, rest in bed, liquid diet, ice and opiates. If the course of the disease, in chronic perigastritis, presents no febrile symptoms, the condition should be treated in the same manner as chronic ulcer,—with hot applications, rest in bed, liquid diet, and bismuth. (See chapter on Gastric Ulcer.)

If the perigastritis has already led to complications,—for instance, to motor insufficiency and secondary dilatation of the stomach,—the condition should be treated surgically.

Hypersecretion

(Gastrosuccorrhœa, "Reichmann's Disease")

The term "hypersecretion" was introduced into the literature by Reichmann in 1882, as a clinical entity. By this term is understood the pathological condition of the glands of the stomach in which they constantly secrete gastric juice.

In this affection, considerable amounts of gastric juice, which may have a normal acidity or a hyperacidity, can be obtained from the fasting stomach before breakfast. There is no uniformity in the opinions of the various authors as to what quantity should constitute hypersecretion.

Since slight amounts of gastric juice may frequently be obtained from the stomach of healthy persons, it is better,—according to my experience,—to assume the presence of hypersecretion only when at least 20 to 30 c.c. of gastric juice are obtained from the fasting stomach.

So far as my experience goes, hypersecretion never occurs from a purely nervous affection of the stomach,—as some authors assume,—but is always an expression of an acid gastritis resulting from different causes, the most frequent factor being either an ulcer, an erosion, a fissure, or a scar at the pylorus, which occasions a delay in the emptying of the stomach, and, thereby, a constant irritation of the gastric glands. It is for this reason that in benign stenosis of the pylorus there is almost always a hypersecretion, which is the forerunner of motor insufficiency of the stomach.

The next most important etiological factor is primary acid gastritis which leads to hypersecretion. The following diagram illustrates clearly the origin and the influence of hypersecretion in gastric pathology. (Fig. 30.)

In this diagram, the patient is represented as being in good health at the point "G;" an ulcer of the pylorus has developed at "U," which at "S" is represented as having given rise to hypersecretion, and to stagnation at "St." Ectasia is the last stage of the process, represented at "E," which, when rationally treated, leads to recovery.

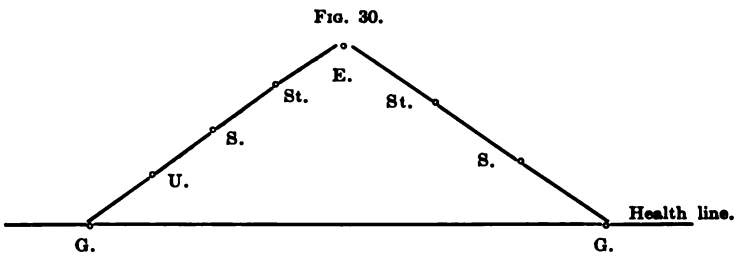


Diagram showing the development and course of hypersecretion.

Hypersecretion, therefore, precedes the motor insufficiency of the stomach, and disappears with it by the institution of curative measures.

Hypersecretion is a rudimentary or incomplete dilatation of the stomach. Periodical hypersecretion of gastric juice is almost always a symptom of *tabes dorsalis*, as will be pointed out below.

Symptoms.—The subjective symptoms of hypersecretion consist of burning, boring, and, rarely, cramp-like pains in the epigastrium, which may extend to the throat,—all of which are relieved by eating, the use of warm drinks, and especially by alkalies.

Objectively, there occurs vomiting of the gastric juice, which is often so sour that the patient feels as if his teeth were covered with acid. The most important objective symptom, however, is the discovery of considerable amounts,—from 30 c.c. up to a half-litre,—of gastric juice in the fasting stomach. The total acidity of the gastric juice in hyper-

secretion amounts to from 70 to 110. Bile is frequently present and mixed with the gastric juice.

In uncomplicated hypersecretion, there are neither macroscopical nor microscopical evidences of food-remnants, and sarcinæ are absent. Should any of these be found in a case of hypersecretion, the assumption is safe that an insufficiency already exists which may lead to dilatation of the stomach.

I am very well aware that different authors assume that hyperchlorhydria and hypersecretion are primary factors, and that pyloric spasm,—which is the immediate cause of the irritation of the mucous membrane of the stomach,—is secondary. But such a view can scarcely be correct, for the reason that after the cure of the obstruction at the pylorus, by either medical or surgical treatment, the hypersecretion spontaneously disappears; while, on the other hand, very many cases of hyperacidity run their course without clinical symptoms.

In the cases of hypersecretion which are the immediate forerunners of motor insufficiency, starch-cells are sometimes obtained from the fasting stomach early in the morning; while if meat-fibres are entirely absent, the clinician should not be surprised, because the proteid foods may have been digested during the night by the action of the hyperpeptic gastric juice.

Diagnosis.—An exact diagnosis of hypersecretion is possible only by the use of the stomach-tube and the examination of the fasting stomach. If considerable amounts of gastric juice are constantly present, in which there is no admixture of food-remnants, the diagnosis is positive. The subjective symptomatology frequently leads to confusion with such associated conditions as ulcer, fissures, and erosions.

In the differential diagnosis, the physician should always eliminate the periodically occurring gastric crises of *tabes dorsalis*, and the vomiting which is frequently associated with migraine.

Treatment.—The treatment of hypersecretion should be directed exclusively toward the primary disease. The therapeutic procedures instituted, therefore, depend upon

whether an ulcer or a hyperacid alcoholic gastritis, etc., is the cause of the trouble.

A tablespoonful of olive or almond oil should be given three times daily, or the milk of almonds (see page 124) may be substituted before meals, if the condition is complicated by pylorospasm. Alkalies should be administered after eating. The diet should be semi-liquid and rich in fats.

If the primary lesion is an acid gastritis with erosions of the pyloric mucosa, large doses of Carlsbad or Vichy water should be given before meals, or the patient should be sent to one of these watering-places. Gormands and heavy smokers belong especially in this category of patients.

The mastication tablets of Bergmann or Belloc may be used symptomatically to great advantage, just as in similar lesions of the stomach.

The treatment of hypersecretion is of especial importance as a prophylactic agent against gastrectasis, since we must always consider hypersecretion as a preliminary or initial stage of dilatation.

Since every case of hypersecretion is the result of an anatomical lesion of the stomach, and should never be considered a nervous affection, anti-nervous treatment is useless.

CLINICAL CASES

Acid Gastritis

CASE 1.—Maurice K., a merchant, 50 years old, had indulged in the use of fatty foods, smoking, and beer-drinking. His appetite was very good, but he had begun to be afraid to eat because of a burning pain in the epigastrium several hours after eating, which had occurred regularly for the past two or three months. Pyrosis was frequent. He was a very strong, obese man. In every examination of the fasting stomach, 30 to 40 c.c. of secretion were obtained, the total acidity of which was 80 to 100.

The patient was cured at Carlsbad.

CASE 2.—Heinrich B., a brewer, 30 years old, presented the same etiological and clinical course as in Case 1, hypersecretion resulting from a relative stenosis of the pylorus.

(For other clinical cases, the reader is referred to case-histories described at the end of the chapter on Gastrectasia, in the course of which the symptom of hypersecretion is frequently mentioned.)

Hyperchlorhydria

Hyperchlorhydria and hypersecretion are not the same.

Hypersecretion indicates an increase in the secretion of gastric juice of normal acidity, while hyperchlorhydria is the secretion of an excessively acid gastric juice.*

In hypersecretion, the test-breakfast is always found to be well digested and of a fluid consistency, or nearly so; on the other hand, in hyperchlorhydria, the test-breakfast is only moderately well digested and rather semi-solid in consistency.

As a matter of course, both of the above-mentioned anomalies of secretion may occur at the same time.

Although, as we have seen in the foregoing chapters, hyperacidity is not a disease *sui generis*, being merely a symptom of various affections, yet it is so frequently and prominently associated with disorders of the stomach and intestine that it is deserving of special consideration in a practical work of this kind.

According to its etiology, there are four different forms of hyperacidity that clinically may be very well classified, diagnosed, and causally treated.

These four forms are: (1) hyperacidity in acid gastritis; (2) hyperacidity in ulcer and stenosis of pylorus; (3) hyperacidity in neurasthenia; (4) hyperacidity in chronic constipation.

The first and second forms are the expression of organic, anatomical diseases; while the third and fourth are expressions of functional affections.

The physician will be able to differentiate the various forms by the following characteristics:

1. *Hyperacidity Occurring in Acid Gastritis*

The test-breakfast has a total acidity of from 70 to 120 and is of a thick, pulpy consistency, while frequently there is a diminished secretion of gastric juice.

*According to the most recent examinations of the Pawlow's school, it appears that the concentration of the gastric juice is always the same, and its total acidity amounts to about 120. The acidity, therefore, depends only upon the number of cubic centimetres secreted. In case "A," for instance, there are secreted in one hour 200 c.c., while in case "B," only 100, etc.

The anamnesis of such patients,—and this is of the greatest importance,—shows a history of abuse of tobacco, wine, beer, and excesses in eating.

As a rule, the patients will be found to have felt subjective pressure and discomfort after eating heavy foods; but in cases where the formation of erosions of the mucosa has already occurred, the patients suffer from burning pain in the epigastrium two or three hours after eating, which is relieved by again taking food into the stomach.

In individual cases, if the erosions are located in the pylorus, the pain is of a cramp-like character, the so-called “epigastralgia,” which, however, rarely occurs immediately after eating, but usually several hours later, especially if the patients have indulged in errors in diet, beer-drinking or heavy smoking. Besides the burning in the region of the stomach, pyrosis is very frequent.

Obese and strongly-built individuals with hearty appetites are usually predisposed to this disease.

2. *Hyperacidity in Ulcer and Stenosis of the Pylorus*

In these affections, the stasis of the ingesta causes an irritation of the gastric glands and, thereby, an increase in the amount of gastric juice secreted, *i.e.*, hypersecretion and hyperchlorhydria occur.

Concerning the symptoms of this form of hyperchlorhydria, the reader is referred to the chapters on Ulcer of the Stomach and Gastrectasis.

The therapy likewise needs no further consideration.

Anatomical changes of the gastric glands, consisting of hypertrophy of the acid cells and atrophy of the chief cells, are present in both of these forms of hyperchlorhydria.

In acid gastritis, the glands become irritated from excesses in eating; while in ulcer and stenosis of the pylorus, the hyperchlorhydria is the result of the disturbance of the motility of the stomach.

In the first form, the hyperchlorhydria is primary; and erosions, should they occur, are secondary.

All other cases of hyperchlorhydria that can be objectively diagnosed are of a functional nature.

They may be clinically differentiated from the hyperchlorhydria of organic disease by the absence of actual pain.

The clinical course of such is either entirely without symptoms, and hyperchlorhydria is only discovered as an accidental or associated condition; or they produce, at most, only mild pressure in the stomach, or heartburn, discomfort and feeling of fulness in the epigastrium.

3. *Hyperchlorhydria Occurring in Neurasthenia*

This form of hyperchlorhydria is found most commonly in neuropathically disposed individuals, and especially in such as have the *habitus enteropticus*.

The symptoms consist of pressure in the stomach after heavy meals, especially if the patient has not had the necessary amount of rest.

In this form of hyperchlorhydria, actual pain never occurs.

The treatment should be directed toward the removal of the primary disease, therefore should combat the general nervous condition of the patient. A full discussion of the details of the therapy will be found in the section on Functional Diseases of the Stomach.

4. *Hyperchlorhydria Occurring in Chronic Constipation*

This exists very frequently without causing the patient any discomfort, or there is only a feeling of unpleasantness and fulness after eating.

This form of hyperacidity is also of a functional nature, and disappears as soon as chronic constipation has been cured by proper treatment.

The cause of hyperacidity in chronic constipation is not quite clear. One factor may be that the mucous membrane of the stomach is irritated by the abuse of purgatives and laxatives; and another cause may be that when there is a stasis of the intestinal contents, the peristaltic action of the musculature of the stomach is similarly affected.

According to the above consideration of hyperchlorhydria, it is evident that there is as little uniformity in the etiology of the different forms of the disease as in its treatment.

It is, therefore, illogical for some authors to enthusiastically recommend a meat-diet for hyperchlorhydria, and for others to insist upon the necessity of a vegetarian diet. Nor is it to be wondered at that under either of such dietetic regimes there occur as many absolute failures as successes in the treatment; for the treatment of hyperchlorhydria must always be planned according to its etiology.

Besides the four forms of hyperchlorhydria already mentioned, there is still a fifth, which occurs acutely as the so-called "Gastroxynsis," of Rossbach, which begins suddenly and continues from one to several days, with an extraordinary increase in the secretion of gastric juice, accompanied by boring pains and vomiting.

It is probable that in most of these cases we have to do with gastric crises of *tabes dorsalis*; and it should be pointed out here that the gastric crises may occur as the first symptom of *tabes*. I saw such a case in a man twenty-three years old, three years after syphilitic infection.

The transient duration of hyperchlorhydria in these cases prevents the physician from confusing the condition with ulcer of the pylorus, in which pain also occurs periodically; but in this instance each period has a duration of several weeks, when the pain occurs regularly at a certain time after eating.

Hyperchlorhydria continues throughout the entire life of some individuals. Indeed in some families it is hereditary, —nearly all the members being affected, and is especially frequent in families where obesity is a characteristic.

Prognosis.—The prognosis is very good in the functional forms of hyperchlorhydria.

The prognosis is generally favorable if the patient is able and willing to confine himself to hygienic living, to forego smoking, drinking, and excessive eating, and to wear suitable clothing which will not constrict the epigastrium, etc.

Hyperchlorhydria, if it has existed for several years, gradually terminates in normal acidity and finally in sub-acidity, of the gastric juice; this is especially the case in acid gastritis.

I have personally observed patients during the evolution of this disease, in whom the total acidity was at first 80, then 60, and later as low as 40.

In stenosis of the pylorus, the hyperacidity gradually decreases after the obstruction has been removed.

Treatment.—The method of treatment in a case of hyperchlorhydria should always depend upon the cause.

In hyperacidity caused by acid gastritis and ulcer, therefore, the treatment should be local; while the therapeutic measures in hyperchlorhydria occurring in neurasthenia and constipation should always be general.

The physician should prescribe a lacto-vegetable diet in the first two forms; in the neurasthenic form, a mixed diet, combined with forced feeding; and in the last form, a vegetarian diet,—in order to obtain regular spontaneous evacuations of the bowels.

CLINICAL CASES

Histories of patients illustrating the first two forms of hyperchlorhydria will be found at the end of the chapters on Gastritis and Ulcer of the Stomach, respectively.

1. *Nervous Hyperacidity*

CASE 1.—Ernst E., a teacher, 61 years old, had suffered discomfort and pressure in the epigastrium for six months, after eating. The appetite was poor. Patient had an aversion against fatty foods. He presented the typical fear-phenomena of neurasthenia. The bowels were sluggish. The patient had had nervous shocks caused by two deaths in the family, and he slept poorly. Treatment in a sanatorium had been unsuccessful.

Patient was given bromide, digitalis, asafetida, and iron, without improvement. He lost 22 pounds in weight. He had suicidal intentions.

Physical examination of the patient was negative. There was no sugar in the urine. Examination of the stomach showed the presence of hyperchlorhydria. The total acidity was 80. The motility of the stomach was normal.

Treatment consisted in the rest- and fattening-cure and the use of bitters. He gained fourteen pounds in weight. Improvement was very slow, and not until three and one-half years later was he quite cured.

For clinical cases illustrating hyperchlorhydria in chronic constipation, see the section on Diseases of the Intestine.

FUNCTIONAL DISEASES OF THE STOMACH

General Remarks.—It should not be concluded, from the considerable space devoted to the organic diseases, that they necessarily exceed, in their frequency, the functional diseases of the stomach. On the contrary, the functional diseases deserve equal space and interest in gastric pathology.

We include, under functional or nervous dyspepsias, all those diseases in which no pathological anatomical change of the stomach is demonstrable; in which, therefore, the organ is diseased only in the pathological-physiological sense.

Although functional diseases of the stomach are often very stubborn in yielding to treatment, still by suitable measures they may usually be brought to complete cure and recovery.

The successful results from the application of therapeutic measures in the diseases of the digestive tract depend upon the physician's being able to classify correctly each individual case in either one or the other group of digestive diseases,—organic or functional,—and when a combination of both exists, to determine which of the two is primary, in order that he may know where to begin the application of the therapeutic measures.

It is clear that frequently a patient suffering from an organic disease of the stomach,—for instance, ulcer,—will if neuropathically inclined present evidences of nervous dyspepsia in addition to the ulcer-symptoms.

This occurs with especial frequency, as we shall see below, in diseases of the intestines.

The opposite is also true,—that a functional affection,—for instance, nervous anorexia,—may lead to an organic disease of the stomach in consequence of the disturbances induced by malnutrition.

Etiology.—The factors which favor the development of a functional disease of the stomach are both inherited and acquired.

Among the inherited tendencies is the *habitus*, which, according to the admirable examinations of Stiller, has been designated as the so-called *habitus enteropticus*, or *asthenia universalis congenita*. This *habitus*, which plays a prominent

part in the diagnosis of the diseases of the stomach and intestine, has already received sufficient and appreciative mention in the introduction.

In *habitus enteropticus*, all of the abdominal organs assume a position more nearly longitudinal than transverse,—especially the stomach, which while normal lies almost diagonally from left to right, but in *habitus enteropticus* takes an almost vertical position.

It is easy to understand that the abdominal organs in enteroptosis assume a lower position if the patient becomes emaciated or the abdominal walls are relaxed.

So long as persons with *habitus enteropticus* are well nourished, or are obese, and in women so long as the abdominal walls are not weakened and relaxed by pregnancy, no symptoms are caused by the presence of *habitus enteropticus*. It is not until some cause,—such as loss of appetite or some nervous affection,—lowers the nutrition of an enteroptotic individual, that the fully-developed symptoms of enteroptosis appear.

Enteroptosis is, therefore, a disease, while *habitus enteropticus* represents only the predisposition.

If the physician is in doubt in a given case as to whether the patient is suffering from an organic or a functional dyspepsia, he should, as a rule, determine the *habitus* of the patient. This will very often prevent his being misled in the diagnosis.

Organic diseases,—such as ulcer, gastritis, etc., usually occur in individuals with *normal habitus*.

Functional dyspepsia, on the other hand, occurs almost without exception in persons with the *habitus enteropticus*.

This generalization does not debar the fact that the reverse of these general principles is sometimes true.

All conditions that are capable of weakening the constitution of the patient, affecting his entire muscular and nervous system, and, in fact, all factors leading to neurasthenia,—hysteria, anæmia, or malnutrition,—predispose the individual to functional diseases of the stomach. Tuberculosis, syphilis, and insufficient nourishment, especially in persons who are physically or mentally over-worked, lead to anæmia and malnutrition, which may also simultaneously cause neurasthenia.

The nervous system is also debilitated through excesses in *Baccho et Venere*, from sexual abuses of any kind, and especially from masturbation.

Emotional strain from business and family troubles, depression, worry, disappointment in love, continuous excitement, death of relatives, and fear of contagion in caring for the sick,—all play an etiological rôle in the functional dyspepsias. It is not possible to mention in detail all of the factors that weaken the general health of the individual.

Only one other factor will be emphasized; that is, trauma, which is sometimes the cause of a functional stomach affection (traumatic neuroses).

If any of the above factors have already caused a disturbance of the functions of the stomach, this in itself will result in a further aggravation of the trouble, for the reason that the patient eats less, and is therefore insufficiently nourished, which still further depletes his general force and vitality.

This fact best explains the reason why such patients are irrationally put on a limited diet of liquids for years,—the attending physician mistaking the functional dyspepsia for one of an organic nature.

Diagnosis.—The diagnosis of functional diseases of the stomach is, as a rule, easy. The physician is, in most cases, able to differentiate these troubles from organic diseases by the anamnesis, as has been shown in detail in the description of the diagnosis of ulcer, carcinoma, and catarrh of the stomach.

The fact that in functional diseases of the stomach actual pain scarcely ever occurs, is of the greatest practical importance in the diagnosis.

The symptoms are, instead, only general dyspeptic disturbances, a feeling of fulness in the stomach, loss of appetite or rapid satiation of hunger, eructation, pyrosis, regurgitation, salivation, and constipation,—with general lassitude, weakness and lack of desire to work.

Prognosis.—The prognosis of a functional disease of the stomach is in itself good. Cure always results if the disease which caused the dyspeptic symptoms can be removed.

Unfortunately this is often impossible, because in the struggle for existence many patients lack the time and money to afford themselves the necessary rest and care.

It need scarcely be mentioned that very frequently it is absolutely essential to a cure, that the patient be sent away for change of scene and climate in order that his mind may be diverted by new surroundings. If he is able to fulfil these requirements for a sufficient length of time, a cure generally results. But it is to be expected that relapses will frequently occur if the patient resumes his former habits of living, because like causes produce like effects.

Treatment.—Treatment should be almost exclusively directed to the removal of the primary disease, and should be, therefore, general, in contradistinction to the treatment of organic disease of the stomach, which is local and directed to the stomach itself.

It is often very difficult to distinguish the different varieties of functional dyspepsia, in none of which are there pathological alterations of the gastric mucosa. They often merge gradually into one another and, in general, have many symptoms in common.

The following classification, which is arranged according to etiological principles, has served me so well in practice that I do not hesitate to retain it in a book which is designed to serve as a guide to the general practitioner, although I am well aware that such a classification is not in accordance with that given in most of the text-books on stomach diseases.

Anæmic-Gastroptotic Dyspepsia

(Atonia, or *Myasthenia Ventriculi*, Mechanical Insufficiency of the First Degree, Nervous Dyspepsia)

As the name indicates, we understand anæmic-gastroptotic dyspepsia to be that affection of the stomach in which the most characteristic symptom is the low position of this organ in a poorly-nourished individual.

Since this condition has been discussed in the Introduction, I will here briefly cover only the etiological points.

The predisposition to this form of dyspepsia is either congenital *habitùs enteropticus*, or an acquired enteroptosis following pregnancy; while the exciting causes of the disease

may be any condition that leads to anæmia, neurasthenia, or malnutrition of the individual.

Gastroptotic dyspepsia, commonly known as atony, is extraordinarily frequent, being perhaps the most common disorder of the stomach.

Its accurate recognition, therefore, is of great practical importance. It very frequently happens that not only the laity, but physicians also classify this very ordinary affection erroneously under the title, "chronic gastritis." This explains why it is that so many patients suffering from functional disorders of the stomach are not cured, and why it is that they ultimately fall into the hands of "neuropaths," who, by the establishment of hygienic measures and by the use of hydrotherapy, very often effect brilliant cures.

Symptomatology.—The symptoms of the disease are divided into *s u b j e c t i v e* and *o b j e c t i v e*.

The former are far more characteristic than the latter, so that it is usually possible to make a correct diagnosis if the anamnesis is obtained with accuracy and care.

Subjective Symptoms.—Subjective symptoms consist of all kinds of dyspeptic disturbances, but especially of pressure in the stomach after heavy meals and, in severe cases, even after a plate of soup or a glass of milk. Other symptoms are a feeling of fulness and distention in the epigastrium, rapid satiation of appetite, or anorexia, gaseous and acid eructations, regurgitation of food a short time after eating, sluggish bowels, water-brash and nausea, general lassitude and distaste for work, especially after meals.

On the other hand, actual pains never occur in uncomplicated anæmic-gastroptotic dyspepsia, as has already been stated in the discussion of Ulcer and Stenosis.

Objective Symptoms.—The objective symptoms are general emaciation and anæmia, in addition to the presence of *habitus enteropticus*, evidenced by an acute costal angle, the long, narrow thorax, and fluctuation of both tenth costal ribs.

The abdomen is relaxed, and the splashing sounds are easily produced.

The lower border of the stomach frequently lies at the level of the umbilicus, or two or three finger-breadths below. Frequently, in women who have borne children, the greater curvature extends a hand-breadth below the umbilicus, even to the symphysis pubis. The position of the greater curvature is easily determined by Obrastzow's method, which has been described in detail in the General Section. If there is not a sufficient amount of fluid in the patient's stomach at the time of examination, the physician should have him drink one or two glasses of water and should then determine the location of the fluid by palpatory percussion.

The various ingenious methods for ascertaining the position of the greater curvature,—such as the carbon dioxide distention of the stomach, the use of effervescent powders, and inflating the stomach with air by means of the stomach-tube and a rubber bulb, and the illumination of the stomach by Einhorn's diaphane,—are not essential in general practice, and are best very annoying to the patient. A detailed description of these methods may be found in any text-book on Diseases of the Stomach and Intestine.

In addition to gastroptosis, there is generally a ptosis of the transverse colon and a dislocated right kidney,—the left kidney being less frequently movable.

The examination of the stomach with the stomach-tube gives the following findings:

The fasting stomach is always found entirely empty in the morning after the test-supper, or at most contains only a few cubic centimetres of gastric juice mixed with mucus and epithelium from the mouth, œsophagus and bronchus.

Should remnants of food be found, contrary to the expectation of the physician, atony may be excluded from the diagnosis, the condition being more probably that of gastrectomy.

An hour after the Boas-Ewald test-breakfast, the stomach contents will be found well digested, with a total acidity from 40 to 65, although transient hyperacidity and hypacidity also sometimes occur,—to which, however, no great importance should be given.

It would be incorrect to assume the presence of acute gastritis, should the total acidity amount to only 20 or 30

FIG. 30a.

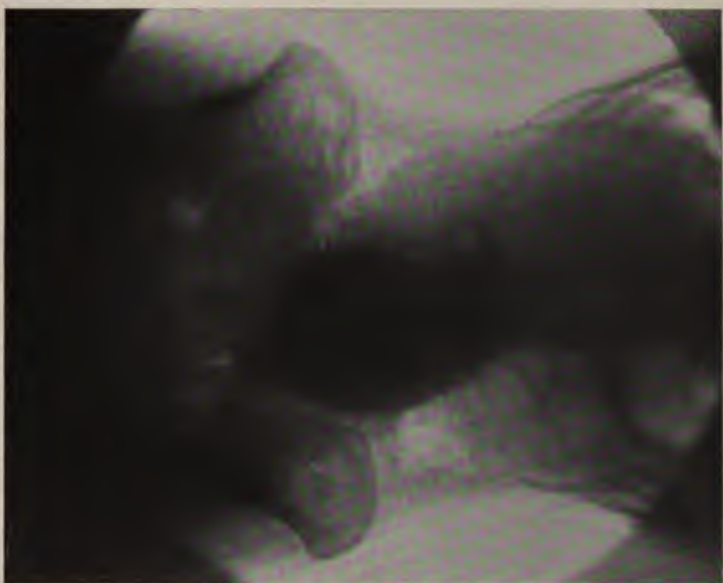


FIG. 30b.



FIG. 30a.—Radiograph of stomach of an adult female, illustrating a more advanced stage of gastropnoia, as is shown by the distinctly vertical position of the organ and the tendency toward sagging. There is nothing in the radiographic appearance, however, that would suggest the likelihood of gastric symptoms having their origin in the gastropnoia at this stage. Note that the pyloric portion of the stomach is distinctly shown, and that the hiatal hernia has escaped so far into the small intestine as to show the entire duodenum, and the beginning of the jejunum. There is no evidence of a duodenal "retraction kink," but the low position of the lesser curvature indicates a decided relaxation or stretching of the gastrohepatic ligament. A more marked degree of ptosis of the colon, found at a subsequent examination but not shown here, suggested that the latter was possibly a factor of importance in the mechanism of the gastropnoia. The radiograph serves to illustrate also a frequent error in the technique of such examination—that of not having a sufficient quantity of food in the stomach at the time to show the position, shape, and size of the organ under the proper conditions. A perfectly normal stomach may, when it contains nothing but the few ounces of a hiatal suspension, assume a vertical position such as is shown here, although the greater curvature is not likely to be found at such a low level. [Courtesy of Dr. H. K. Pancoast.]

FIG. 30b.—Radiograph of stomach of a female aged thirty-one years, showing a still more advanced stage of gastropnoia. There is no dilatation. The action of the same patient is shown in FIG. 30c. [Courtesy of Dr. H. K. Pancoast.]

FIG. 30c.



Radiograph of the colon of the same case as shown in Fig. 30b, and made eighteen hours later, showing an extreme degree of ptosis of the entire structure. [Courtesy of Dr. H. Pancoast.]

FIG. 30d.

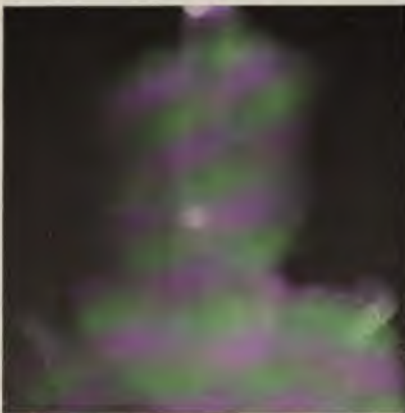


FIG. 30e.

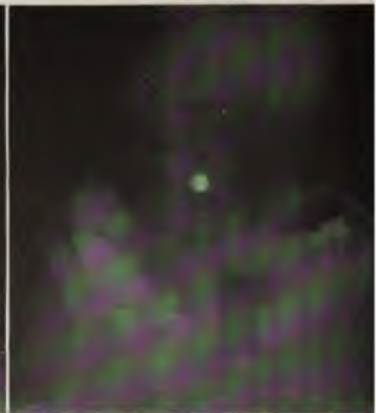


FIG. 30d.—Excessive gastropnoxis in a girl the subject of epileptic fits. [Courtesy of Dr. C. M. Cooper, of San Francisco.]

FIG. 30e.—Marked enteroptosis, the entire colon lying well below the iliac crests. [Courtesy of Dr. C. M. Cooper, of San Francisco.]

otherwise the clinical symptoms of the case were those of anæmic-gastroptotic dyspepsia.

The remnant-test of Mathieu-Rémond (see page 35) usually amounts to from 220 to 270 c.c. one hour after the test-meal. Although this exceeds the normal, it is as likely to be due to an increase of the gastric secretions as to impairment of the motor powers of the stomach.

Seven hours after the Riegel test-dinner (see page 35), the stomach will usually be found empty.

In cases, however, of extreme physical debility, some of the test-dinner may still be present in the stomach seven hours after eating. These cases, however, do not differ in any other factor from the usual anæmic-gastroptotic dyspepsia.

It has been thought necessary by some to designate such cases as motor insufficiency of the first degree, or atony.

The authors who share this view ascribe the delay in the expulsion of food into the duodenum to a primary muscular weakness of the stomach. I am of the opinion that the finding of small remnants of food seven hours after the test-dinner is as frequently the result of excessive secretion of the gastric juice, and that it is occasionally caused by diminished innervation of the musculature of the stomach.

That the authors who consider the cause of the trouble to be a primary muscular weakness of the stomach cannot be in the right, is best proven by the therapeutic results of forced feeding in this affection.

If this theory were correct, such patients would suffer from *gastrectasis* or motor insufficiency of the second degree when their stomachs were excessively overloaded by the forced feeding. Since this is never the case, but on the contrary, such patients recover their health through the forced feeding cure, the theory of primary muscular weakness in anæmic-gastroptotic dyspepsia is evidently incorrect; and the cause of the affection is to be found in a general or constitutional disease.

Consequently, I never have any fear of resorting to forced feeding in cases where remnants of the test-dinner are still present in the stomach seven hours after eating, if the patients present only the clinical symptoms of a purely functional affection of the stomach. It really amounts to malpractice to resort to *gastropexy*,—which frequently has been done,—for the relief of this condition, since this procedure exposes the patient to danger without obtaining more relief than is possible by forced feeding and rest.

Diagnosis.—The diagnosis of functional anæmic-gastroptotic dyspepsia is made from the above-mentioned symptom,—namely, pressure in the stomach, especially after meals, whether fluids or solids; and the larger the meal, the greater the disturbances.

In the objective examination, the physician usually finds normal secretions and normal motility of the stomach.

In severe cases, there is sometimes a slight delay in the expulsion of the test-dinner into the duodenum, but in most cases there is stagnation of food.

The total acidity may be slightly increased or decreased, or free hydrochloric acid may be entirely absent. Usually, however, there is a variation in the acidity; for instance, one day there will be a total acidity of 60 and a few days later 30, and *vice versa*. In this disease, there are, naturally, enteroptosis and impaired nutrition.

Differential Diagnosis.—Ulcer and ectasia are easily differentiated from functional dyspepsia, since in both these diseases vomiting is a symptom; while in ulcer, epigastric pain is prominent.

Carcinoma is also easy to exclude from the diagnosis, the reason being that in carcinoma the gastric secretions are permanently reduced, and the course of the latter disease would be malignant.

Only in chronic gastritis is it sometimes impossible to make a differential diagnosis from anæmic-gastroptotic dyspepsia without the use of the stomach-tube, since in the latter affection pressure in the stomach also occurs after meals.

In contradistinction to functional dyspepsia, however, pressure does not occur after the patient has taken liquid food.

In addition to this clinical differentiation, the examination may prevent confusion in his diagnosis by giving the patient a test-breakfast. In chronic gastritis, the secretions are persistently increased, diminished, or entirely absent.

The anamnesis, the *habitus*, and the ptosis of the abdominal organs in enteroptotic dyspepsia give further evidence for a differential diagnosis.

Prognosis and Course.—The clinical course of the disease is eminently chronic, often extending over decades, for the disease may exist from youth to old age.

It generally attacks those individuals who have weak stomachs, and is hereditary in the same sense as is *habitus enteropticus*, *i.e.*, the predisposition is inherited, while the disease itself is brought on by unfavorable influences and factors.*

The disease shows remissions,—healthy periods alternating with illness,—according to whether the patient is taking the proper care of himself, or must work hard.

It is worthy of mention that the symptoms of anæmic-gastroptotic dyspepsia in women usually disappear during pregnancy,—which is very simply explained from the fact that the abdominal organs, which normally have a low position, are then supported by the growing uterus; and there is also the favorable influence of gravidity upon the metabolic process of the body. This fact is usually observed in multiparæ.

The disease may become serious through complications; for instance, pulmonary tuberculosis may develop in the patient who is malnourished and weakened by the disease.

Habitual constipation is a very frequently resulting phenomenon of functional dyspepsia, because the patient, in consequence of his dyspeptic disturbances, eats such small amounts of food that there is not sufficient to maintain the normal intestinal peristalsis.

Enteroptotic dyspepsia never develops into gastrectasis without the occurrence of a complication, such as ulcer of the pylorus.

Many patients of insufficient financial means, or who lack the necessary time for treatment, are never cured.

Treatment.—The treatment of anæmic-gastroptotic dyspepsia can naturally be only a general one, to strengthen the weakened constitution and to increase the nervous, muscular, and circulatory vigor of the patient, through good care, forced feeding, rest, and plenty of fresh air.

* Of atony, one might say with Goethe, "What thou hast inherited from thine ancestors, thou must win in order to possess."

In many cases, a change of scene is all that is required to add tone to the nervous system of the patient, and to increase his appetite, thereby improving the nutrition and regulating the digestion.

The symptoms of the disease will disappear under this regime, without the institution of other therapeutic measures. Such patients, therefore, do not require the treatment given for organic affections of the stomach at such places as Carlsbad, Kissingen, etc., and should in general avoid the use of the various mineral waters. A sojourn at some health resort high in the mountains or at the seaside, is more suitable.

Three other forms of hydrotherapeutic procedures are generally useful, which, if necessary, may be carried out at home; these are cold friction or the cold pack, the half-bath and the cold douche.

These stimulating treatments should not be used if the nervous system of the patient is in an irritable condition, evidenced by exaggerated knee-jerks, excitement, and loss of self-control on slight provocation. Protracted lukewarm baths, or the pine-needle baths are preferable in such a case.

As a household treatment, I usually begin with applications of cold moist towels. After the patient has become accustomed to this treatment the cold wet sheet-pack should be applied to the entire body, accompanied by vigorous friction, given by an expert nurse, if possible.

In summer, the patient should take cold shower-baths or plunge in a lake or river. A weaker patient may be given half-baths instead, sitting in water up to the epigastrium, at a temperature of 25° to 20° R. [88° to 78° F.), and having water poured over him at a temperature of 20° to 15° R. [78° to 68° F.), the patient meanwhile rubbing himself vigorously to avoid becoming cold. The entire procedure of the half-bath should not exceed five minutes, and the best time for its use is early in the forenoon.

More complicated hydrotherapeutic procedures may be carried out at a sanitarium or a water-cure establishment; although in most cases of functional dyspepsia, the necessary hydratic procedures may be given at home.

Excessively severe treatment is harmful and should be avoided in hysterical and irritable patients, and naturally in cases when it is doubtful whether an organic or a functional dyspepsia exists. There are numerous examples of cases where the patient was made worse by the use of water, apparently with the assumption that a nervous affection was present, when in reality the trouble was due to an ulcer or some other organic disease of the stom-

Diet.—In every case, the dietetic treatment is the most important part of the therapy. It effects the most brilliant results, but these can be fully obtained only in connection with other hygienic factors, such as fresh air, pure water, and the avoidance of fatigue.

The diet in anæmic-gastroptotic dyspepsia must, above all things, be such as will improve the nutrition of the individual. It should be strengthening, and contain considerably more calories per day than are necessary for the maintenance of the organism. In other words, the patient should be given the rest- and fattening-treatment, such as has been perfected by Playfair and S. Weir Mitchell.

Whenever possible, the patient should absent himself from his usual occupation for about six weeks, and spend the first two or three weeks of treatment in bed.

It is preferable that such cures be carried out in a sanitarium. There are, however, a large number of patients who do not have the necessary time nor sufficient financial means at their disposal to avail themselves of the advantages of institutional treatment, so that it is often necessary to attempt the cure by ambulatory treatment at home.

The diet-scheme suitable for ambulatory fattening-cure should be arranged about as follows:

The articles named in the parentheses are suitable if the patient is at the same time suffering from chronic constipation.

7:00 A.M. Tea with cream, butter-rolls. (Stewed fruits, marmalade, honey, whole-wheat bread.)

9:00 A.M. Cereal or flour soup cooked with cream, bread and butter, eggs or scraped ham. (Koumiss or buttermilk.)

12:00 M. Vegetables cooked with butter, boiled or roast meats, sweet fruit-sauces, mild pastries. (Cider.)

After this meal the patient should rest in a recumbent position with loosened clothes for one or two hours.

3:00 P.M. Tea with cream, etc., as at 7:00 A.M.

5:30 P.M. Flour soup, etc.

7:30 P.M. Tea with cream, bread and butter, cold meats or eggs.

9:00 or 10:00 P.M. Fruit.

As might be expected, patients have more digestive disturbances while the increased amount of nourishment being taken during the first two or three weeks of the fattening-treatment, than they had when on the previous liquid diet. The physician must not, however, let himself be influenced by the complaints of the patient, but should energetically insist upon his adhering strictly to the above mentioned diet-regime.

The physician should always assure himself, by means of a pair of scales, whether or not the patient is increasing weight; and as soon as there is a gain of two or three pounds in weight, the patient will be easily convinced that his stomach is not so much at fault as he had supposed, but that, on the contrary, his digestion is quite good; and as he gains in confidence, he will be much more willing to bear the possible discomforts of forced feeding.

Nausea and regurgitation, which frequently occur after meals, should not be given too much attention.

It is only when cramp-like pain and diarrhoea set in that the amount of food should be lessened. The physician should then once more carefully examine the patient to determine whether or not an organic affection exists which has been previously overlooked.

After about two weeks' treatment, when the metabolism has been improved, the dyspeptic disturbances generally begin to disappear; and they cease entirely after about three or four weeks of treatment.

As a rule, the patient will have gained in weight about eight or ten pounds, and will feel strong and healthy and able to enjoy the ordinary household diet without any discomfort.

With sanitarium-treatment, there is often a great increase in weight, and a still more rapid and striking improvement in the condition of the patient.

An actual and permanent cure is obtained by this plan of treatment if the dyspepsia was caused solely by anæmia and enteroptosis. The abdominal organs, especially the capsules of the kidneys and the mesentery, regain their normal

amounts of fat, which helps to establish the normal equilibrium and position of these organs, while the general treatment has also improved the quality of the blood and led to functional energy of all the abdominal organs.

The rest-fattening cure, however, cannot restore all cases of dyspepsia of a functional nature.

Those patients whose nervous systems have been injured by over-work, dissipation and worry, generally have only the nutrition restored to the normal by the fattening-cure, their dyspeptic symptoms not always disappearing. For these cases, mental diversion and change of scene are absolutely necessary.

Medicinal Treatment.—The drug-treatment of anæmic-gastroptotic dyspepsia is useful only in so far as it assists in carrying out the diet-treatment, by stimulating the appetite and suppressing the hyperæsthesia of the gastric mucosa, etc. These indications are best fulfilled by bitters given before meals.

The following prescriptions are examples:

1. ℞ Tincturæ nucis vomicæ, gtt. xc-℥ iiss 5.0-10.0
Tincturæ gentianæ (or tincturæ rhei), ℥ vss-viss 20.0-25.0

M. Sig.—Thirty drops 10 to 15 minutes before meals in a wineglassful of water or on sugar, t.i.d.

2. ℞ Tincturæ cinchonæ, ℥ iss 50.0
or extracti calami fluidi, ℥ iss 50.0
or tincturæ quassia, ℥ iss 50.0
or extracti condurango fluidi, ℥ iss 50.0

M. Sig.—A teaspoonful, t.i.d.

3. ℞ Acidi hydrochlorici diluti, ℥ xl 2.5
(Tincturæ nucis vomicæ), ℥ xxxii 2.0
Vini condurango, ℥ iiss 100.0

M. Sig.—A teaspoonful, t.i.d.

4. ℞ Extracti cinchonæ, ℥ i 30.0

Sig.—Twenty drops, t.i.d.

5. ℞ Tincturæ belladonnæ foliorum, ℥ iss 5.0
Extracti condurango fluidi, ℥ vss 25.0

M. Sig.—Twenty-five drops t.i.d., for hyperæsthesia of the gastric mucosa.

6. R Extracti nucis vomicæ,
 Extracti belladonnæ foliorum, āā gr. ivss 0.3
 Pulveris glycyrrhizæ compositi, gr. xxiv 1.5
 M. ft. pil. xxx. Sig.—A pill after eating, t.i.d.
7. R Ferri reducti, ʒiiss 6.0
 Extracti nucis vomicæ, gr. vi 0.4
 Quininæ hydrochloridi, ʒss 2.0
 Acidi arsenosi, gr. i 0.06
 Extracti rhei, gr. xv 1.0
 Mass. pill. q.s. ut f. pill. No. lx. Sig.—Two pills t.i.d. (Biermer.)

Massage of the stomach, and also of the intestine when constipation exists, usually affords the patient considerable relief during the rest-cure. It should consist chiefly in stroking the epigastrium with the flat hand after meals for five or ten minutes. This produces a pleasant and agreeable feeling of warmth.

In organic affections of the stomach, on the contrary, massage usually produces unpleasant results and often produces vomiting.

For very relaxed patients, the physician may also advise general massage of the entire body, in order to stimulate the general metabolism, while the local massage of the stomach is performed by the physician personally with the best of results.

Remarks on Enteroptosis

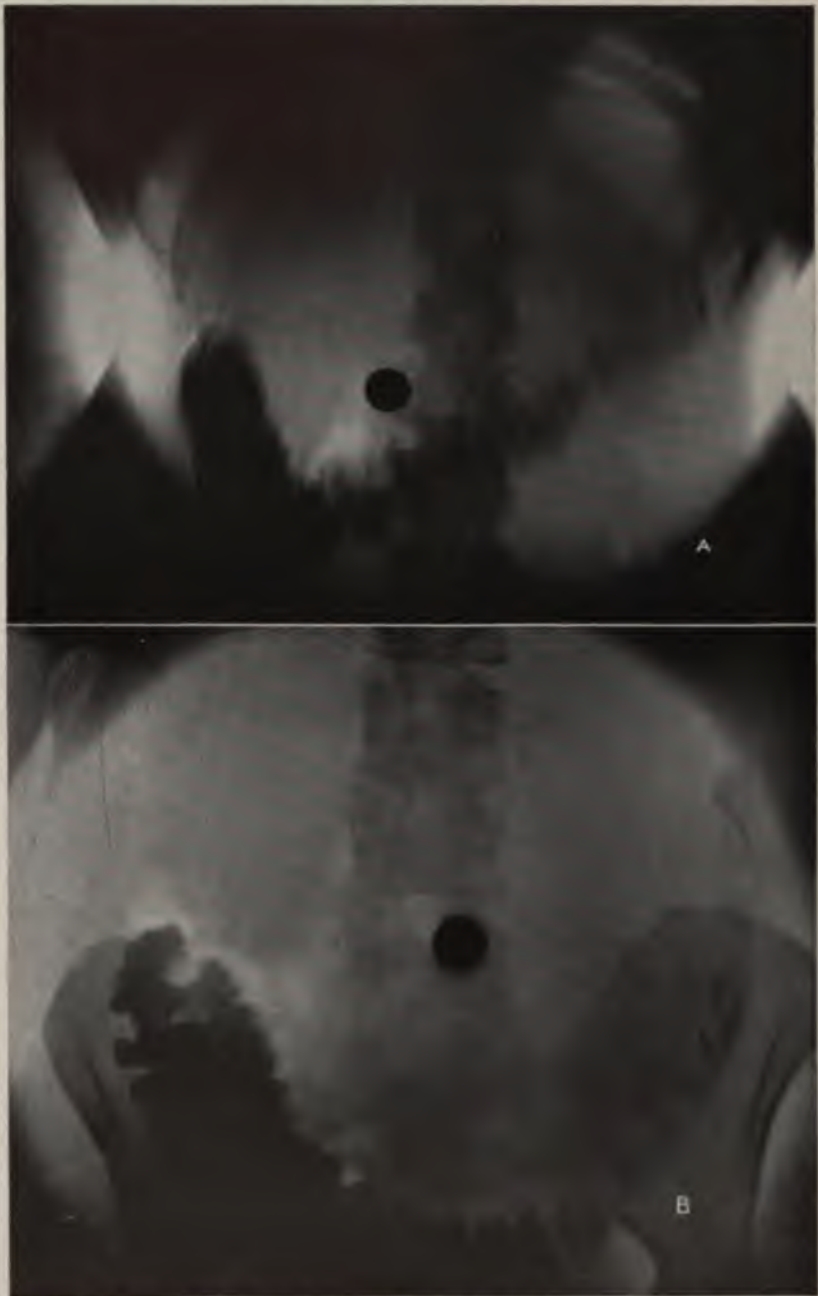
(Gastroptosis, Nephroptosis, and Pendulous Abdomen)

Glénard was the first to appreciate correctly the relation between the sinking of the abdominal organs and disorders of the digestive tract. He showed that a large number of nervous affections of the stomach may be traced to this anatomical condition.

Stiller recognized that the fundamental cause of enteroptosis is the *habitus enteropticus*. Owing to the fact that persons with *habitus enteropticus* generally possess weak constitutions, Stiller has designated this entire type of individuals as having "*asthenia universalis congenita*."

The *habitus enteropticus* is, therefore, congenital, while enteroptosis, or Glénard's Disease, is acquired through various factors incident to modern life.

FIG. 30f.



Enteroptosis. *A*, showing effect of posture in case of marked enteroptosis. *B*, Radiographs made with same patient standing. [Courtesy of Drs. E. J. Cook and Albert Solland.]

It is possible that *habitus enteropticus* is to be attributed to avatism, and can be traced to the time when human beings had not yet assumed the upright posture; for in no animal is the thorax so wide as in man, and it has probably developed only gradually. This is why a person with a broad thorax is scarcely ever affected with enteroptosis, since his organs are much more firmly fixed and held in place.

In addition to congenital or constitutional enteroptosis, there is an acquired or local form which occurs in women after pregnancy when the abdominal walls have been very much distended.

The following abdominal organs may assume an abnormally low position: the stomach to a hand-breadth below the umbilicus; the transverse colon to the symphysis; the liver, and more rarely the spleen; and both kidneys, especially the right kidney.

There are three degrees of nephroptosis:

The first degree, when the lower portion, the second degree when half of the organ, and the third degree when the entire kidney is palpable during deep inspiration. If the kidney remains in its abnormal position during expiration and the quiescent respiratory period, the condition is described as dislocated, floating, or movable kidney of the fourth degree.

Uncomplicated floating kidney may perhaps cause some discomfort to the individual, but never actual pain.

Treatment.—Therapy, to be suitable for the congenital or constitutional enteroptosis, can be only such as will tend to strengthen the weakened constitution of the patient; while acquired enteroptosis, produced by local conditions, must, in addition to the above, be treated locally. In this form, therefore, the application of suitable abdominal bandages is indicated; these serve to restore the sunken abdominal organs to their normal positions. This purpose is fulfilled by most of the abdominal bandages purchasable in large instrument-houses.

To prevent the upward displacement of the bandage, thigh-bands should be used, just as in hernia trusses and bandages.

Corsets are absolutely forbidden in enteroptosis. Women with enteroptosis should wear "health-waists," to which

FIG. 31.

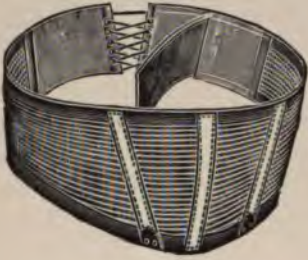


FIG. 32.

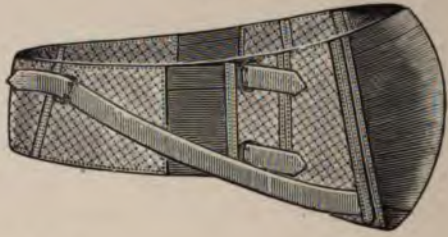


FIG. 33.



Various forms of abdominal belts.

FIG. 34.



Stengel's kidney belt.

the skirts are buttoned, or the skirts may be supported by straps over the shoulders. Street-clothes should also be worn

supported from the shoulders, so that all pressure at the waist may be avoided.

[The above statement of the author, in which he says that corsets should be forbidden in enteroptosis, evidently refers to the older form of corset which constricted the epigastrium and crowded downward the viscera of the abdominal and pelvic cavities.

The more recent "corrective straight front" corset, if properly made and fitted by a corset-maker, presses inward and upward on the lower abdomen, serving to restore to their

FIG. 35.



Diagram showing the adhesive plaster marked for cutting.*

FIG. 36.

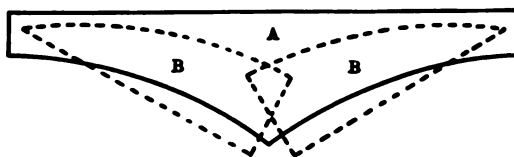


Diagram showing the adhesive plaster belt.

normal position organs which are displaced downward. Since no constriction of the lower thorax and of the epigastrium is caused the wearer, such corsets may be used in lieu of an abdominal bandage in many cases of enteroptosis.]

In women with normal *habitus*, however, corsets are not forbidden; it is even better to wear them if properly fitted, since without corsets the skirts are simply tied around the waist, sometimes causing constricted liver and other disturbances.

The use of adhesive plasters as a substitute for abdominal bandages has been recommended by two American authors, Rose and Rosewater, to be applied in the following manner:

*[The sections indicated by the dotted lines, and marked (see Fig. 35), are separated from the bandage A, and laid upon it in reversed position so as to overlap (see Fig. 36).]

The ends of three broad strips of adhesive plaster are applied to the lower part of the abdomen, just above the symphysis; the other end of the middle strip is then brought upward and applied to the sternum. The right and left strips, respectively, are drawn obliquely around the sides of the patient and adhere to the spinal column. A fourth transverse strip of the plaster may also be applied across the abdomen above the umbilicus.

In certain cases, this adhesive plaster bandage has given me good results, although its continued use is generally unpleasant to the patient,

FIG. 37.



The first step in the application of the adhesive plaster belt.

causing discomfort during the night, producing eczema and sudamina, and rendering it impossible for him to bathe. The necessity of changing the plaster every three or four weeks makes it rather more expensive to the patient in the long run than an abdominal bandage.

[The Rose adhesive plaster bandage may also be applied in the manner shown in Figs. 35, 36, 37, 38.

A strip of "mole-skin" plaster seven inches in width and of sufficient length is cut as in Figs. 35 and 36, and then applied as in Figs. 36 and 37.

The disagreeable itching and skin irritation which sometimes result from the use of Rose's adhesive plaster belt may be largely avoided if certain precautions mentioned by

Rose* and confirmed by experience are observed. The so-called "mole-skin" plaster, 7 inches wide, is preferable to any other. Before applying the plaster, the abdomen should be thoroughly washed with alcohol and ether to remove the fats and moisture of the skin. In my practice, patients have frequently worn one belt three or four weeks without causing any irritation of the skin.

FIG. 38.



The second step in the application of the adhesive plaster belt.

I usually apply the adhesive plaster belt preliminary to prescribing the ordinary abdominal belt, in order to more accurately estimate the amount of disturbance caused by the enteroptosis, and to more intelligently select a belt which will be adaptable for prolonged use. (See illustrations.)

Persons who have enteroptosis with the normal *habitus*, especially women, have quite a number of unpleasant symptoms, particularly the feeling of heaviness, backache, weight, and even of a complete prolapsus of the uterus, also drawing-

* "Atonia Gastrica," by Rose and Kemp, Funk and Wagnalls Co., 1905.

pains in the sacrum and in the costal arches, especially after hard physical labor or standing for a long time.

It need not be especially mentioned that both ileus and hernia of the anterior abdominal wall sometimes occur in severe cases of enteroptosis.

Either congenital or acquired enteroptosis may exist without symptoms as long as the nutrition of the affected individual is good.

Sometimes the physician accidentally discovers gastroptosis or movable kidney when examining children or adults with good digestion. According to Stiller, such a finding should always be regarded as an indication that such individuals are predisposed to functional disturbances of the stomach and intestine.

Phthisical Dyspepsia

Although dyspepsia caused by phthisis belongs to the large group of anæmic-enteroptotic dyspepsias, the subject will be given separate consideration on account of its great practical importance.

Its symptoms are exactly the same as those of anæmic gastroptotic dyspepsia,—persistent loss of appetite, pressure and fulness after meals—whether solid or liquid food,—regurgitation, lassitude and weakness.

Objective symptoms are ptosis and easily obtained splashing sounds in the epigastrium, while both the motility and secretion of the stomach may be normal or only slightly deviating from the normal; besides severe anæmia, emaciation may be present, as well as the symptoms of lung-affectio

The physician should make it his absolute duty to examine the lungs of every young person that suffers from persistent dyspepsia, and he will doubtless be surprised to find how frequently tuberculosis of the lungs is responsible for what has been treated months or years as chronic gastritis.

Treatment.—The therapy, naturally, should deal with the primary disease. A very full, rich diet should, therefore, be advised in spite of the dyspeptic complaints of the patient. If the diet is such as to improve the nutrition, the stomach symptoms will disappear of themselves.

As a supporting treatment, creosote combined with a bitter may be prescribed, and is best given in the form of the well-known creosote-tincture, which contains one gram of creosote to four drams of tincture of gentian. The effect of this medicament is almost specific in phthisical dyspepsia. In the beginning, I prescribe 8 drops three times daily after eating, in a teaspoonful of red wine; every day increasing the dose one drop, in such a manner that on the fourth, fifth and sixth days the patient takes 9 drops three times daily, and on the seventh, eighth and ninth days 10 drops three times daily, etc., until 20 drops are taken three times daily, which should be continued for about three months.

In well-marked advanced cases of phthisis accompanied by dyspepsia, the physician will obtain very good results with codeine.

In regard to the relation between phthisis and dyspepsia, it should be remarked that the opposite of what has been said above is sometimes the case, when dyspepsia is primary and phthisis secondary.

CLINICAL CASES

Because of the importance and frequency of functional dyspepsia, I have added quite a number of illustrative cases.

1. *Congenital Cases*

CASE 1.—Mr. M., a business man, 33 years old, who had led a dissipated and reckless life. For two years he had suffered from a feeling of fulness and pressure in the epigastrium, and from eructations, after each meal. The appetite was good and the bowels regular. He had never suffered pain in the epigastrium. Patient was anæmic and thin, weighed 111 pounds and had the *habitus enteropticus*. The test-breakfast showed that the gastric secretions were normal. The treatment consisted of forced feeding and the use of bitters. In six weeks, the patient had gained 10 pounds in weight and later was completely cured, and was able to eat all kinds of food without discomfort.

CASE 2.—Hedwig Z., a governess, 30 years old, for four years had suffered from a feeling of fulness after each meal, and from constipation, but never pain or vomiting. The appetite was poor. The patient was anæmic, emaciated, and had ptosis of the abdominal organs. The test-meal showed normal acidity of the gastric juice.

The treatment consisted of a fattening-constipation diet, and bitters and massage; and within a short time the patient was free from all discomfort.

CASE 3.—Gertrude E., a teacher, 23 years old, had been mentally over-worked for over a year, and had felt exhausted and weak for five months past, with no appetite and with constant pressure and fulness in the epigastrium after eating any kind of food. Occasionally she had gone several days without any gastric disturbances. The patient was very anæmic and emaciated. She had the *habitus enteropticus*. The test-breakfast was well digested, and the total acidity one and one-half hours after the test-meal was 78. (Her father likewise had had hyperacidity.) The treatment consisted in forced feeding, bitters, and rest from work. She gained four pounds in weight in three weeks and the dyspeptic complaint soon ceased.

2. Cases of Acquired or Mixed Forms of Ptosis

CASE 1.—Clara M., 30 years old, had been pregnant twice. Her father had died three months previous from "large spleen," since which bereavement the patient had been ill from loss of appetite, rapid satiety and the feeling of pressure and fulness in the epigastrium after eating any kind of food. The bowels had been regular and she had suffered from no pain nor vomiting. Patient was very anæmic and emaciated, and weighed 114 pounds. She had both the inherited and the acquired forms of ptosis. Her right kidney was movable to the third degree, the spleen slightly enlarged, the colon sunken, and loud splashing sounds could be easily obtained in the epigastrium. The treatment consisted of ambulatory forced feeding, bitters and massage. In two and one-half months, patient had gained 18 pounds in weight, was fully restored to health, did her work without fatigue, and was able to eat any kind of food without discomfort.

CASE 2.—Mrs. W., 30 years old, had been pregnant eleven months previous. For six months she had suffered from pressure, but no pain, after eating. The patient had been much worried for the past six weeks. Stools were regular. Patient was very anæmic and emaciated, weighing only 110 pounds. She had both congenital and acquired ptosis. Both kidneys were movable to the third degree. Loud splashing sounds in the epigastrium were easily produced.

Treatment.—Rest in bed, forced feeding, and bitters. In two months she was free from all discomfort and had gained 5 pounds in weight; after six weeks, her weight had increased to 117 pounds, and she was entirely well.

3. Phthisical Dyspepsia

CASE 1.—Louise W., 31 years old, the wife of a merchant, had at one time been pregnant. Nephroptosis had been diagnosed ten years previous. For the past seven or eight weeks, she had had poor appetite, sluggish stools, pressure and fulness after eating, which were relieved by assuming

recumbent position. She had night-sweats, had lost 20 pounds in weight, and was very anæmic and emaciated. She had the *habitus enteropticus* and relaxed abdominal walls; both kidneys were movable to the second or third degree, and there was a slight catarrhal involvement of the right apex. No benefit was obtained from forced feeding and the use of bitters. Patient was, therefore, sent to a sanitarium for treatment.

CASE 2.—Heinrich M., an engineer, 23 years old, had had occasional stabbing pains in the epigastrium, distention, and diarrhœa for two years. For six or eight weeks he had had pressure in the stomach after meals and poor appetite, besides quite frequent slight chills, expectoration and night-sweats. He had been treated for gastric catarrh with a light liquid diet. He was very thin and anæmic, and had the *habitus enteropticus*. Râles were heard in the apices of both lungs. His temperature was 38.3 C. The test-breakfast was deficient in acids, the total acidity being 22. Strong splashing sounds in the epigastrium were obtained. The patient was sent to Görbersdorf, where he was cured.

CASE 3.—Carl P., a farmer, 39 years old, had for six months had pressure in the stomach after eating, but no pain. His appetite had been good. The patient had *habitus enteropticus*, with loosening of the tenth costal cartilages, and inflammatory involvement of the right apex. The treatment consisted of the administration of creosote and gentian. The pressure in the stomach disappeared, his appetite improved, and he gained four pounds in weight.

CASE 4.—Mrs. T., 28 years old, had lost her mother from tuberculosis, and one sister was phthisical. Two years previous, the patient had been treated in Wehrawald for tuberculosis of the lungs. Nine months ago she gave birth to a child, since which time she had been exhausted, without appetite, had suffered from pressure and fulness in the epigastrium and regurgitation, after eating any kind of food. Patient was very much emaciated. She had both the congenital and acquired forms of ptosis, and the abdominal walls were very much relaxed. Both kidneys were dislocated. There was catarrh of both the apices. No benefit was obtained from the forced feeding, bitters and massage. Patient was sent to a sanitarium, where she died in about a year.

Nervous Dyspepsia

Nervous dyspepsia is very closely associated with and related to anæmic-gastroptotic dyspepsia. There are, however, a few points so essentially different, that in most cases a distinction between the two affections is possible.

In neither form of dyspepsia are there anatomical lesions of the mucosa of the stomach; at least, we are unable to detect any with our present methods of examination.

While, as has been sufficiently emphasized, the *habitus enteropticus* together with emaciation and anæmia are the predominating signs of anæmic-gastroptotic dyspepsia, we do not always find these present in a purely nervous dyspepsia.

The latter may develop in persons with the *normo habitus* if the nervous system becomes unstable and irritated from any cause. The same thing occurs in persons who are well nourished—only more rarely—if they are mentally overworked or suffer from psychical disturbances.

Etiology.—Nervous dyspepsia is caused by disturbance of the vegetative nervous system,—the sympathetic nerve and its abdominal branches, the splanchnic nerves; since the sympathetic nerve stands in intimate relationship with all the organs of the body, the affection of any organ may cause nervous dyspepsia, as soon as the sympathetic nervous system is in a condition of unstable equilibrium, as,—for example, in hysteria.

Nervous dyspepsia is, therefore, always a local evidence of a general nervous condition. A pathological alteration, limited to the nerves supplying the stomach, the splanchnic nerve or Auerbach's plexus,—is not probable, as the symptoms of a general neurasthenia or hysteria are always present in such cases.

Mental over-work, especially hurried nervous activity, emotional depression from death, sorrow, and care, or the fear of contagion while caring for cancer- or tuberculous patients, or fright, or trauma,—all form a large group of etiological factors.

Another large group of causative factors is associated with disease of the sexual organs, occurring most frequently in men with phosphaturia, prostatorrhœa, spermaturia and, in short, in those of perverse sexuality and those who indulge in masturbation and in coitus interruptus; while in women the chronic diseases of the pelvis, which need not be mentioned in detail, induce a like result.

Nervous dyspepsia is also frequently found in persons who suffer from chronic constipation or diarrhœa.

Any of these factors, as we shall see later on in the clinical cases, may be associated etiologically with nervous dyspepsia.

Symptomatology.—Actual pain, as also in anæmic-enteroptotic dyspepsia, never occurs in nervous dyspepsia, but only general dyspeptic disturbances, such as pressure and fulness after meals. At times, these symptoms begin after eating only light, easily-digested foods; while at other times there is no discomfort, even after heavy, indigestible foods.

Additional symptoms are distention of the epigastrium, eructation, and regurgitation. Actual vomiting does not occur, but there is usually an irregular, perverse, or complete loss of appetite.

Very frequently there is a persistent pressure in the epigastrium and behind the sternum, similar to the sensation of *globus hystericus*.

The dyspeptic symptoms throughout the clinical course of this disease are dependent upon the condition of the nervous system. With physical and mental rest, the symptoms disappear, but to return after any kind of excitement.

The objective examination in nervous dyspepsia usually reveals the fact that the stomach is normal in both its secretory and motor functions. The fasting stomach is either entirely empty or contains only a few cubic centimetres of gastric juice; and no remnants of the Reigel test-dinner are to be found in the stomach seven hours after eating. An hour after the Boas-Ewald test-breakfast, the meal is found well digested; and the total acidity, as a rule, amounts to from 40 to 70.

It is peculiar to nervous dyspepsia that there occur great variations in the secretory functions of the stomach.

In the same patient, the examiner may find a total acidity of 60, which a few days later may be 40 and at another time 20, while the fourth examination may again show 60. Free hydrochloric acid may be entirely absent, or hyperchlorhydria and an excessive secretion of gastric juice may occur. In short, the condition of the stomach varies with that of the nervous system.

On the other hand, gastric ferments are always present in nervous dyspepsia, even when there is an absence of free hydrochloric acid.

For further details in regard to this point, the reader is referred to the chapter on Gastric Ferments in the General Section.

Diagnosis.—From the facts that the subjective symptoms of nervous dyspepsia are so manifold and variable, and that objective symptoms are either entirely absent, or take definite shape only after prolonged observation, it is, in many cases, impossible to arrive at an immediate diagnosis; and the physician should withhold his opinion until repeated examinations have been made.

Of first importance is the variation of the stomach secretions and the dependence of the dyspeptic symptoms upon the conditions of the nervous system.

Differential Diagnosis.—The differential diagnosis is very easy in individual cases when the secretions and the motility of the stomach are normal. In other cases it is very difficult, because the affection may be easily confused with chronic gastritis.

Gastric ulcer may be excluded from the diagnosis by its positiveness by the occurrence of epigastralgia at an almost regular interval after eating; while in nervous dyspepsia actual pain in the stomach does not occur.

One of the sequelæ of ulcer,—namely, perigastritis,—more frequently leads to confusion in the diagnosis than does the ulcer. The details of the symptomatology of this affection are given in the chapter on Gastric Ulcer. It need only be mentioned here, that in perigastritis the symptoms and discomforts of the patient are largely dependent upon physical activity and are but slightly influenced by the condition of his nervous system.

Gastric hernia sometimes gives rise to a mistaken diagnosis, because the symptoms of this condition are often atypical and vague that the physician may classify the affection as “nervous dyspepsia.”

Occasionally, cancer of the stomach is not recognized as such, and is considered by the physician to be nervous dyspepsia.

Nervous dyspepsia is differentiated from anæmic-enteroptotic dyspepsia,—first, by the etiology; and second, and more significantly, by the variability of its symptoms.

Anæmic-gastroptotic dyspepsia occurs in very anæmic and under-nourished individuals who have congenital or acquired enteroptosis. The symptoms appear acutely after each meal, and persist unchanged for years at a time, disappearing only when the patient is provided with improved hygienic conditions.

In contrast to this, the clinical symptoms of nervous dyspepsia may appear also in well-nourished individuals with normal *habitus*, if the equilibrium of the nervous system has been disturbed.

If hyperacidity, subacidity, or anacidity is present in a case of nervous dyspepsia, confusion with hyperacid gastritis or anacid gastritis is possible, especially if only a single chemical examination of the stomach has been made.

If the examiner can demonstrate sudden variations in the secretory functions of the stomach, gastritis is naturally excluded. Unfortunately, from the standpoint of diagnosis, there are cases of nervous dyspepsia associated with constant hyperchlorhydria or subacidity of the gastric juice, when confusion as to the nature of the condition can be prevented only by the ensemble of all symptoms of the disease, and by accurate determination of the etiology.

For instance, in acid gastritis there is usually a history of excesses in drinking, smoking, and eating; and in subacid or anacid gastritis, a history of prolonged alcoholism, hasty eating, imperfect mastication and the misuse of laxatives.

The rennin and pepsin ferments are almost always present in normal amounts in nervous dyspepsia. This finding alone, however, is not a positive differential point, because these may also be present in approximately normal amounts in mild cases of gastritis.

The determination as to whether any given case is one of nervous dyspepsia or not, is of utmost importance in the indications for treatment.

In doubtful cases, it is always better for the physician to prescribe a treatment which is suitable for an organic affection, since this, under no condition, can injure the patient; for instance, if the typical ulcer-cure has been given without obtaining positive results, the clinician may then regard the case as one of nervous dyspepsia and may proceed with a treatment directed toward restoring the nervous system to its normal condition.

Prognosis and Course.—Nervous dyspepsia scarcely ever progresses into an organic disease of the stomach, and then only in consequence of loss of appetite and malnutrition of the patient, which latter leads in turn to severe anæmia and emaciation (a loss in weight amounting to as much as 50 pounds has been observed), tuberculosis, and very frequently to chronic constipation, with its sequelæ,—hypochondriasis, secondary intestinal catarrh, membranous colitis, etc.

On the contrary, gastrectasia, gastritis, ulceration, cancer, and hypersecretion never develop from nervous dyspepsia.

The clinical course is often tedious,—improvement alternating with relapses,—depending upon the condition of the general nervous system. If the disturbing factors cannot be eliminated from the lives of these patients, cure is often impossible.

On the other hand, a slight psychological improvement in the patient, especially in women, often enables the physician to obtain within a few days surprisingly favorable results.

Treatment.—Contrary to the treatment of organic diseases of the stomach, the therapy of nervous dyspepsia should not be directed to the removal of local complaints, but to the improvement of the general condition of the patient, which involves the restoration of the nutrition and the toning up of the entire nervous system.

The dyspeptic symptoms often disappear simply through prolonged rest in bed, better nourishment, and the removal of those factors which weaken and irritate the nervous system,—such as noises in the streets, etc.

A. Dietetic Treatment.—The dietary should always be adaptable to the physical constitution of the patient. Forced

feeding, which was described in the previous chapter, is suitable only for those cases of nervous dyspepsia in which malnutrition is an associated condition.

A patient with normal nutrition,—for instance, one with thick panniculus adiposus,—naturally does not require forced feeding, and only rarely should a rest-cure be instituted.

Obese persons with nervous dyspepsia should be given a diet which will bring about a decrease in weight,—starches and fats being avoided as much as possible.

For constipated patients, a rational constipation-diet, such as is described in the chapter on Chronic Constipation, should be prescribed, for the reason that very frequently constipation aggravates the symptoms of nervous dyspepsia or may even be the cause of the affection. In individual cases, mild laxatives may be used if spontaneous evacuation of the bowels does not result from the diet alone; the most suitable in such instances being regulin, tamarinds, purgen, etc. (See below.)

In order to convince the patient that it is not his stomach that is diseased but his nervous system, the physician should insist, at the very beginning of treatment, that he give up the bland, non-irritating diet-regime which he has been wrongly following, either of his own accord or upon the advice of the attending physician, under the misconception that his trouble was chronic catarrh of the stomach. As soon as the patient is shown that a full diet produces no greater discomfort than a mild diet, he gains confidence and more readily follows the advice of the physician.

Since in severe cases of nervous dyspepsia, the rest-cure and forced feeding may not be sufficient to bring about recovery, it may be preferable for the patient to be treated in a sanitarium which is well equipped with the necessary hydrotherapeutic apparatus, and which has beautiful surroundings and is distant from a large city.

In the dietetic treatment, it must again be strongly emphasized that in doubtful cases, that is, if the physician is not sure as to whether an organic or a nervous affection of the stomach be present, he should at first prescribe a diet which is suitable for the organic disease; also in cases where a neu-



DISEASES OF THE DIGESTIVE CANAL

ness is combined with an *organic* disease of the stomach,—
as for instance, *nervous dyspepsia* with acid gastritis.

B. Hygienic Treatment.—This line of therapy includes all those adjuncts necessary for the treatment of nervous affections in sanitariums and watering places,—namely, rest-cure, diversion, baths, gymnastics, massage and electricity.

We cannot enter into the details of these measures, since they do not concern the practicing physician so much as those conducting such institutions.

It is often very difficult for the physician to decide upon the most suitable sanitarium or bathing resort. The following general rules may serve to guide him:

Patients with relaxed and depressed nervous systems who are in a fair condition of nutrition should be sent to the seaside, unless there is present a marked degree of anæmia. The Baltic Sea is, as a rule, more suitable for women and the North Sea for men.

Nervous dyspeptics with an irritable condition of the nervous system should be sent to the mountains: those who are well nourished to the higher ranges, such as the Tyrol or the Bavarian Alps; while anæmic patients should be sent to mountains of medium altitude, such as the Black Forest, the Hartz, Thüringen, and the Riesengebirge.

The deciding factors, therefore, in the choice of the sanitarium or resort are the state of the general nutrition,—obesity, anæmia, etc.,—and the condition of the nervous system, which is best indicated by the reflexes.

Anæmic and very nervous patients should not be treated with cold-water procedures, but with protracted, lukewarm, full baths,—such as are given, for example, in Landeck, Elster, Badenweiler, etc. The same principles should govern their home treatment.

Massage also should be used, with caution. As a rule, light massage with friction of the epigastrium and the abdomen are indicated. All of the more severe procedures, such as heavy massage, clapotement, etc., only aggravate the dyspeptic symptoms; while the mild stroking movements give considerable alleviation. This mild massage with friction is what the “quacks” designate as “magnetism.”

C. Suggestive Treatment.—This consists of verbal suggestions and the influence of the personality of the physician

upon his patient, and in the personal trust which the patient has in the physician's assurance that no severe stomach-affection exists and that only an atonic condition of the nerves supplying the stomach is causing the trouble. The mere frequent repetition of these facts is often productive of actual improvement and even cure of the nervous dyspepsia.

More susceptible and ignorant patients should be treated with electricity and effleurage of the epigastrium, for they often believe that the "magnetic" treatment which they are receiving has great curative powers. In practice this method works wonders with such patients.

Treatment by electricity also belongs to the realm of suggestive therapeutics. It may be dispensed with as a rule, and is generally more suitable for sanitarium-treatment; although in chronic cases very good, though transient, results are often obtained by its use. It is beneficial only to those who believe in its healing power and who have the utmost confidence in the physician.

It need scarcely be mentioned that in irritable cases of nervous dyspepsia the galvanic current, and in relaxed patients the faradic current, should be used. The electricity should be applied externally by means of two moistened electrodes,—one placed on the back and the other on the epigastrium. If the physician prefers, endofaradization may be given. A flat electrode is placed upon the epigastrium; and after the patient has drunk a glass of water, a stomach-electrode (which may be obtained in any large instrument-house) is introduced into the stomach.

Instead of the regular stomach-electrode, an ordinary stomach-tube may be used, No. 8 or 9 [Am. No. 20-21], closed at the upper end by a small cork through which a copper wire has been pushed. The copper wire should extend to the blind end of the stomach-tube, and the proximal end should then be connected with the electrical apparatus. The current should be weak at first and gradually increased in strength as long as it can be borne by the patient. The duration of an endofaradization treatment should, as a rule, be about 5 minutes, while the external electrical treatment should last 10 to 15 minutes.

D. Medicinal Treatment.—Sedatives,—such as bromides,—are the most general medicinal agents to be used in the treatment of nervous dyspepsia. The physician may prescribe either a glass of effervescent bromide-salts night and morning, or one of the following prescriptions:

1. ℞ Validol, ℥iv 15.0
Sig.—Six to ten drops t.i.d.
2. ℞ Sodii bromidi, ℥i 30.0
Sig.—A knife-point twice a day, or fifteen grains in a cup of valerian tea.
3. ℞ Syrupi hypophosphitum, ℥ii 60.0
Sig.—A teaspoonful t.i.d.
4. ℞ Extracti cannabis indicæ, gr. ʒ 0.05
Sacchari, gr. viiss 0.5
M. ft. pulv. No. x. Sig.—One powder twice daily (or 8 to 10 drops of the tincture).
5. ℞ Chloral hydratis, ℥i 4.0
Syrupi aurantii corticis,
Aquæ, āā, ℥i 30.0
M. Sig.—A teaspoonful t.i.d.

Bromides are suitable for nervous dyspepsia of the excitable type only. In the depressed form of the disease, with diminution of the appetite, general despondency and hypochondria, bitters should be given, just as in anæmic-enterototic dyspepsia; and they are equally successful in causing the disappearance of many of the annoying symptoms.

The following are the clinical histories of a few cases of nervous dyspepsia, which serve to illustrate the characteristics of this disease better than prolonged detailed descriptions.

CLINICAL CASES

CASE 1.—Mrs. Ida A., 27 years old, had always been very nervous and subject to hysterical crying. She had inherited a neurotic tendency from her father, and had frequently been subject to tremors, headaches, nausea and vomiting. She had been married for three years but had had no children. Menstruation had always been irregular, often not occurring for months. According to the statement of the patient, both ovaries had been prolapsed. She complained of loss of appetite and a feeling of great pressure in the epigastrium, which was often entirely independent of both the quality and quantity of food eaten, as sometimes she could eat any kind of food, and at other times she suffered from dyspepsia even after liquids. The bowels were sluggish. Stools were formed, of large caliber and hard. The use of laxatives was often necessary.

Examination showed that she was well nourished, with an alternating paling and flushing of the skin. The patient had a typical *habitus enteropticus*, the right kidney was movable, and the patellar reflexes were remarkably exaggerated.

The treatment consisted of a fattening-constipation diet, warm baths, and a large knife-point of bromide of potassium three times daily, together with a glass of valerian tea. After one week of treatment, the patient had normal evacuations of the bowels, the pressure in the stomach had diminished, and three weeks later had entirely disappeared. The patient had gained four pounds in weight and was in good health. In this case, much benefit was obtained from suggestive therapy.

CASE 2.—Oswald K., a teamster, 26 years old, had masturbated for years. For several months previous he had had constant pressure in the stomach, more intense after heavy meals. He had never had epigastric pain or vomiting. Stools were fairly regular. Patient was emaciated and pale. He had *habitus enteropticus*. The test-breakfast showed the gastric juice to be subacid, the total acidity amounting to 36.

Treatment.—Bitters, fattening-constipation diet, and cold frictions. Within three or four weeks the patient was absolutely free from all of his former trouble and remained entirely well during the whole two years that he was under observation.

CASE 3.—Harry T., a business man, 27 years old, had for two years had dyspepsia, with fulness and pressure in the epigastrium after meals, loss of appetite, eructations, and constipation. Since this period he had lost 35 pounds in weight. The patient had for years over-worked in attending to his business. He was very anæmic, and *habitus enteropticus* was marked. The test-breakfast was well digested, with a total acidity of 74. After six weeks of treatment in the sanitarium at Thalheim, the patient returned completely cured of his dyspeptic troubles, and having gained 20 pounds in weight.

Special Forms of Neuroses of the Stomach

In the modern text-books on gastric diseases, by Ewald, Boas, Rosenheim, Riegel, etc., the gastric neuroses are schematically classified into secretory, sensory and motor neuroses, according to the individual functions of the stomach.

In a book such as this, however, which is intended as a practical guide in the diagnosis and treatment of digestive diseases, it would be impracticable to conform to this classification. Such a work can discuss in detail only the more common forms, not mentioning those which are rarely encountered, and whose treatment had better be left to the

attention of a specialist. With these preliminary explanatory remarks, the following text will be better understood and appreciated by the reader.

1. Nervous or Reflex Vomiting

(Including Nervous Eructation and Regurgitation) .

By the term "nervous vomiting" we define that form of gastric neurosis which is accompanied by vomiting of a food eaten,—this being due to a purely nervous irritation especially of the gastric nerves, without there being any demonstrable pathological changes of the stomach.

Nervous vomiting occurs most commonly in women especially at the beginning of menstruation and in the menopause. Men are very rarely affected.

Nervous vomiting always occurs in a neuropathic individual, and is due to some such exciting cause as overwork, agitation, anger, sorrow, masturbation, trauma, etc.

The patient vomits all foods,—liquids as well as solids,—almost immediately after eating. The determination of this fact in the anamnesis is of exceptional importance, because vomiting occurring within the first ten or fifteen minutes after eating is not met with in any other disease, if we exclude stenosis of the œsophagus and cerebral affections.

Nervous vomiting is not associated with pain. The subjective symptoms consist rather of pressure in the stomach, feeling of fulness, loss of appetite, and sometimes repugnance toward food, just as in other forms of functional dyspepsia.

It is a striking symptom of nervous vomiting that patients in spite of their frequent vomiting, are usually but slightly emaciated, although they very often become anæmic.

Differential Diagnosis.—A large number of affective disorders come into question in the differential diagnosis of nervous hysterical vomiting.

First of all, the vomiting of pregnancy must be excluded, which is sometimes a difficult task; likewise other abnormalities of the generative organs,—especially displacement of the uterus,—which very frequently cause reflex vomiting.

The periodical vomiting associated with the gastric crises of locomotor ataxia, which will be spoken of in another chapter, should also be eliminated from the diagnosis, and likewise all other affections with which vomiting might be associated. I will mention only migraine, cerebral affections, acute peritonitis, chronic nephritis, nephrolithiasis, and above all, helminthiasis in children.

Vomiting in children, the so-called "juvenile vomiting," is quite frequently observed in nervous and anæmic children, and represents a special form of gastric neurosis. It appears from the eleventh to the thirteenth years in children who have previously been healthy, about the time they enter school.

In some of these cases, early masturbation is the cause; while in others, worms are the exciting factor. In these cases the stools should be carefully examined for ova of intestinal parasites, the details of which will be given in the chapter on Microscopical Examination of the Fæces. It is well known that the vomiting may also occur from the intestinal irritation resulting from ascarides, oxyuria, and other small worms, as well as from the presence of tapeworms.

Both chronic and subacute gastro-enteritis in children is also frequently the cause of vomiting. In these conditions, it is characteristic that the vomiting is always dependent upon the quality of food, and occurs after eating such heavy foods as potatoes, bread, acids, or fruits, etc., but not after liquids.

An incomplete or rudimentary vomiting,—the well-known *regurgitation* of food a short time after eating,—should be discussed here. It occupies a middle position between simple eructation and vomiting and is, as a rule, associated with eructations of chyme, the mouth becoming full of stomach-contents which have a bitter, acid taste, due to the presence of gastric acids and peptone. After *regurgitation* the food is expelled from the mouth.

This condition should be clinically differentiated from an associated one known as *rumination*, which is most frequently observed in men who have indulged in irregular and hasty eating for years.

These patients regurgitate food soon after the meal, and, instead of spitting it out, chew it and swallow it again.

Nervous eructation occurring in diseases of the œsophagus, as has already been mentioned, is sometimes observed with nervous vomiting. These affections are often seen one after the other in the same individual.

Heartburn, or *pyrosis hydrochlorica*, is associated with nervous vomiting, although it is also a symptom of such organic affections of the stomach as gastric ulcer and acid gastritis. For details, see the chapter on Hyperchlorhydria.

Prognosis.—The prognosis of nervous vomiting is,—as a rule,—good, although its clinical course covers a long period of time.

The affection disappears spontaneously after the nervous system has been restored to its normal tone.

Treatment.—The therapy should be directed chiefly to the removal of those factors in the life of the neuropathically inclined individual which have given rise to the neurosis.

Usually we have to do with the removal of various mental conditions; although it is self-evident that such factors as diseases of the genital organs, particularly in women, should be excluded to prevent confusion of nervous vomiting with the reflex vomiting of pregnancy, etc.

The therapy should, therefore, be largely of a suggestive nature, and should include bromide and valerian preparations, just as in nervous dyspepsia.

I generally give the test-breakfast in such cases, following my rule of systematically examining every patient. The advantage of doing this with such patients is, that they feel that the physician is interested in their individual affection and they are afterwards more easily assured that the stomach is performing its normal functions and that only the nerves are affected. This assurance and conviction tend considerably toward the quieting of the nervous system, which indirectly brings about a cure.

On the same basis of suggestion, I sometimes lavage the mucous membrane of the stomach of such a patient with lukewarm water, using Rosenheim's irrigation-tube, and some-

times also resort to endofaradization, as has been mentioned in the previous chapter.

I have had much better results from effleurage of the epigastrium, which should be carried out as follows:

The physician should lightly stroke the region over the stomach with both hands, the right alternating with the left, using a gentle and slightly vibratory movement; and it so happens that ignorant and susceptible patients often think they are being "magnetized." By this procedure I have often seen the most striking results after three or four treatments, so that patients who had a short time previously vomited everything they had eaten were able to digest the heaviest foods without any trouble.

The appended histories of clinical cases best represent the clinical course and treatment of nervous vomiting. Naturally, the treatment must always be selected and adapted for each individual case. For instance, the "magnetizing" treatment would be quite unsuitable for the intellectual class of patients.

There are numerous cases of nervous vomiting in which the nervous system has been so disturbed through overwork for a number of years that all therapeutic measures are without effect. In these cases only prolonged residence in other climates, as in the Riviera, or the high altitudes, or a lengthy stay at a suitable sanitarium, will be of benefit.

In nervous vomiting, as in nervous dyspepsia, the same principles governing the hydrotherapeutic and balneological therapy are applicable. Since in almost all cases we are dealing with an irritable form of neurosis, prolonged residence at the northern seaside is generally inadvisable, although resorts along the Mediterranean may sometimes be recommended.

CLINICAL CASES

CASE 1.—In the case of Frieda F., 19 years old, the daughter of a midwife, menstruation which had begun at the age of 16 had been irregular. For one year there had been sluggishness of the bowels, and for five weeks previous, the patient had been obliged to use enemata because purgative remedies had become ineffectual. For five months patient had had loss of appetite, pressure in the stomach after heavy meals, and often vomiting after eating, which had recently occurred several times daily. Patient was fairly well nourished. The *habitus enteropticus* was present. The appendix was palpable. Otherwise the physical examination was negative.

Treatment.—The therapy consisted in suggestive treatment and massage which was called “magnetism,” also belladonna and codeine pills, an heavy constipation-diet, in spite of which no pressure in the stomach or vomiting occurred. After two and one-half weeks, the patient could bear heaviest diet without the use of narcotics. Massage was continued and electrofaradization begun. After three treatments of the latter, the stools were evacuated spontaneously, since which time the patient has been entirely well.

CASE 2.—Emma R., 34 years old, the daughter of an army officer, had suffered from chlorosis and occasional stomach-trouble for the past five years. For two weeks previous, the patient had loss of appetite, vertigo, and persistent vomiting immediately after eating. Only slight interruptions in the vomiting spells occurred, followed by some improvement. The patient had constant pressure in the stomach, but no pain. She was of slight physique, had the *habitus enteropticus*, a small goitre, and a movable right kidney. Bromides and faradization were ineffective. Massage was, therefore, substituted, which proved of great benefit. For instance, she was soon able to eat such food as herring and potatoes without any discomfort. In the course of five years, during which time she was under observation, she had only two periods of vomiting, which were removed each time by effleurage of the epigastrium, and verbal suggestion. The total acidity of the gastric juice was normal.

CASE 3.—Gertrude P., a sales-girl, 16 years old, gave a history of sexual perversion and early sexual relations. She had had gonorrhœa and had been subject to severe mental strain. For one or two years, the patient had at periods vomited everything she had eaten, immediately after meals and had felt severe pressure in the stomach. She had been treated unsuccessfully for ulcer several times. Patient was well nourished. She had the *habitus enteropticus*. The acidity of the test-breakfast was normal, the acidity being 64. After one week of daily massage, softly stroking the epigastrium, the pressure in the stomach and the vomiting completely ceased and the patient was able to eat meat, potatoes, etc., without any discomfort. Her health remained normal for several months, at which time she suffered a relapse, and was again cured by the same treatment. Later on, the patient developed hysterical writer's cramp, for which she was treated two months with cold baths, etc., in a sanitarium for nervous diseases. The writer's cramp disappeared but the patient still complained of pressure in the stomach which was again removed by one week's treatment with massage. This condition subsequently recurred, associated again with writer's cramp, for which she was again sent to a sanitarium.

2. Gastric Vertigo

By the term “gastric vertigo” is understood the frequent occurrence of a feeling of dizziness about the end of a mealtime.

It is most commonly observed in young persons who are extremely nervous, in consequence of masturbation or other causes. Except for this symptom, the patients feel well.

The objective signs of the stomach are negative. The secretion shows normal or fluctuating values. Motility is normal.

The diagnosis is made from the history of the subjective disturbances and from the negative objective findings.

The prognosis is favorable. The affection generally disappears soon after the causal factors have been removed.

Therapy.—The therapy consists in the abolition of those factors which have weakened the nervous system, the administration of bromide and valerian preparations, massage of the entire body, and the employment of half-baths. If the condition occurs in a patient with poor nutrition, a mild fattening-diet is indicated.

CLINICAL CASES

CASE 1.—Julius S., a joiner, 55 years old, had had influenza for three years, and for two years had suffered from stomach-trouble, a feeling of dizziness and loud eructations after each meal. He had no pain, his appetite was poor, and he was ill-nourished. Stools were irregular; and he frequently complained of pressure in the head. The test-breakfast showed a slight sub-acidity. After treatment with bromide and valerian tea, the patient improved.

CASE 2.—Marie V., 40 years old, had been healthy up to three months previous, since which time she had suffered from heartburn and a feeling of vertigo, generally one hour after a meal,—even of liquids. If she had sufficient rest the above symptoms did not appear; but they invariably returned after hard labor. The patient's bowels moved once or twice a day; stools were soft. The appetite was good.

Physical Examination.—Patient was pale and emaciated; the right kidney was palpable. Total acidity of the test-breakfast was 30. After treatment with bromides the patient improved. Oxyuria had been noted in the stools for the past three months, therefore the case was not a simple gastric neurosis, but reflex vertigo.

3. Nervous Anorexia

Great variations in the appetite may occur from purely nervous influences; it may be considerably increased or totally lost.

Bulimia (ox-hunger), or *cynorexia*, by which meant an abnormal increase of the feeling of hunger, occurs quite frequently.

The fundamental reason for this condition is probably an abnormal increase in the motility of the stomach where its contents are propelled into the duodenum in considerably less than the normal time.

Such patients experience an imperative need of food which, if not gratified, results in phenomena resembling attack of fainting, which disappear immediately after eating.

The actual cause of the affection is unknown.

The prognosis is not especially favorable, since the trouble will often persist many years, and causes exceeding discomfort and annoyance.

Every case of bulimia should naturally be examined for diabetes, since a ravenous appetite is often the first symptom of this disease.

Gastralgokenosis.—Closely associated with this affection is the so-called "gastralgokenosis," a form of gastric neurosis which was introduced into the pathology of the stomach by Boas, and is characterized by a painful emptiness of the stomach.

Patients with this affection do not experience the insane, irresistible desire to eat as do those with bulimia, but several hours after meals an unpleasant feeling of contraction in the pit of the stomach occurs, which disappears immediately after taking any kind of food. This symptom is very frequently considered as "heart-pain" by the laity.

Patients suffering from gastralgokenosis feel a need to eat, yet lack the desire. They have an abnormal feeling of hunger but no appetite.

This neurosis need not be confused with ulcer or erosion of the pylorus, in which severe pain occurs several hours after eating,—so-called epigastralgia,—which disappears immediately after taking food or drink.

Whenever a cramp-like pain occurs at a definite time after meals, the examiner should always think of an ulcer.

associated with hyperchlorhydria,—which has been discussed in detail in the section on Gastric Ulcer.

Treatment.—Gastralgokenosis may be easily and successfully treated by having the patient eat every two or three hours, thereby removing the factors of malnutrition and anæmia, when the condition will disappear of itself.

In contradistinction to this, the physician is quite helpless in the treatment of *bulimia*. In individual cases, arsenic and silver nitrate offer good service.

1. ℞ Liquoris potassii arsenitis,
Aquæ menthæ piperitæ, āā, ℥iiss 10.0
M. Sig.—Six to ten drops after meals, t.i.d. Add one drop to the dose each week.
2. ℞ Argenti nitratis, gr. vi 0.4
Aquæ, ℥viss 200.0
M. Sig.—A tablespoonful (porcelain) in a wineglassful of water fifteen minutes before meals.

Nervous Anorexia.—In contrast to *bulimia* is nervous anorexia, or total loss of appetite.

Before the examiner makes a diagnosis of nervous anorexia, it is necessary first to exclude other diseases of the stomach or of other organs which produce the same symptom, especially incipient tuberculosis, early carcinoma of the stomach or other organs, typhoid fever, Basedow's disease, etc.

Etiology.—The causes of nervous anorexia are, as a rule, emotional disturbances from bereavement, loss of property, fright, railroad and steamship accidents, etc.

A patient suffering from nervous anorexia may become considerably emaciated, losing as much as fifty pounds or more, so that the suspicion of the presence of a malignant neoplasm will at first occur to the examiner.

The other functions of the stomach,—secretion and motility,—are either quite normal or offer variations typical of nervous dyspepsia. Frequently there is a marked diminution in the amount of hydrochloric acid in the gastric juice which renders the differential diagnosis between nervous anorexia and latent carcinoma of the stomach especially difficult.

It is not at all rare for hyperchlorhydria to be associated with nervous anorexia.

Treatment.—The therapy consists in the administration of bitters. The following have proven useful in my experience:

Fluid extract of quinine, 20 drops before meals, t.i.d.

Tincture of gentian, or rhubarb, a teaspoonful before meals, t.i.d.

Fluid extract of calamus, a teaspoonful before meals, t.i.d.

Orexin, 4 or 5 grains (0.3) in capsules, t.i.d.

In most cases, a change of scene is essential, though not to any special health resort, it being sufficient for the patient to go to any kind of summer resort or to visit relatives in the country or at the seashore, or to go anywhere that offers the necessary change and diversion, for in this affection almost always have to do with a depressed condition of the nervous system.

Acoria.—By way of addendum, I will mention the condition known as *acoria*, a neurosis in which the patient has lost the sense of satiation of hunger.

The condition is encountered especially often in women in the climacteric.

The treatment of *acoria* is wholly ineffectual, and it often exists for several years. The therapy is largely limited to sending the patient to a health resort, administering symptomatic remedies, and waiting for the neurosis to disappear of itself.

CLINICAL CASES

CASE 1.—Dora P., an artist, 54 years old, had for ten years had attacks of nausea, gnawing pain in the epigastrium, and vomiting of water during periods occurring from two to four times each year. The appetite was good but the patient was afraid to eat. The attacks occurred only after she had not eaten for several hours, and were usually terminated by the regurgitation of liquids. The patient had several times been treated for tapeworm. She had been constipated from twenty to thirty years, and had been under a severe nervous strain in caring for her paralytic husband.

Patient was pale, poorly nourished, had the *normal habitus*, and relaxed abdomen; the right kidney was movable to the second degree; the transverse colon and the sigmoid flexure were contracted and palpable. There were symptoms pointing to disease of the central nervous system. The test-breakfast showed the stomach-contents to be normal, the total acidity being

Treatment consisted in the administration of belladonna pills and a constipation-fattening diet, with oil enemata twice a week. After two weeks of treatment, the stools were spontaneous and the painful emptiness of the stomach and the vomiting of water had entirely ceased. During the following few months, the patient increased twenty pounds in weight, and remained in good health.

CASE 2.—Pauline C., a dancer, 30 years old, had had occasional stomach-trouble during her childhood, after which period she had been healthy until one year previous, since which time she had had considerable discomfort in the epigastrium several hours after a meal, which would cease immediately after eating even a mouthful of food. Patient had occasionally vomited mucus. There had been a loss of ten pounds in weight. Some days the patient had felt free from the symptoms. On account of her occupation, she had been irregular in her meals for several years. Examination showed that she was emaciated and had *habitus enteropticus*. She was treated with bromides and valerian without results. The test-breakfast was normal, total acidity being 50. The painful emptiness of the stomach frequently recurred, and improvement was obtained only after prescribing the ulcer-diet and the use of mastication tablets; so in this case there probably existed an ulcer of the stomach rather than a gastric neurosis.

CASE 3.—Anna R., a housewife, 28 years old, had for two and one-half months suffered from painful contracting sensations in the epigastrium whenever the stomach became empty,—these attacks generally occurring early in the morning and at 2:00 or 3:00 o'clock in the afternoon, as the patient did not eat anything between the hours of 8:00 o'clock in the morning and 3:00 o'clock in the afternoon. Soon after eating, the pains disappeared. After treatment with belladonna, valerian, and regulation of the diet, improvement occurred without resorting to treatment for ulcer.

CASE 4.—Clara H., a capitalist, 46 years old, had had an operation for hemorrhoids seven years previous. For five years the patient had never experienced the sensation of satiation of hunger. Improvement resulted from treatment at Franzensbad, which was followed by a recurrence of symptoms, and the weight was reduced from 168 to 110 pounds. At the time of the examination, the patient was constipated, and the appetite poor, but hunger was not appeased by eating. She was treated with belladonna, etc., and with massage to regulate the bowels. The acoria was not influenced by treatment. Observation of the patient gave the impression that she was hysterical.

Nervous Hyperacidity, Subacidity and Anacidity

In the section on Nervous Dyspepsia, it was stated that the gastric secretions might be increased, diminished or entirely lost through purely nervous influences. The subject merits, therefore, a somewhat detailed consideration.

The diagnosis of any of these conditions is possible only after a prolonged observation of the patient.

In the differential diagnosis of nervous hyperacidity, the physician should especially eliminate acid gastritis and gastric ulcer. A detailed consideration of the differential points has already been given in the chapter on Hyperchlorhydria.

In making the diagnosis of nervous anacidity, this affection is most likely to be confused with anacid gastritis and incipient carcinoma. The chapter on Nervous Dyspepsia presents the question in detail.

Many authors assume that total achylia may occur on a purely nervous basis and that the functions of the gastric glands are depressed even to complete cessation in the production of the gastric ferments, without being associated with any anatomical change of the mucosa.

In my opinion, this is an error. An anatomical process is probably always the cause of a diminution in the total acidity of the test-breakfast, when it is as low as from 6 to 8.

It is not essential to account for such diminution by an alcoholic gastritis alone, since a parenchymatous inflammation of the gastric mucous membrane may arise from other causes, such as years of privation, hasty, irregular eating, bad teeth, and the misuse of laxatives.

The total acidity of a purely nervous anacidity is rarely found to be below 18. There is an absence of only free hydrochloric acid. The combined acids and the ferments are present.

The treatment is that of the primary disease, as in nervous dyspepsia.

In hyperacidity, the belladonna preparations are indicated; and in subacidity and anacidity, strychnine, as in the following prescriptions:

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|------|-------------------------------------|------|
| 1. R | Tincturæ belladonnæ foliorum, ʒiiss | 10.0 |
| | Tincturæ valerianæ, ʒv | 20.0 |
| | M. Sig.—Twenty-five drops, t.i.d. | |
| 2. R | Tincturæ nucis vomicæ, ʒiiss | 10.0 |
| | Tincturæ rhei, ʒv | 20.0 |
| | M. Sig.—Twenty-five drops, t.i.d. | |

Hypersecretion is also held by some authors to be a nervous affection, especially by Riegel and his school, who

assume that the gastric glands respond to purely nervous influences with an alimentary hypersecretion in slight cases, and with continuous secretion of gastric juice in more severe cases.

According to the view held by the majority of authors, hypersecretion is always of an organic nature and rightfully belongs to the chapters which discuss Acid Gastritis and Stenosis of the Pylorus.

The gastric glands become irritated and hypertrophied, and respond with a continuous hypersecretion of gastric juice, from the irritating effect of poisons, alcohol, nicotine, excessive meat-eating, and over-eating. The glands of the stomach are subject to the same irritation if stagnation of the stomach-contents results from stenosis of the pylorus caused by scars or ulcer.

If the irritation of the gastric glands is removed,—as may result from suitable treatment, from the healing of the ulcer, or by gastro-enterostomy,—the glands gradually resume their normal functions.

It very often requires years, however, to bring this about, since the causative factors have also been operative for many years.

Nervous Cardiospasm and Pylorospasm

The diagnosis of these conditions is very often wrongly made in general practice. As has been mentioned in discussing the differential diagnosis of Gastric Ulcer, all kinds of affections are diagnosticated under these terms; while as a matter of fact, spasm of the cardia or of the pylorus very rarely occurs as a neurosis.

Generally the conditions taken for cardio- and pylorospasm are cases of gall-stone colic, gastric crises of tabes, angina pectoris, intestinal colic and—the most frequently—ulcer of the pylorus associated with hyperchlorhydria.

My opinion is, that there is practically no nervous affection of the stomach in which actual pain is a symptom. Whenever a pain does occur, the physician should always think of an organic lesion of the mucous membrane of the stomach. Although there are certain unpleasant sensations in the epigastrium in neurasthenia and in nervous dyspepsia, neither actual pain nor cramps ever occur. The absence of real pain, in fact, differentiates functional from organic disease of the stomach.

If pain suddenly occurs as a symptom in a patient who has been suffering from a nervous affection of the stomach for years, the physician should at once think of a complica-

tion. For example, I saw a case of severe neurasthenia and hyperacidity which had for years presented symptoms of nervous dyspepsia,—loss of appetite, pressure and fulness at eating, etc. Gastralgia suddenly developed, occurring several hours after meals. It was pronounced by a specialist to be due to a nervous affection of the stomach, and was so treated. The sudden occurrence of hæmatemesis, however, gave evidence of the true nature of the affection, namely, gastric ulcer.

The somewhat exceptional association of an organic disease of the stomach with nervous dyspepsia was characteristic of this case.

I must state that I have never yet observed an undoubted case of nervous spasm of the pylorus or cardia.

Painful cardiospasm is generally caused by some organic lesion, such as small erosions of the mucous membrane around the cardia. When otherwise caused, the symptoms produced by the spasm are more like unpleasant sensations in swallowing than actual pain. [See discussion of chronic cardiospasm, page

CLINICAL CASE

Rosalie G., 48 years old, had given birth to nine children, and had been subject to much grief and care,—her husband being an inmate of an asylum. Menstruation had been irregular. For two years, the patient had a feeling of contraction in the epigastrium every ten or fifteen minutes which was independent of eating. Patient had never vomited, and her bowels had been fairly regular. She was considerably emaciated, had *hæmopticus*, and relaxed abdomen. The pylorus was palpable, of about the size of a walnut, and was felt by the palpating hand to be alternately soft and hard. Both the secretions and the motility of the stomach were normal. Patient made temporary improvement under bromides, valerian, and sage, during which time she increased in weight and felt no discomfort. After renewed trouble and worry, the above symptoms always returned. Patient was seen five years after the first examination, and was in practically the same condition; so that malignant or benign stenosis of the pylorus could be excluded in this case.

With this I close the discussion of Functional-Nervous Affections of the Stomach. They are extremely diverse in their manifestations; and the art of the physician, his ability to improvise, and his ingenuity in the treatment and man-

ment of these cases, find a large field in this form of dyspepsia. Those of the largest experience in these cases will naturally obtain the greatest number of cures.

It may be mentioned once again that in doubtful cases the patient should at first be treated as if he had an organic disease of the stomach; and only after this method of treatment has been unattended with favorable results should the affection be assumed to be a neurosis and general treatment instituted.

DISEASES OF THE STOMACH IN CONNECTION WITH DISEASES OF OTHER ORGANS

Stomach-Affections Secondary to Diseases of Other Organs of the Body (Symptomatic Affections of the Stomach)

Although the relationship between diseases of the stomach and constitutional diseases and affections of other organs of the body has been mentioned quite often in the foregoing chapters, there are a few especially frequent and important reflex stomach-conditions that should be individually considered.

1. The Stomach and Disorders of Metabolism

Anæmia very frequently produces dyspepsia, as we have seen in the section on Functional Diseases of the Stomach, no matter what the origin of the anæmia is; and especially, if enteroptosis and malnutrition are associated conditions.

Pernicious anæmia,—or any other form of wasting disease,—such as carcinoma of any of the internal organs,—frequently causes atrophy of the gastric glands.

In regard to anæmia, it is also true that the atrophy of the gastric glands may be primary, and pernicious anæmia the secondary affection, if at the same time the absorptive ability of the small intestine is much impaired.

Anæmia leads only exceptionally to anatomical, but very frequently to functional, disturbances of the stomach.

In regard to the diagnosis and treatment, the reader is referred to the chapter on Anæmic-Gastroptotic Dyspepsia, for the details.

Chlorosis is frequently associated with organic affections of the stomach, such as erosions and ulcers. It is only in the

minority of cases, however, that such complications as perforation, adhesion, cicatricial formation, and stenosis of the pylorus occur; for the reason that only small superficial breaks in the continuity of the mucous membrane of the stomach are present, which heal without scar-formation.

This explains why it is that, in proportion to the frequency of ulcer, fewer women are affected with stenosis of the pylorus and secondary dilatation of the stomach than men, in whom ulcers arise from other causes, such as chronic gastritis and compression of the epigastrium in various occupations.

In chlorotic dyspepsia, especially in young girls, the symptoms are often very vague and indefinite; at one time there is pain, at another time pressure, and at still another time, burning in the epigastrium, which in most cases the physician will be able to ascribe to chlorotic erosions of the mucosa. These disturbances, as a rule, are stubborn to treatment, persisting often two or three years, and disappearing only with the chlorosis.

The treatment does not differ in any way from that of ordinary ulcer. It should consist in the administration of silver nitrate, as long as pain is present in the epigastrium. No iron should be given until all local gastric symptoms have disappeared. It is preferable to send patients, who can afford the expense, to some chalybeate spring, such as Flinsberg, Pymont, etc. [Sharon Chalybeate Spring, Schoharie County, N. Y., Churchill Alum, Virginia, Cresson Alum Springs, Pennsylvania, Santa Clara Vichy, California.]

It is well known that diabetes very frequently causes dyspeptic symptoms,—especially acoria, ravenous appetite, and disagreeable *fetor ex ore*.

Stomach disturbances are frequently associated with gout and obesity. Hyperchlorhydria with its symptoms is usually present with the former; while pyrosis and burning pains in the stomach and the symptoms of acid gastritis are usually present in obesity, as a result of immoderate eating.

The treatment of all these conditions is that of the primary disease, the details of which cannot be entered into here.

2. Acute Infectious Diseases

Gastric symptoms, loss of appetite, and vomiting occur especially often in meningitis, scarlet fever, influenza, and typhoid fever.

The vomiting is usually reflex, while the loss of appetite is due to the febrile process, although it is often,—for instance, in influenza,—an expression of an acute parenchymatous gastritis which is demonstrable at autopsy.

3. Chronic Infectious Diseases

Tuberculosis of the lungs frequently causes disturbances of gastric digestion, as has already been mentioned in detail in the chapter on Phthisical Dyspepsia. Tubercular lesions limited to the mucous membrane of the stomach are very rare.

Syphilitic lesions are also very rarely found in the stomach, although syphilitic ulcers are now and then found post mortem.

Specific affections of neighboring organs, such as the liver and the lymphatic glands accompanying the portal vein, may indirectly produce gastric disturbances by narrowing the pyloric outlet and by producing jaundice.

The well-known gastric crises of tabes, and the dyspepsia associated with paralysis, may also be mentioned. It should be recalled, as well, that nervous dyspepsia is often caused directly from fear of syphilitic infection.

4. Central Nervous System

The relationship between diseases of the stomach and disturbances of the sympathetic nervous system has been suggested in the chapters on Nervous Dyspepsia and Gastric Neuroses.

The important association existing between diseases of the stomach and the central nervous system should also be considered.

The very frequent occurrence of vomiting in diseases of the brain,—particularly in meningitis, and cerebral tumors,—is well established. Cerebral vomiting is characterized by its occurring independently of the nature of the food; and it is

particularly likely to occur whenever the patient assume upright position.

The correct diagnosis is usually possible from the association of symptoms, or if the physician is able to prove the functions of the stomach are normal.

I recently had occasion to observe a patient who vomited profusely whenever he assumed an upright position. While one would at first naturally think of carcinoma of the pylorus, the microscopical examination of the contents of the stomach showed that no stagnation of food existed, and therefore excluded the existence of pyloric stenosis. Free hydrochloric acid was present, but neither sarcinæ nor lactic acid bacilli. From the associated symptoms, therefore, I made a diagnosis of cerebral vomiting. The patient, a man about fifty years old, died soon afterwards, and a cerebral tumor was found at autopsy.

The vomiting which results from disease of the cerebellum or the nerve may also be properly mentioned here. Headache usually precedes vomiting in these cases, as in the well-known symptom-complex of migraine.

Less often recognized is the fact that gastric crises may be the first symptom of locomotor ataxia; the loss of the patellar reflexes, and the presence of the Argyll-Robertson pupil not being evident until two or three years later. Gastric crises usually occur in patients with a syphilitic history who have had insufficient medication, or none at all. In almost every case, examination reveals the scar of a venereal ulcer. The gastric crises usually occur six to seven years after the specific infection, although I have seen cases in which the crises developed in two or three years.

The gastric crises are characterized by periodical attacks of vomiting all food. These attacks are often accompanied by most severe pain. Later, mucus and bile are vomited.

Every case of periodical vomiting should be examined for tabes.

In some instances, the gastric crises recur every month, lasting for three days; while in other cases they return at intervals of months or even years; and in still other cases they disappear permanently after two or three paroxysms. The occurrence of gastric crises is at present

unaccounted for. Following an attack, the patient is again entirely well and digests everything he eats, just as if he had never experienced any stomach-trouble.

The diagnosis is generally easy, although mistakes are frequent, because the true nature of the disease is unsuspected by the examiner.

The treatment is unsatisfactory.

If the attacks occur from five to seven years after infection, mercurial inunctions followed by iodide treatment should be tried. Generally, however, it is then too late to be successful. In doubtful cases, the decision as to whether specific treatment should be instituted would better be left to the opinion of an expert neurologist.

Symptomatic treatment consists in the use of strychnine, morphine and other narcotics. The following prescriptions will be found serviceable:

1. ℞ *Cerii oxalatis*, gr. $\frac{1}{2}$ -iss 0.5-0.1
Sig.—T.i.d.
2. ℞ *Morphinæ hydrochloridi*, gr. $\frac{1}{2}$ 0.02
Sig.—T.i.d.
3. ℞ *Atropinæ sulphatis*, gr. $\frac{1}{15}$ 0.0005

CLINICAL CASES

CASE 1.—Constantine G., a waiter. 35 years old, had a chancre eighteen years previously, which was treated by injections. He had gonorrhœa several times, and for three years had had attacks about once in two months when he vomited everything he ate, in addition to bile, and suffered from violent pains in the epigastrium, head, and chest. These attacks usually lasted for about seven days. In the intervals, patient ate and digested all foods without discomfort. The bowels were regular, except that two days previous to the attack there was always constipation. The examination showed the patient to be well nourished. He had exophthalmus, the Argyll-Robertson pupil, slight ataxia, and the loss of the patellar reflexes. The secretory and motor functions of the stomach were normal.

CASE 2.—Gustav P., a weaver. 47 years old, had contracted syphilis twenty-five years previously. For the past four years he had suffered from attacks of vertigo and vomiting which occurred without any apparent cause and lasted for several days. In the intervals, the patient was in good health. The pupils reacted to accommodation but not to light. The patellar reflexes

were absent, and there was no ataxia. Motility and secretion of the stomach were both normal, and the total acidity of the gastric juice was 64. The administration of cerium oxalate gave temporary improvement.

CASE 3.—Adolphe L., a servant, 26 years old, had had syphilis seven years previously. For the past six months he had suffered from attacks vomiting without any apparent cause. These lasted four or five days, and were usually accompanied by severe diarrhœa. The left patellar reflex was diminished, and the pupils reacted to light. There was no Romberg symptom. The diagnosis of tabes was confirmed in Professor Oppenheim's clinic. No improvement resulted, the attacks of gastric crises recurring.

CASE 4.—August W., a mason, 30 years old, had contracted syphilis ten years previously and had had typical attacks of gastric crises with severe pain for about one year. As nothing but morphine would give relief, he contracted the morphine habit. The attacks occurred about every month during the two and one-half-years' observation of the patient.

5. Stomach and Circulatory System

In valvular diseases of the heart and in arteriosclerosis gastric disturbances occur which are the result of congestion in the general circulation, causing *plethora abdominalis*, congestion of the liver, etc.

Such patients complain most frequently of loss of appetite, and of constant pressure and fulness in the epigastrium.

The pain in angina pectoris is frequently confused with spasm of the pylorus.

In arriving at a diagnosis, the existence of marked arteriosclerosis, as well as the dependence of the attacks of pain upon physical activity, overloading the stomach, or advanced age of the individual, should protect the examiner against mistaking the condition for spasm of the pylorus. Also, the pain of angina pectoris occurs behind the upper portion of the sternum, and radiates generally to the left arm; while during the attack the patient has a feeling of great depression and fear of impending death, which symptoms are very characteristic of this disease.

The gastric disturbances associated with disease of the heart disappear as soon as the circulatory compensation has been established. The therapy, therefore, should be suitable to the primary lesion which is causing the circulatory disturbance.

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|------|---------------------------------|-------|
| 1. R | Infusi digitalis, ℥iv | 124.0 |
| | Liquoris potassii acetatis, ℥i | 30.0 |
| | Syrupi aurantii, ℥v | 20.0 |
| | Aquæ destillatæ, q. s. ad ℥viii | 200.0 |

M. Sig.—A teaspoonful every 2 or 3 hours.

2. R Tincturæ strophanthi,

Sig.—Five to eight drops in a wineglassful of water t.i.d.

CLINICAL CASE

Dr. C., 69 years old, had had no appetite for three months and suffered from a feeling of fulness in the epigastrium, especially after eating. Physical examination showed advanced arteriosclerosis, irregular action of the heart, and œdema.

Treatment consisted of rest in bed, and the giving of a diuretic mixture and juniper tea, after which the œdema and gastric disturbances disappeared. The patient had come to me for treatment, fearing that he was suffering from carcinoma of the stomach.

6. Stomach and Diseases of the Lungs

The essential points concerning the relationship between pulmonary tuberculosis and dyspepsia have already been considered in the chapter on Phthisical Dyspepsia, so it is unnecessary to reconsider this particular subject again.

The connection between vomiting and severe bronchitis is less fully appreciated, especially when such vomiting occurs in adults. Vomiting is regularly present in children with whooping-cough. Adults, however, suffering from bronchitis, often consult the physician for relief from the vomiting,—instead of from the bronchitis which is the cause of such vomiting.

In these cases, the vomiting usually follows a severe attack of coughing early in the morning, shortly after breakfast. If the physician is able to determine, from the statements of the patient, the dependence of the vomiting-attack upon the bronchitis, both the diagnosis and the therapy of this form will easily be established.

Either Ems or Salzbrunner salts should be given in hot milk; and codeine or morphine, in the usual way.

The following clinical cases will illustrate the connection between attacks of vomiting and bronchitis:

CLINICAL CASES

CASE 1.—Margaret H., 28 years old, the wife of a merchant, had for four months suffered from vomiting of a green-colored mucus with a bitter taste, which occurred early in the morning soon after rising. By a very carefully obtained anamnesis, it was established that the patient had first suffered from a spasmodic cough, which soon produced nausea and vomiting. After meals, the patient experienced no discomfort, and the bowels were regular. The total acidity of the test-breakfast was 44. The examination of the vomitus proved it to consist of sputum. Improvement followed treatment with Ems salts and codeine.

CASE 2.—Franz K., a locksmith, 46 years old, had had no appetite for three weeks. Every morning after breakfast the patient had an attack of coughing, which was almost invariably followed by vomiting, but during the rest of the day he had no stomach-trouble. The bowels were regular, and the motor and secretory functions of the stomach were normal, the total acidity being 50. Râles were present in both lungs. The patient entirely recovered under an anti-bronchitis treatment.

7. Stomach and Genito-Urinary System

Apart from nephritic colic, which may be confused with spasmodic conditions of the stomach, and chronic nephritis,—which sometimes leads to passive congestion, pressure in the stomach, and finally to urinic phenomena,—the diseases of the prostate require special consideration.

As the result of inflammatory conditions of this gland, distention of the bladder and a feeling of fulness in the abdomen occur. Such patients usually seek the advice of the physician on account of the gastric pressure.

The following clinical cases may serve to illustrate:

CLINICAL CASES

CASE 1.—Herman S., a capitalist, 61 years old, had for about six months suffered from loss of appetite, occasional vomiting, and from pressure and a feeling of fulness in the epigastrium, as well as bladder trouble,—dribbling of urine, etc. The total acidity of the test-breakfast was 50, and the motor powers of the stomach were normal. The physical examination revealed a tumor about the size of the head, which was found just above the symphysis,—midway between the umbilicus and the symphysis,—and which proved to be a distended bladder. Catheterization caused a disappearance of the “stomach-troubles.”

CASE 2.—Rudolph H., a tailor 32 years old, had been without appetite for three weeks, and had a feeling of fulness in the entire epigastrium. The bowels were regular, but the patient was occasionally nauseated and experienced some trouble in urination. He remembered having taken a severe cold prior to his illness. A tumor above the symphysis proved upon examination to be a distended urinary bladder.

Treatment consisted of belladonna suppositories, sitz-baths, and a diuretic; after which the micturition became normal, and dyspeptic symptoms ceased.

8. Stomach and Liver, Pancreas and Spleen [Gall-Bladder]

Enlargement of the liver, from inflammatory processes and from stasis in the portal circulation, often manifests itself subjectively by a constant feeling of fulness in the epigastrium, caused by the consequent crowding upon the abdominal space,—especially when there is a simultaneously existing ascites.

The same subjective symptoms are produced by enlargement of the spleen.

It has already been repeatedly mentioned that gall-stone colic may often be confused with spasmodic pain of the stomach. The sporadic occurrence of gall-stone colic, and also the enlargement and sensitiveness of the liver and gall-bladder in acute cases, should readily protect the physician from making a wrong diagnosis.

[The advances made in early diagnosis and treatment of diseases of the biliary passages,—due largely to American and English surgery,—deserve a fuller consideration of the subject than the author has given.

The early symptoms of gall-bladder disease are very often of a dyspeptic nature. Such patients have been treated for weeks, months and years for stomach-trouble; and only the development of active and positive signs of gall-bladder disease has caused the correct diagnosis to be made in many of these cases.

Thanks largely to the opportunities which surgery has offered of making comparisons between the clinical symptoms and the pathology of the earlier inflammatory affections of

the biliary tract, the clinician is now able to recognize such cases by the subjective and objective symptoms of the patient. But cases are still too frequent where, owing to complications,—such as adhesions, etc.,—the symptoms are so indefinite and the symptomatology so confusing that the differential diagnosis of organic gastric disease is difficult and perplexing.

In the differential diagnosis between organic stomach affections and diseases of other organs of the abdomen, including the gall-bladder, the cardinal point is that the symptoms of organic stomach-diseases are dependent upon food and that the symptoms of organic diseases of other organs of the abdomen are not.

In peptic ulcer, for example, the pain which occurs from one to four hours after eating is the most characteristic symptom of that disease,—all other symptoms, such as vomiting, hyperacidity, gas, and even hemorrhage, being present in diseases of other organs of the abdomen; but the pain phenomenon of ulcer differs from the pain caused by diseases of other organs, in that, although sometimes temporarily excited by foods, warm drinks, soda, etc., it recurs regularly after eating, usually two to four hours, throughout the ulcer-period.

In contrast to this, the pain in gall-stone disease is independent of eating, is not modified by food, is irregular in relation to meals, and is periodical in occurrence; like the pain of ulcer, it is located in the epigastrium, but it has a wide field of radiation, usually extending to the right costal and scapular region, and is generally of a more sudden character.

In cystic duct-obstruction and in cholecystitis, the pain is occasionally more or less constant in the epigastrium, and for this reason more likely to be confused with gastric disease than is the pain of cholelithiasis. But here again, the pain is independent of and not modified by the kind and amount of food eaten, which fact excludes the pain as being of gastric character.

Tenderness to pressure in the epigastrium may be present or absent in cholelithiasis, but in cholecystitis it is a more constant physical sign. It is located usually in the right of the median line in the region of the gall-bladder.

than otherwise. There is quite frequently a tenderness to pressure at the right of the ninth to the twelfth dorsal vertebræ in both gall-bladder and liver disease, and heavy percussion over the posterior hepatic area is more painful than over the corresponding area of the left dorsum.

In gastric ulcer, the point of tenderness is sharply defined, and is almost always minutely localized by the patient to a small area throughout the ulcer-period. In a considerable number of ulcer-patients, the area lying to the left of the ninth to the twelfth dorsal vertebræ is sensitive to pressure.

Vomiting is common to both cholelithiasis and gastric ulcer, although not so frequently a significant factor in the former.

In gall-stone disease, vomiting appears soon after the initial pain and may give some relief. It is profuse only when the attack comes on after a meal, and then the normal food and the normal acidity of the vomitus will be recognized.

In gastric ulcer, vomiting occurs from one to four hours after meals, at a time when the pain and hyperacidity are most intense, and it is usually followed by relief from pain.

In uncomplicated gall-stone disease, the gastric contents will be found normal.

In organic stomach-disease, the gastric contents will show characteristic variations from the normal depending upon the nature of the disease, as in cancer, carcinoma, carcinoma, etc.

In chronic disease of the gall-bladder, adhesions frequently exist between the gall-bladder and the pancreas and other structures, and so distal to these adhesions a differential diagnosis is possible only when an intelligent early history is obtainable.*

Graham says that in the study of these cases "there is nothing so important as the careful development of the history, and that when this can be clearly obtained, error in diagnosis will be at a minimum."

[* For helpful suggestions in the study of these cases, see the paper by Professor Graham, of the Rochester Clinic, also, in a recent letter from the author, general diagnostic principles of early gall bladder disease.]

He considers the most important differential points of gall-bladder dyspepsia to be: "Little stress laid on food as a cause of pain; the irregularity of symptoms, as to time of attack; the period over which the attack runs; the discomforts and pain depending little, if any, upon the amount or kind of food; and the distress being epigastric."

A few suggestions concerning the therapy of cholelithiasis will be parenthetically offered.

In the acute attack, the physician should prescribe strict rest in bed, and the application of hot linseed poultices and one or two leeches in the region of the gall-bladder, with the internal administration of 0.03 [$\frac{1}{2}$ gr.] extract of belladonna, or 0.001 [$\frac{1}{100}$ gr.] of eumydrin, three to four times daily. In case there is a tendency to vomiting, either morphine may be given subcutaneously, or the above-mentioned remedies may be given in suppositories per rectum.

The nourishment should be limited to tea, milk, and cereal soups.

Chronic cholelithiasis, as well as the after-treatment of an acute attack, should receive attention preferably at Carlsbad, where the hot mud-poultices may be used to great advantage. The Carlsbad water should be drunk as hot as possible, in amounts of three or four glasses daily,—three in the morning and one in the afternoon,—for a period of about four weeks.

For very stubborn and severe cases, the physician should prescribe rest in bed and the use of the hot poultices from four to six weeks, before advising operative measures.

If the Carlsbad regime proves ineffective, the oil-treatment should be prescribed. A wineglassful of olive or almond oil should be drunk every morning for about four weeks. Recently chologen* has proved useful in individual cases. It should be given for a period of from six to ten weeks.

Eunatrol, salicylic acid, and probilin pills,—which consist of salicylic acid, sodium oleate, phenolphthalein and menthol,—should be taken before breakfast and in the evening, in doses of three or four pills, with one-third to one-half litre of hot water.

The patient should be referred to a surgeon when internal therapy fails, or when attacks of cholelithiasis are frequent. [The medical treatment of gall-stone disease is very uncertain in its results and owing to the pathological conditions present it can scarcely be more than palliative. Early surgical treatment should therefore be advised unless contraindications to an operation exist.]

* There are three strengths,—No. 1 for light, No. 2 for medium severe, and No. 3 for severe cases. The physician should prescribe two tablets before the dinner the first day, and two tablets before lunch and dinner on the second day, and on the third day two tablets before each meal; while on the fourth day, the patient should begin over again, etc.

Neoplasms of the pancreas,—such as cysts, carcinomata, etc., as well as other disorders of the pancreas,—such as concretions and hemorrhages,—are frequently confused with gastric diseases.

A carcinoma of the pancreas, which causes stagnation of the contents of the stomach by compressing the stomach-outlet, cannot be differentiated in some cases from a cancer of the pylorus.

In suspected cases of pancreatic disease, the physician must never neglect to examine the urine carefully for sugar, and also the stools for an increased fat-content.

Fortunately, so far as therapy is concerned, a differentiation between the two affections is unimportant.

9. Stomach and Intestinal Diseases

Numerous sufferers from intestinal diseases believe their real trouble is of gastric origin. Especially is this the case with those who have the so-called “intestinal dyspepsia.”

By the term “intestinal dyspepsia” is understood the occurrence of all kinds of dyspeptic symptoms, such as pressure, fulness in the epigastrium, loss of appetite, nausea, and even vomiting, flatulence, distention, and a more or less severe intestinal catarrh,—the functions of the stomach meanwhile being normal. In addition to the above symptom, griping pains occur in those cases where an organic intestinal affection exists.

Since such complaints have their origin mostly in the colon, which runs transversely through the epigastrium, its close intimacy with the stomach may very easily confuse both the patient and the physician as to the exact nature of the affection.

Disturbances of the functions of the intestine are always objectively evident. Either persistent constipation or diarrhœa, or alternating constipation and diarrhœa, will be found present.

With these symptoms, cramp-like pains, which are a sign of spasm of the intestine, very frequently occur. Occasionally, the movements of the bowels are normal, the patient suffering only from impaired absorption and gaseous disturbances.

Improvement naturally results in these cases only through treatment of the intestine.

It is often very difficult to determine the location and intensity of a catarrhal condition of the intestine. If constipation exists, it is almost always of a spastic nature, requiring the use of belladonna,—0.01 ($\frac{1}{8}$ gr.) of the extract, or 10 drops of the tincture,—three times daily, also a non-irritating diet and Vichy water.

If diarrhœa is present, with only occasional constipation, the patient should be given a non-irritating diet, combined with intestinal astringents, such as tannocol, bismuth, etc.

Fuller details will be given in the section on Chronic Intestinal Catarrh.

CLINICAL CASES

CASE 1.—Otto G., a business man 42 years old, had for fifteen years suffered from attacks of vertigo after errors in diet. He had also been troubled with heartburn and a feeling of fulness in the epigastrium and in the entire abdomen. There had been much flatulence, and the stools were lumpy and of a spongy consistency. He had occasional diarrhœa, and had lost 26 pounds in weight. There was no hyperchlorhydria. The liver and spleen were enlarged. Treatment consisted of a bland, non-irritating diet, the use of Vichy water and the calcium salts, with subnitrate of bismuth,—after which the stools became regular, and the flatulence and dyspeptic symptoms disappeared. He gained 10 pounds in weight, but noticed that he still suffered from vertigo whenever he ate eggs.

CASE 2.—Miss L., a singer 26 years old, had been constipated twelve years, so that purgatives were necessary. For six months she had suffered from languidness half an hour after dinner, and nausea in the morning, followed by vomiting of mucus and bile. The appetite was poor, and the patient slept badly.

Physical examination was negative. The patient was given a coarse constipation-diet, after which the bowels became immediately regular, and in three weeks all the dyspeptic symptoms had disappeared.

10. Stomach and Sexual Organs

The co-relation between the female sexual organs and the stomach is generally recognized, especially the vomiting associated with uterine colic before or during the menses, and also the vomiting caused by retroflexion of the uterus, and by pregnancy.

It is therefore essential, before making a diagnosis of nervous vomiting, to examine the pelvis carefully, in order to determine the condition of the uterus, since the statements given in the anamnesis of these cases are so often unreliable and misleading.

Chronic metritis, perimetritis, ovarian disease, prolapsus of the uterus, etc., are extremely often the cause of nervous dyspepsia, nervous eructation, etc.

In regard to the male sexual organs, it may be mentioned that diseases of the semen-producing organs are closely related to disorders of digestion. The dyspepsia caused by sexual neurasthenia following masturbation, prostaticorrhœa, spermatorrhœa, or phosphaturia, has already been spoken of in sufficient detail in the chapter on Nervous Dyspepsia.

Diseases of the Intestine

Introduction.—Diseases of the intestinal tract are even more extensive and common than those of the stomach. An enormous number of people suffer from irregularity of the bowels,—diarrhœa, constipation, or flatulence; so prevalent are these, indeed, that in civilized man, particularly in adults, a normally functioning intestine is rarely found.

The causes of these prevalent disturbances of the bowels are the use of artificial “foods” during the first few years of childhood; and in adult life, unhygienic living,—such as sedentary occupations, insufficient exercise, mental over-work, frequent overloading of the digestive tract, irregular meals, alcoholic excesses, etc.

The great length of the intestinal canal, amounting on an average to from 7 to 8 metres, frequently makes the diagnosis of the exact location and character of any special disease very difficult. Our present knowledge of the individual diseases of the intestine is much less advanced and accurate than our knowledge of the stomach, because it is much more difficult to examine the functions of the intestine than those of the stomach, by means of a so-called test-meal. Only very

recently, following the initiative of Schmidt and Strasburger, clinicians have begun to use the test-meal, subjecting the stool formed from it to a chemical and microscopical examination.

Unfortunately, this method of examination can be utilized only in the clinic and in hospital practice, being scarcely adaptable to the every-day use of the general practitioner. To be carefully performed, it requires a trained nurse and considerable routine on the part of the physician; and in consideration of these factors, is better left to the use of the specialist.

In this book, we cannot go into the anatomical and physiological details of the intestinal tract, especially since it is taken for granted that such knowledge is already familiar to the physician.

A few remarks concerning the characteristics of a normal stool only will be made. From a person on a mixed diet, it is always of large caliber and semi-solid consistency. Clumps of yellowish-brown mucus, but never membranous mucus, may be adherent to its superficial surface. The normal color may be any of the shades from light yellow to dark brown; it is black-brown only after certain foods,—such as red wine, blueberries, spinach, etc.

In twenty-four hours the stool will amount to about 170 grams.

With vegetarians and those who have temporarily eaten largely of fruit and vegetables, it may be normally unformed and of pulpy consistency.

After the eating of much milk and butter, the color may be a decided light yellow without being pathological.

Every stool that differs from the above-indicated normal stool is pathological, as we shall see below in describing stools of hard consistency and those of small calibre, or of unformed, semi-liquid, or fluid consistency, etc.

Etiology.—In general, the causes of disease of the intestine are the following:

1. *Diseases of the Stomach.*—Impairment of gastric digestion is frequently the cause of disturbances of the intestine.

Chronic gastritis, especially, gives rise to a secondary chronic intestinal catarrh, although it should be mentioned that both diseases are often caused by the same etiological factor, such as excess in eating or drinking.

The secretion of too much as well as of too little gastric juice will disturb the intestinal digestion. If a hyperacid gastric juice enters the duodenum, the bile and the pancreatic juice are unable to normally neutralize the acid chyme after it has entered the bowel.

On the other hand, when chyme which is deficient in acids enters the duodenum, there is insufficient stimulation for the secretion of bile and pancreatic juice of a normal quality and quantity.

In both of the above instances, intestinal digestion suffers; and catarrh of the smaller, and later of the larger, intestine results. Diarrhœa first sets in after some error in diet; and after existing for several years, it becomes chronic.

In simple gastric dyspepsia, when the appetite is much reduced and when even light, easily assimilated foods cause disturbances in peptic digestion, the functions of the intestine become implicated, because normal peristalsis cannot be maintained with a deficient amount of nourishment. It is in this way that chronic constipation most commonly develops.

An organic disease of the stomach will disturb the functions of neighboring organs, such as the transverse colon, and especially the duodenum. For example, hyperacidity of the gastric juice may cause the development of a peptic ulcer in the duodenum, or adhesions may form between the stomach and the transverse colon from perigastritis, giving rise to the formation of fistulae, and thereby to severe disturbances in the functions of the intestine.

The converse may occur; that is, primary intestinal disease, especially catarrh of the bowels, may cause secondary disturbances of the stomach, as we have seen in the chapter on Nervous Dyspepsia.

2. *Frequent Indigestion.*—This is, especially in children, one of the most common causes of chronic disease of the

intestine, for the reason that insufficient care is maintained to produce an anatomical cure following acute conditions. Such cases are usually considered cured, if the violent symptoms have ceased, or if the pain and diarrhœa, with the help of an anti-diarrhœa remedy, such as opium, have disappeared; then the patient is not observed long enough, no sparing diet adhered to for a sufficient time, to allow the intestine to be restored to its normal anatomical condition.

Opium is given entirely too often in such cases. In diseases of the intestine, it would be better if it were entirely dispensed with. Every case of acute diarrhœa requires the most careful treatment in order to prevent permanent anatomical alterations of the mucous membrane of the intestine.

Inherited tendencies toward alimentary troubles are recognized, there are undoubtedly families in which an alteration in the function of the intestine is a prevalent trait. Several members of one family will have a tendency toward diarrhœa; while in another family, a corresponding inclination exists toward constipation.

3. *Infections and Intoxications.*—Both acute and chronic affections frequently cause acute and chronic disturbance of the intestine. I need mention only lead, copper, arsenic, phosphorus, opium, and ptomaine poisoning,—besides diphtheria, diphtheritic and syphilitic infections,—which may be associated with an inflammatory condition or ulceration of the intestine.

4. *The General Constitution.*—The general constitution has the greatest influence on the occurrence of functional intestinal diseases,—especially of hereditary constipation. Persons with the *habitus enteropticus*,—especially women after pregnancy who have relaxation of the abdominal walls, and in addition to the congenital, have acquired enteroptosis,—are predisposed to atonic constipation, the existence of which for several years will give rise to a large number of disturbances and finally lead to an organic disease of the intestine, as we see further on.

5. *Neighboring Organs.*—Hemorrhoids may be either the result or the cause of chronic constipation.

Diseases of the neighboring organs, such as the peritoneum, liver, spleen, kidneys, or heart, are also detrimental to the normal functions of the intestine.

Passive congestion in either the greater, the lesser or the portal circulation causes stasis of the blood in the mesenteric veins, producing a passive congestion of the blood-vessels of the intestinal mucous membrane, with its clinical result.

The bands formed from peritonitis, and further acute and chronic peritonitis, may give rise to the most severe intestinal disturbance.

6. *Nervous System*.—Besides the above-mentioned etiological factors, there are a large number of purely nervous affections of the intestine, the exact nature of which we do not understand.

It is of the utmost importance that the physician seek and remove the *causa morbi*, so as to produce a permanent cure in every case of acute and chronic intestinal disease.

Symptomatology.—The symptomatology in intestinal diseases, just as in affections of the stomach, is divided into subjective and objective.

The subjective symptoms consist of pressure, feeling of fulness, distention not merely in the epigastrium but in the entire abdomen, flatulence, nausea, the tendency to vomit, and vomiting; also cutting, gnawing, cramp like, recurrent pain in the region of the umbilicus and radiating to all sides, the so-called "mesogastralgia," which may increase to the sensation of oppressive constriction and finally to severe colic.

Besides the above, constipation and diarrhea occur as two subjective symptoms which merge into the objective.

The objective signs and symptoms in diseases of the intestine must, as a rule, be obtained from the statements of patients alone, since such cases are usually ambulatory and not under the constant observation of the physician.

The most common symptoms are irregularity in the evacuation of the bowels, constipation, diarrhea, and fever, besides meteorism and the escape of flatus, mucus, blood, purulent concretions, substances resembling gravel, feculent matter, &c.

The significance of the individual subjective and objective symptoms will not be discussed until later on.

Examination of the Patient.—The examination of a patient suffering from intestinal trouble should consist in the following:

1. Anamnesis.
2. Physical Examination.
3. Chemical and Microscopical Examination of the Stools, and if necessary of the Stomach-Contents.

1. In obtaining the anamnesis, the physician should proceed exactly as in Diseases of the Stomach, to which chapter the reader is referred, in order to avoid repetition.

The differential diagnostic points, however, may properly be given here:

Pressure, fulness and distention throughout the entire abdomen, which are independent of eating but which are, on the other hand, dependent upon the evacuation of the bowels, are indicative of an intestinal affection, especially when they occur early in the morning before food has been eaten, or when the symptoms are associated with irregularity of the bowels. If, on the other hand, these symptoms occur only after eating, and are limited to the epigastrium, the physician should suspect that their origin is in the stomach. While in the stomach, pressure is alleviated by eructations; in the intestine, it is relieved by the escape of gas.

In chronic affections of the intestine, actual pain is rarely associated with eating; while in disease of the stomach, pain is directly dependent upon the quality and quantity of food,—as has been shown in the chapter on Gastric Ulcer.

Intestinal pain, as a rule, lasts for only a few minutes,—very rarely for hours, except in such cases as lead colic,—and it is usually relieved by the escape of gas.

The mistaking of spasm of the pylorus for intestinal colic is notably frequent in diagnosis. The point just mentioned,—that in intestinal colic the pain is of only temporary occurrence—will guard against such an error, especially if

the physician bears in mind that the pain of pyloric spasm occurs regularly at certain times after meals.

If the physician determines from the anamnesis that the patient is suffering from an irregularity of the bowels, he will have much less difficulty in differentiating whether stomach trouble or disease of the intestine is present.

I would not mention this matter in so much detail, had I not so frequently seen conditions, which were in reality intestinal colic, diagnosed as a spasmodic affection of the stomach. And again, when the physical examination has determined that the patient has a congenital or an acquired enteroptosis, the diagnosis of dilatation of the stomach, secondary to spasm of the pylorus, was assumed. Accurate observation, however, would soon reveal the fact that the alleged pylorospasm was in reality intestinal colic resulting from spastic constipation, and that the alleged dilatation of the stomach was nothing more nor less than gastroptosis.

2. *Physical Examination.*—The technic of palpation has already been considered in the Introduction to Diseases of the Stomach. The following, however, must be particularly mentioned in this place as requiring the close observation of the physician:

The *habitus*, the degree of nutrition of the patient, his color, the condition of the abdominal wall, and whether diastasis of the recti muscles is present, as well as visible peristalsis of the coils of the small intestine.

An attempt should be made to palpate the colon from the cæcum to the sigmoid flexure. This is best done by a rolling movement with the palmar surfaces of the extended fingers placed at right angles to the course of each portion of the colon. It is also frequently possible to palpate the appendix.

When the abdominal walls are thick and rigid, the colon is not palpable; but, on the contrary, it can almost always be felt when the abdominal walls are relaxed, especially in women who have given birth to several children, or in men who were formerly stout and have become emaciated. It is especially easy to palpate the transverse colon when it is contracted and hard; while it is almost impossible to differentiate a soft, empty colon from the neighboring structures.

The palpation of the colon cannot be theoretically learned but requires considerable practice and experience. Beginner should select, for examination, individuals who are emaciated or those who have relaxed abdominal walls.

Particular attention should be given to the investigation of areas of the colon that are sensitive to pressure. Sometimes the entire organ is sensitive, especially in a catarrhal condition associated with spasmodic contraction.

The abdomen should be carefully palpated, also, for possibly existing tumors. The inexperienced may easily mistake fecal accumulations or irregularities in the bellies of the recti muscles for new growths. The latter are hard, nodular, and resistant to the palpating hand; while fecal tumors yield under the fingers and give the so-called Geun's symptom, that is, a feeling, after pressure on the mass, that the finger still adheres to the tumor; besides, fecal tumors usually have a knotted formation and shape, and are limited largely to the descending colon and the sigmoid flexure.

As a rule, the coils of the small intestine are not palpable but the examiner may often observe its peristalsis around the umbilicus, especially in women who have relaxed abdominal walls and who, after repeated pregnancies, have diastasis of the recti muscles extending from a finger's to a hand's breadth. These visible peristaltic movements of the small intestine are not in themselves pathological, and are unassociated with neuroses or stenoses of the small intestine. The only pathological features in such a case are the above-described conditions of the abdominal wall.

While palpating the cæcum, a gurgling sound is frequently heard, which is merely a sign that the intestinal contents are of a fluid consistency, and undergoing fermentation.

Hard, irregularly-formed tumors are frequently palpable in this region, and are usually of either a tubercular or a carcinomatous nature.

To palpate the vermiform appendix, the physician should first locate McBurney's point,—which lies midway between the umbilicus and the anterior-superior spine of the ilium. He should place the palmar surface

of the fingers of the left hand just below this point, at right angles to the line from the umbilicus to the anterior-superior spine of the ilium. By a slow, downward pressure of the fingers, accompanied by a rolling movement, the appendix will frequently be felt as a cartilage-like band, about the length of the little finger and as thick as a lead pencil, which can be rolled here and there under the palpating finger. In this way, with experience and practice, it is frequently easy to demonstrate whether the appendix is swollen and sensitive, or elongated, or if it has assumed or is retaining an abnormal position.

Palpation should not be concluded until the abdominal rings also are carefully examined for hernia; and finally, the rectum and anus should be palpated in all doubtful cases.

Percussion should be used by the physician to outline tympanic areas of the abdomen.

3. *Chemical and Microscopical Examination of the Stool*

No detailed nor complicated methods of examining the dejections will be described in this book, but only such procedures as are important and essential to the practical physician.

a. **MACROSCOPICAL EXAMINATION.**—This is fully as valuable as the microscopical examination of the stool; and indeed, for the general practitioner, it is often the only possible method, if the microscope and the necessary chemical reagents are not at his disposal.

With a little practice, and by keeping the following points in mind, the physician will be able to diagnose correctly the majority of chronic affections of the intestine by the examination of the fæces with the naked eye alone.

1. *The Form of the Dejection.*—It has already been mentioned that the normal stool is formed, of large caliber, and sausage-shaped; and also that with vegetarians it may normally be of a semi-solid consistency.

All other stools are pathological, such as those that are spongy, semi-solid, liquid, abnormally hard, or of small caliber.

2. *Color.*—The color of normal fæces may range from yellow to brown. Black stools are caused by the presence of blood, or medicaments such as iron and bismuth. The light-gray stool is indicative of liver-affections; and the green, of acute enteritis.

3. *Consistency*.—The normal consistency of the stool is about that of butter at room-temperature. Fæces that are hard are most frequently observed in atonic constipation while they may be still harder in spastic constipation. The stools are doughy, spongy, or cream-like in mild cases of intestinal catarrh; semi-fluid to fluid, in severe cases; and finally of watery consistency, in Asiatic cholera.

4. *Food-Remnants*.—Food-remnants are frequently recognizable with the naked eye; for instance, bits of potato or other vegetables, or of whortleberries, mushrooms, etc., a few of which are less significant in diagnosis than undigested remnants of meat, connective tissue, and fats; since vegetable remnants are found in every normal stool, while the presence of large amounts of meat and connective tissue is indicative of disturbed gastric digestion.

5. *Pathological Constituents*.—The pathological constituents which are recognizable with the naked eye are blood, pus, and mucus.

The blood varies in color from bright red to tarry black. If the former, it is usually free and not mixed with the fæces; when of the latter color, its origin is in the upper portion of the gastro-intestinal tract, and it is found closely admixed with the stool. Red blood-cells are microscopically demonstrable only in the former instance, when the blood is free and of a red color. In the latter instance, the presence of blood must be chemically proven.

Bright red blood in the stool almost always comes from ruptured hemorrhoids or from a rectal polyp. When blood and pus are found in the stool, even in teaspoonful amounts, a suspicion should always be aroused in the mind of the physician that a malignant disease of the rectum is present. Carcinomata of the rectum are often treated for weeks as hemorrhoids.

Pus.—In tuberculosis and dysentery of the colon, and malignant growths of the colon and rectum, pus generally occurs in connection with blood.

To best detect pus, the examiner should spread the entire stool as thinly as possible upon a smooth, black surface and look for small gray points with the aid of the dissecting

needle or a wire loop; the specimen should then be examined microscopically for leucocytes, tubercular bacilli, etc.

Mucus.—Small amounts of mucus are present on the surface of the normal stool. In chronic catarrh of the colon, mucus surrounds the entire stool like a membrane. A light-brown mucus is often evacuated, together with semi-solid, unformed dejections, which should be considered as an objective sign of severe enteritis.

FIG. 39.



Normal stool. *M.*, muscle-fibres; *H.*, plant-hairs; *F.*, fat-globules; *B. Z.*, pear-cells; *Sp.*, plant-spirals; *P. Z.*, plant-cells; *P.*, Phosphate.

The membranous form of mucus is always from the colon; and it may be said that the more typical the membrane, the lower down in the colon is its origin. Mucus from the ascending colon scarcely ever exceeds the size of a pea. When mucus is first evacuated, it generally has the appearance of an amorphous, clumpy mass, but its membranous character will be revealed if it is separated with forceps or a needle and shaken out in water.

Mucus from the small intestine is not seen macroscopically.

In catarrh of the small intestine, the stools look as if they had been varnished, if they have passed rapidly through the colon without undergoing changes in that portion of the gut. In such a case, the superficial surface of the stool appears

smooth and reflective after it has stood for some time. In this affection, the stool is often soft, porous and sponge-like.

For further details, see the chapter on Intestinal Catarrh.

6. *Concrements and Foreign Bodies.*—The stool should always be examined for these in a case of gall-stone colic. The entire stool should be stirred with warm water and washed through a fine sieve, by which procedure gall-stones are usually recognized. The Boas stool-sieve may be used to good advantage for this purpose.

FIG. 40.



Stool containing fat and bismuth. *M.* muscle-fibres; *N.* fat-needles; *F.* fat-droplets; *B.* bismuth-crystals; *O.K.* calcium oxalate crystals; *Ka.* calcium salts.

The physician must always guard against confusing vegetable-remnants, and especially fruit-seeds, with gall-stones. The suspected bodies should be placed in a watch-glass containing a solution of liquor potassæ, which softens the vegetable tissue, so that when they are crushed between two cover-glasses they may be easily recognized with a microscope. On several occasions, poppy seeds have been brought to my clinic by patients who thought them to be biliary concretions.

Often the débris formed from pears very closely simulates gall-stones, since the pear-tissue contains hard, cellular material which may form the so-called intestinal concretions, whose retention might produce colic.

It would be impossible to enumerate the various foreign bodies,—such as coins, buttons, teeth, pieces of bone, fruit-seeds, etc.,—that are sometimes found in the stool.

7. *Parasites*.—Tapeworm, *Ascaris lumbricoides*, etc., cannot escape the careful macroscopical examination of the stool.

b. MICROSCOPICAL EXAMINATION OF THE STOOL.—**Technic.**—For a proper examination of the stool, at least three preparations should be made:

FIG. 41.



Enteritis. *M*, muscle-fibres; *H*, yeast-cells; *E*, epithelium; *Cl*, clostridia.

1. Dry.
2. With the addition of a little water or acetic acid.
3. With the addition of Lugol's solution.

1. A portion of the stool, about the size of a half a pea, should be pressed as flat as possible between two cover-glasses until it becomes transparent, and should then be examined with the low power of the microscope.

By this method, the physician will inform himself concerning the digestion of meat, fats, and connective tissue. Muscle-fibres are easily recognized by their yellow color and regular surface. They are present in every normal stool and should not be considered as pathological, unless almost the entire field of the microscope is covered with them, or unless

large masses of the muscle-fibres appear grouped together. In such a case, the physician may assume that the gastric digestion,—one of the chief functions of which is to dissolve connective tissue,—is poor.

If a large number of isolated muscle-fibres are present in the microscopical field, it should be inferred that digestion in the small intestine is not normal.

FIG. 42.



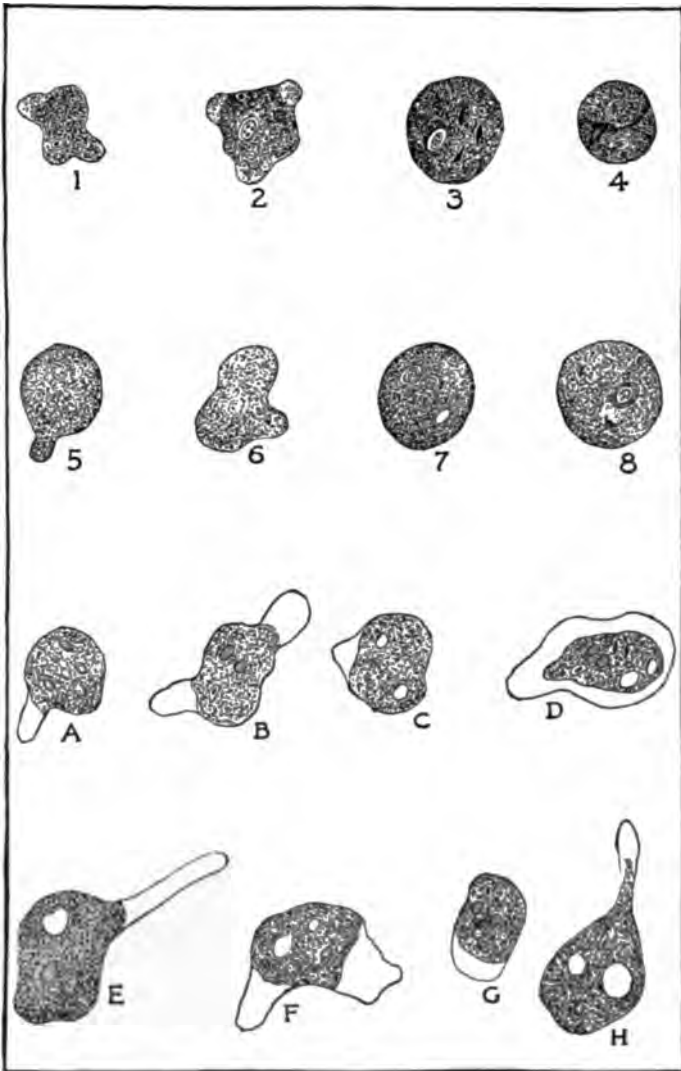
T. E., *Tænia solium*; *Ch*, Charcot-Leyden crystals; *M*, muscle-fibres; *F*, fat-droplets; *A. E.*, eggs of ascarides; *H*, yeast; *E*, epithelium; *N*, fat-needles.

An intense yellowish-green color of meat-fibres is indicative of catarrh of the ileum.

In normal conditions, only a few fat-droplets will be found in the stool. But in cases in which there is catarrh of the large or of the small intestine, disease of the pancreas or any pathological conditions in which there is an obstruction of the *ductus choledochus* which, because of the absence of bile, gives a gray-white color to the stool,—the entire field of the microscope may be full of fatty-acid crystals, needles, droplets, and even clumps of fat.

Connective-tissue fibres are recognized by their shagreened surface and their tortuosity. They are often much swollen. An enormous number is indicative of the diminution or entire absence of hydrochloric acid in the gastric juice.

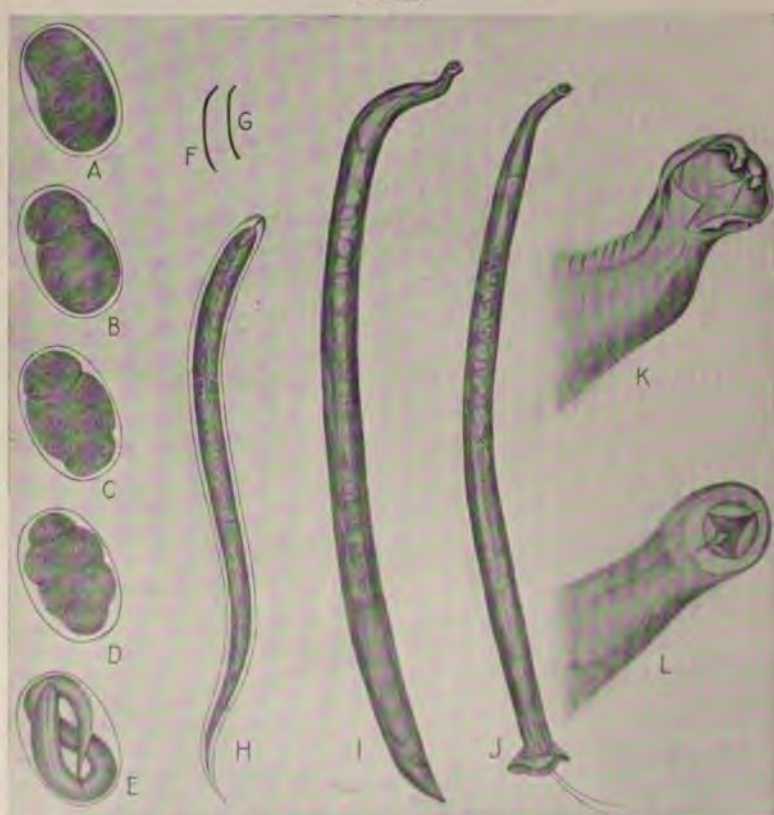
FIG. 42a.



1 to 8, *Entamoeba coli*. Note well-marked nuclei with heavy nuclear membrane. Lack of distinction between the ectoplasm and endoplasm. The pseudopodia, composed of ectoplasm, resemble very closely in structure the endoplasm; 3 and 8 show crystals; 4, primary division; 7 shows a small vacuole and nucleus.

[A to H, *Entamoeba histolytica*. A shows *Entamoeba histolytica* containing five red blood-corpuscles; B shows small nucleus with thin membrane and two red blood-corpuscles; A, C, E, F, and H show absence of nuclei; vacuoles and red blood-corpuscles present. [Drawn by Dr. J. R. Cowan.]

FIG. 42b.



[A, B, C, hook-worm eggs as found in stools; D, E, later stages of development; H, embryo; F, G, male and female hook-worm, considerably larger than their natural size; I, J, same, enlarged; K, head of *Anchylostoma duodenale*. L, head of *Uncinaria americana*. Specimens obtained from one of five cases of hook-worm disease observed by Dr. Joseph M. King, of Los Angeles. [Drawings made by Mrs. King.]

In this preparation, the eggs of intestinal parasites are also recognized, especially those of tapeworms, ascarides, and the trichocephalus.

The accompanying cuts will illustrate the above findings.

2. A portion of the fæces, about the size of the head of a pin, should be mixed with a drop of normal sodium chloride solution and examined with an objective of higher magnification. In this specimen, the examiner will likewise observe the degree of digestion of meat-fibre, fat, and connective tissue, and will also note the presence of pus, amœbæ, infusoria, Charcot-Leyden crystals, epithelia, and red and white blood-corpuscles.

In stools of fluid or semi-fluid consistency, the physician should examine the specimen for mucus, without the addition of a sodium chloride solution or acetic acid.

Charcot-Leyden crystals in the mucus are quite typical of helminthiasis.

An enormous amount of epithelia is characteristic of chronic intestinal catarrh. If a severe inflammatory condition of the intestinal mucosa is present, numerous white blood-corpuscles, in addition to epithelia, will be found.

3. A portion of the fæces about the size of a pin-head should be mixed with a drop of Lugol's solution. Under high magnification, the examiner should determine whether free starch-corpuscles and clostridia,—which are both colored blue by the iodine in Lugol's solution,—are present in profuse numbers.

Free starch-cells are always a sign of a catarrhal condition of the small intestine. Normally, starch is only found enclosed in cellulose. Clostridia are always a sign of fermentation; the more cellulose the food contains, the more profuse is the development of clostridia, which give a sour odor to the stool. When they are present therefore in large numbers, the examiner may assume a pathological condition of the small intestine.

In many cases, he should make a fourth or a fifth preparation from parts of the stool presenting some unusual appearance; for example, bloody or purulent portions (see Figs. 40 and 41).

Frequently it happens that crystals,—such as triple phosphates, calcium oxalates, etc.,—as well as large numbers of bacteria, and the most diverse kinds of plant-cells, which

are easily recognized by the thick, glistening membrane, are observed under the microscope. In dilatation of the stomach, sarcinæ are also found in the fæces, which are, consequently, of especial importance in the diagnosis.

The microscopical examination of the fæces allows us, therefore, to form conclusions concerning the following:

1. The digestion of meat, fat, connective tissue and starch.
2. The presence of blood, mucus, and pus.
3. The presence of concretions, crystals, ova of the various parasites, and Charcot-Leyden crystals.

The microscopical examination will lead to a correct diagnosis only in connection with the macroscopical findings.

c. CHEMICAL EXAMINATION.—1. *Test for Occult Blood.*—A positive reaction to this test is of value only when very few meat-fibres are present in the stool.

To obtain a significantly positive result, it is necessary that, for three days before making the test, the patient be kept on a diet which does not contain blood or iron.

Either the Aloin-test may be made, which has been described in Part I; or the more simple and sensitive test,—recently introduced by O. and R. Adler, and modified by Schlesinger and Holst,—may be made in the following manner:

I. Dissolve a knifepoint of pure benzidin in two or three cubic centimetres of glacial acetic acid.

II. Add 2 c.c. of H_2O_2 to ten or twelve drops of "I."

III. Boil a portion of the fæces the size of a pea, which has been thoroughly mixed with five or six cubic centimetres of water, in a test-tube closed with a wad of cotton.

IV. Add two or three drops of the solution of boiled fæces to "II." If blood is present, a green or bluish reaction will occur in from one to three minutes.

2. *Schmidt's Bilirubin-Test.*—A portion of fæces about the size of a bean should be placed in a watch-crystal containing a 5 per cent. sublimate solution, and allowed to stand for twenty-four hours. At the end of this time, portions of the stool containing bilirubin will have become green, while those containing hydro-bilirubin will be yellowish-red. Positive reactions of either are indicative of a catarrhal condition of the small intestine.

CLOSING REMARKS AND DIRECTIONS

Patients whose bowels move normally may bring the stool to the physician's office in a closed glass receptacle. Constipated patients should produce an evacuation of the stool by using a soap suppository, the stool being left in a vessel half-filled with water, for the inspection of the physician. In office-practice, the stool may be conveniently obtained and preserved by the use of the apparatus previously described.

PRIMARY ORGANIC DISEASE OF THE INTESTINE

Acute Enteritis.

General Remarks.—In considering acute intestinal catarrh, which occurs with great frequency, we shall discuss the subject as briefly as possible, since nearly every physician is familiar with the symptoms and treatment. It is only the severe, chronic cases that come to the physician for treatment, as the milder and more acute ones are usually relieved by home remedies.

Acute enteritis becomes serious, as a rule, only in children, or in old and decrepit, or arteriosclerotic, persons. It occurs epidemically during the summer months, as is well known.

The entire intestinal tract may become affected or only individual portions of it, such as the duodenum and jejunum, when the inflammatory process extends from the stomach, and when the causative agent passes through the stomach without producing inflammation of its mucosa, as is the case with certain poisons that are soluble only in the alkaline intestinal juice. The mucosa may be so severely inflamed that ulceration occurs, the stools then becoming bloody in character.

Etiology.—The causes of acute enteritis, in the order of their frequency, are the following:

Indigestion, infections, intoxications, and exposure to cold.

Foods which are especially injurious in acute enteritis are raw fruit, ice-cold beer, fresh cucumbers, sour potatoes, and meat-dishes, especially in summer; while overloading the stomach with fancy dishes, such as goose, liver, patties, ragouts, etc., is the most frequent causal factor in the winter.

Besides the intoxications resulting from attempted suicide, murder, criminal abortions, etc., there should be mentioned, as causative factors, vermifuge remedies and the occupation-poisons, such as copper, lead, etc.

Exposure to cold causes acute catarrh of the intestine, especially when the resistance of the mucosa has been weakened by previous catarrhs.

Symptomatology.—The chief symptom is diarrhœa, which occurs with almost explosive suddenness and with colic. It is not rare for twenty stools to be passed in 24 hours, although in some cases constipation results from spasm of the colon,—first, when only the small intestine is affected; and second, when the offending material,—for instance, undigested remnants of food, such as cucumbers, sour potatoes, etc.,—lodges in the folds of the mucous membrane of the colon, producing spasm, accompanied by severe pain from the resulting irritation.

Colic,—that is, gnawing, boring, contracting pain,—begins in the mesogastrium, radiates in all directions, and disappears with a movement of the bowels or the escape of gas; it recurs repeatedly, and accompanies nearly every case of enterocolitis.

Fever occurs, as a rule, only in infectious enterocolitis. Indeed, it is characteristic of this form, and will amount to 40° C., [104° Fahr.] or more. The other causative agents produce either no fever at all, or at most 38.5° C. [101° Fahr.]. Vomiting and nausea exist only when the stomach also is involved.

The general condition of the patient, even in moderately severe enteritis, is poor. In very severe cases, there are great weakness and lassitude, caused by the violent pain.

The spleen is generally swollen and sensitive to pressure, especially in infectious enterocolitis. Indeed, the whole abdomen is sensitive to pressure, especially over the course of the transverse colon. Icterus is often an accompanying or subsequent symptom. The stool is of a semi-solid or fluid consistency, and mixed with large shreds of mucus which are often tinged with blood. Old, hard scybala may also be

passed. The odor of the stool is at first very penetrating or acid, later it is stale and flat. The color may be brown, green, yellow or light gray. Late in the affection, mucus only is passed.

Microscopic examination shows the presence of epithelia and in severe cases of red and white blood-corpuscles, remnants of food, bacteria, etc.

Diagnosis.—The diagnosis is made from the sudden onset of the above-mentioned symptoms,—namely, diarrhœa, fever, colic, mucus and blood in the stools,—and by the establishment of an etiological factor.

Differential Diagnosis.—Typhoid fever, *crises enteriques*, and acute yellow atrophy of the liver are the most common diseases to be differentiated from acute enterocolitis.

There are cases in which only a prolonged observation of the disease will differentiate enterocolitis from typhoid fever, although the roseolæ, splenic tumor, and the general condition will usually protect the physician against mistake.

Treatment.—The tasks of the physician are largely limited to protecting the mucosa of the intestine from further injury as much as possible, and to controlling the pain and diarrhœa.

Rest in bed is essential as long as there is fever. In cases in which the latter is high,—39° to 40° C.,—cold applications should be used on the abdomen. In moderate fever,—38° to 38.5°,—the Priessnitz compresses are indicated; while febrile cases are best relieved by the application of moist, hot compresses wrung out of chamomile infusion, etc.

The dietetic treatment for the first two or three days is the same as in acute gastritis,—peppermint tea, black tea with cognac, gruels, soups, cocoa cooked in water or red wine, and the gradual institution of rice and cereals added to pigeon or chicken broths, and finally chicken, veal, white bread, etc.

Meats, raw fruits, cold drinks and vegetables should be forbidden for some time.

Medicinal Treatment.—Belladonna should be used for the suppression of the cramp-like pain; and styptics for the control of the diarrhœa, as in the following prescriptions:

1. ℞ Extracti belladonnæ foliorum, gr. $\frac{1}{2}$ — $\frac{1}{4}$ 0.02-0.03
Sig.—Three or four times daily.
2. ℞ Extracti belladonnæ foliorum, gr. $\frac{1}{2}$ 0.02
Tannocol, gr. xv 1.0
Sig.—One powder three or four times daily.
3. ℞ Tannalbin, tannigen or tannoform, gr. xv 1.0
Sig.—Three or four times daily.

Opium and its preparations should be strictly forbidden, because they paralyze the peristalsis of the bowels, and thereby prevent the evacuation of the *materia peccans*. In contrast to the effect of opium, belladonna relaxes the painful contraction of the intestine, while leaving the peristalsis undisturbed.

I administer a laxative only when the fever is higher than 38.5° C., and has continued more than three days. In children or adults with good teeth, I prefer to give 0.03 to 0.2 [$\frac{1}{2}$ gr. to 3 gr.] calomel three times, at about one-hour intervals, or until the desired effect is produced. In other cases, I administer either a teaspoonful of castor oil or a heaping teaspoonful of Carlsbad salts.

In cases in which there is no fever, I do not prescribe a laxative unless the cramp-like pain does not disappear. Otherwise, I prescribe muriatic acid mixture.

Constipating remedies should not be given unless the fever has entirely disappeared, or is only slight, since otherwise the inflammatory process and the clinical symptoms would be prolonged.

Prophylaxis.—Individuals who seem to have a predisposition to enterocolitis should be warned against raw fruit, cold beer, cucumbers, sweets, over-eating, etc.

Prognosis.—The prognosis of the disease is generally good, although there always remains a certain weakness of the mucous membrane of the intestine.

It should finally be mentioned that repeated attacks of acute catarrh often lead to chronic enterocolitis.

Chronic Catarrh of the Intestine

(Chronic Enterocolitis)

General Remarks.—Chronic catarrh of the intestine is very frequent in old people, and less so in children. Men are more often affected than women, because they are exposed to a greater number of injurious influences.

The disease may extend over several decades. Indeed, severe cases are never cured in the anatomical sense; and several years of the most careful treatment are required to produce even a clinical cure.

As a general thing, the beginning of the affection is generally entirely neglected, so that the disease gradually becomes worse until finally, on account of the suffering due to constant pain, flatus, and diarrhœa, the patient consults a physician.

Etiology.—Primary intestinal catarrh is caused by direct injury to the intestinal mucous membrane, while secondary catarrh is caused by passive congestion brought on by venous stasis in the greater or the lesser circulatory systems, or by the continuity of inflammation from neighboring organs.

Primary catarrhal enterocolitis arises from indigestion, infections,—such as tuberculosis, dysentery, etc.,—intoxications, exposure to cold, misuse of laxatives, entozoa, habitual constipation, and mechanical irritation from scybala.

Secondary enterocolitis results from cardiac diseases, affections of the kidneys, sclerosis of the liver, and from ulceration, tumors, and stenosis of the intestine.

The most common cause of chronic enterocolitis is frequent indigestion, in consequence of which chronic catarrh of the stomach and of the intestinal tract both occur.

As a rule, chronic gastritis precedes chronic enterocolitis. It very frequently happens that catarrh of the intestinal tract is secondary to atrophy of the gastric glands, the so-called *achylia gastrica*, when the food enters the duodenum non-chymified, and this in the course of years produces chronic inflammation.

Naturally, both affections may arise at the same time and from the same cause,—as, for instance, from the excessive use of alcohol. For this reason, the gastric juice should be examined in every case of chronic enterocolitis.

Symptomatology.—The subjective symptoms are loss of appetite, * nausea, feeling of fulness, and distention of the entire abdomen which, in contrast to the same symptoms in gastric diseases, appear early in the morning, are of only short duration, and are, except for flatuous foods, independent of eating.

Other symptoms more characteristic of this disease are flatulence, colic or the so-called mesogastralgia, and frequent tenesmus. Lassitude, weakness, lack of desire to work, and nervous irritability are present in enteritis.

Objective Symptoms.—By palpation and an accurate examination of the stools, the physician will find the most typical signs and symptoms.

The whole abdomen is frequently distended and sensitive to pressure, especially over the entire course of the colon, whose sensitiveness in a localized inflammation of the large intestine is characteristic.

Enlargement of the spleen is sometimes found in a catarrh which has existed for years.

The condition of the stools depends upon the intensity and the localization of the inflammatory process of the intestinal tract.

In mild cases, the stools are of firm consistency, have a small caliber, and are surrounded with membranous mucus.

In cases of moderate severity, their condition is variable,—solid and liquid stools alternating with each other, or with those of a pulpy consistency.

In the more severe cases, the stools are persistently semi-solid, semi-fluid, or liquid, and are mixed with large shreds of mucus. The superficial surface of the stools of pulpy consistency is reflective, having a varnished appearance.

* This does not occur in some cases; for instance, in gormands suffering from intestinal catarrh, the appetite is often excellent.

When ulcerations or erosions are associated with catarrhal inflammation, the stools are often mixed with bloody, purulent mucus.

There are cases of enterocolitis in which the clinical course is characterized by periods of complete constipation alternating with severe diarrhœa.

Further details have been given in a previous chapter on Macroscopical Examination of the Stools.

Diagnosis.—The diagnosis of catarrh of the intestine is, in general, very easy. The statements of the patients often suffice as to whether they have a diarrhœa which is persistent or frequently recurrent, whether it occurs only after eating certain foods, whether mucus is present in the stools, and whether or not they suffer from colic.

The Localization of the Lesion.—This is often very difficult, and in many cases quite impossible, although the following suggestions will generally be found applicable in the diagnosis.

Inflammation limited to the small intestine causes loss of appetite, borborygmus, a gnawing sensation in the middle of the abdomen, meteorism, or flatulence; while actual pain and diarrhœa occur but rarely. The stools contain much fat and sometimes free starch-cells and many muscle-fibres, while mucus is scarcely ever recognized, even with the microscope. The condition is aggravated by the use of flatuous foods, cold drinks, raw fruit, and by overloading the stomach.

The diagnosis of catarrh of the ileum is arrived at largely from accurate statements made by the patient in the anamnesis. The stools are formed, are of soft consistency, and the bowels are regular.

Catarrh limited to the colon runs a clinical course, as a rule, with constipation, or a sluggish condition of the bowels with the evacuation of spastic stools, unless an ulcerative process is present. Only in severe cases are the stools of large caliber and of a pulpy consistency, when they are surrounded by membranous mucus, which is frequently not recognized until the stool has been placed in a vessel of warm water. In the event that the stool is brought to the physician in a dry

glass receptacle, the mucus may no longer be recognizable, because of its having become dry. If constipation is present, it will be necessary to insert a soap-suppository in the rectum of the patient in order to obtain the stool for examination.

Catarrh of the entire intestinal tract, that is, of the large and small intestine, almost always runs a clinical course with diarrhœa. The more extensive and severe the inflammatory process, the more severe is the diarrhœa,—there being often from two to six stools in twenty-four hours. If the dejections are still more frequent, the clinician should think of ulceration of the intestine, and should direct the examination of the patient accordingly. In chronic cases, a movement of the bowels is especially frequent early in the morning, probably caused by the fermentation of the fœces during the night. Mucus in large or moderate amounts is almost always present in the dejections, and in fluid stools is detected in pea-sized portions, and may be removed with a teasing-needle or forceps and shaken out in water, when it is easily recognized.

The so-called ileocæcal catarrh, which at the same time attacks the greater part of the ascending colon, runs a clinical course with the above-mentioned symptoms and with persistent sluggishness of the bowels, sometimes complete constipation, or profuse diarrhœa accompanied by severe pain. Objectively, the examiner will find gurgling murmurs in the ileocæcal region.

Catarrh of the large intestine almost invariably runs a clinical course with cramp-like pain, mucus in the stools, and "wind-colic."

In general work, the physician must be satisfied with the determination as to whether slight, moderate, or very severe catarrh of the intestine is present, because an exact localization of the lesion is often possible only after prolonged clinical observation and a microscopical and chemical examination of the fœces.

Differential Diagnosis.—Nervous diarrhœa is almost the only affection that might be confused with chronic enterocolitis. This is extremely rare, however, and can only be

diagnosed: first, when the dejections contain no macroscopically visible mucus; and second, when diarrhœa occurs invariably after any excitement. In almost every case of nervous diarrhœa, there exists a latent catarrhal condition as the basis of the trouble, which fact should always be kept in mind in the treatment, because many so-called nervous diarrhœas are cured only by anti-catarrhal therapy.

Ulcers and erosions of the mucous membrane may be differentiated from chronic enterocolitis by the absence of blood and pus in the dejections of the latter.

In every instance, the etiological factor should be ascertained if possible, and the following three points should be given especial attention:

1. Whether the gastric secretion is normal; or whether there is present, for instance, achylia or hypersecretion.
2. Whether the catarrhal condition is due to venous congestion.
3. Whether there is a malignant affection accompanying the enterocolitis.

Treatment.—The first task in the therapy is, naturally, the removal of all etiological factors, so far as possible, and the careful study of the functions of the heart, liver, and stomach. An examination of the contents of the stomach must be made, when possible, in every case of chronic enterocolitis. Otherwise it often happens that for months the therapeutic measures will produce no result. Concerning this point, the reader is referred to the section on Chronic Gastritis.

In the following discussion, I have divided cases of chronic enterocolitis into three groups:

1. Mild cases, with either constipation or normal stool, and with many disturbances of the small intestine.
2. Moderately severe cases, with alternating constipation and diarrhœa.
3. Severe cases, with persistent diarrhœa.

Hygienic and Dietetic Treatment.—In all forms of intestinal catarrh, any sudden exposure to cold and chilling of the abdomen, feet, or entire body should be avoided. The patient should wear woolen underclothing and a woolen abdominal bandage during the day and a Priessnitz compress at night. Workingmen should avoid, as much as possible, occupations which give rise to intestinal catarrh, especially those in which they come into frequent contact with arsenic, lead, copper or mercury. Only a limited amount of smoking should be allowed.

The diet in chronic enterocolitis must be bland, non-irritating and easy of absorption; and in severe cases, it should be, in addition to the above, astringent in character, and consist of the following: Tea with one tablespoonful of cream, red wine, cocoa or blackberry wine; cereal soups, gruels, rice, sago, noodles, macaroni; the broth of white meats, fresh soft eggs, toasted white bread, Leibniz's cakes, butter; and milk diluted one-half with cereal soups or cocoa, but never undiluted.

In cases of moderate severity, the patients may be allowed, in addition to the above, light vegetables,—such as spinach, carrots, cauliflower, asparagus, peas, potato purées, and red meats cooked in butter or broiled.

In light cases, the dietary may include whole-wheat bread, stewed fruit-sauces, meats, fish, and the like. In this form, it is unnecessary to adhere strictly to any special dietary. Only the following foods are forbidden: cold drinks, strong coffee, plain milk, sour milk, all acid foods, raw fruits,—such as sweet oranges, dates, figs, and apples—legumes, cheese, cabbage, smoked meats and fish, fat meats, fresh bread, and pastries. Special diet-tables will be found in the Appendix.

The mechanical treatment consists in warm or hot injections.

In severe cases, associated with diarrhœa, in which treatment per mouth is not successful in controlling the bowels, I generally prescribe the following enema, night and morning:

One teaspoonful of tannin, 1 tablespoonful of starch and 1 litre of water 32° to 33° R. [104°–106° F.]; or a solution

of silver nitrate, 0.5 to 1.0 [gr. viiss to xv] to 1000, or one tablespoonful of the extract of blackberry to $\frac{1}{4}$ litre of water.

Since many astringent preparations should be employed with considerable caution, their use is limited to the clinic; but the tannin-starch enema may be prescribed without hesitation for home treatment.

In moderate cases, an injection of one litre of hot Carlsbad water or a litre of hot water containing a teaspoonful of the artificial Carlsbad salts, should be given every morning.

Under this treatment, the cramp-like pain and the diarrhœa disappear with surprising quickness in a great number of cases, because of the soothing effect upon the irritated membrane.

In mild cases, enemata are unnecessary.

Massage is contraindicated in all cases. However, a very gentle stroking massage may be allowed if there is neurasthenia.

Balneological Treatment.—Balneological treatment depends first upon the condition of the stomach; and second, upon the intensity of the enterocolitis.

If there is a deficiency of gastric secretions, the sodium chloride waters of Homburg, Wiesbaden, or Kissingen [Champion and Hawthorn Springs, Saratoga, N. Y., and Blue Lick Springs, Kentucky], are indicated. In mild cases, when there is either a normal or a sluggish condition of the bowels, the above-mentioned waters should be given lukewarm; in moderate cases, at the temperature of the body; and in severe cases, as hot as possible, but in very small doses.

On the other hand, when there is normal acidity of the gastric juice, or hyperchlorhydria,—as in acid gastritis,—the waters of Carlsbad, Neuenahr, Franzensbad, Marienbad, or Vichy [Tate Epsom Water, Tennessee; French Lick Springs, Indiana; Buffalo Lithia Water, Virginia; Crab Orchard, Kentucky], should be prescribed in the same quantities and at the same temperature as described above. Well nourished individuals should be sent to Carlsbad, while anæmic and badly-nourished patients should be given the milder Vichy water.

Two or three glasses of the water should be drunk each day,—two glasses on the empty stomach early in the morning, and one glass before the evening meal. The spring-water salts, or the artificially prepared salts dissolved in plain water, may be used as above indicated, by patients who are travelling or those who cannot afford the luxury of a visit to one of these watering places.

In enterocolitis associated with constipation, either $\frac{3}{4}$ of a teaspoonful of Carlsbad salts or $1\frac{1}{2}$ teaspoonfuls of Vichy salts should be dissolved in $\frac{1}{4}$ litre of water and taken on the empty stomach early in the morning.

These mineral water treatments should be continued from four to six weeks and begun again after an intermission of two or three months, and so on for several consecutive years; for it is impossible to produce a complete cure in one course of treatment when an intestinal catarrh has existed for several years.

Medicinal Treatment.—The control of pain and the regulation of the bowels are the indications for medicinal treatment. I prescribe astringents only in cases of persistent diarrhoea. The most suitable of such preparations are tannin and bismuth although tannocol, tannalbin, tannoforn, and tannigen have given very good results in doses of a knife-point to one-half teaspoonful three times daily. Bismuth subnitrate, bitannate of bismuth, bismutose, and nosophen may also be useful, while dermatol is particularly suitable in tuberculosis of the intestine. For cases in which the stools are persistently of a pulpy, semi-solid consistency with marked fermentation, calcium salicylate combined with bismuth are the most effective. Good results are obtained from the use of the following prescriptions:

1. ℞ Calcii carbonatis,
Calcii phosphatis, āā, ʒvi 25.0
Bismuthi salicylatis, gr. lxxx 5.0

M. Sig.—One teaspoonful after meals.

2. ℞ Tannocol,
or Tannalbin,
or Tannigen,
or Bismuthi subnitratiss, gr. viiiss-xv 0.5-1.0
- Sig.—T.i.d.

The most efficient sedative and anodyne remedies are belladonna, menthol, valerian, and the carminatives. I administer them in the following prescriptions:

1. ℞ Extracti belladonnæ foliorum, gr. vii 0.5
M. ft. pil. No. xxx. Sig.—One pill after meals, t.i.d.
2. ℞ Menthol, gr. iss 0.1
Ft. pil. i. Sig.—T.i.d.
3. ℞ Spiritus menthæ piperitæ, gtt. lxxx 5.0
Tincturæ belladonnæ foliorum, ℥iiss 10.0
Tincturæ valerianæ, ℥iv 15.0
M. Sig.—Thirty drops in a cup of hot water or fennel tea, t.i.d.
4. ℞ Extracti belladonnæ foliorum, gr. ivss 0.3
Menthol, gr. xv 1.0
Tincturæ valerianæ, q.s. ad ℥i 30.0
M. Sig.—Twenty-five drops t.i.d.

The treatment of chronic intestinal catarrh, because of its diversity of symptoms, requires much experience and the art of individualizing. The physician must not change from one line of treatment to another merely if there is no apparent improvement in two or three weeks; for instance, having given the mineral water for this length of time, he should not change to astringents, nor *vice versa*, as the first line of treatment has not been given a sufficiently thorough trial.

Prognosis and Course.—The treatment of chronic intestinal catarrh should extend over several years; indeed many patients must adhere strictly to a suitable dietary for the rest of their lives if they are to remain free from intestinal disturbances, as relapses are likely to occur after the slightest error in diet or exposure to cold. As a rule, improvement is only very gradual.

All patients suffering from chronic enteritis become nervous and hypochondriacal, which further modifies the prognosis and complicates the course of the disease.

APPENDIX

1. *Membranous Enteritis.*—Membranous catarrh of the colon, which is still designated by some authors as "myxoneurosis intestinalis," is in reality a simple, chronic, reparable,

superficial catarrh of the colon which accompanies chronic constipation, as will be shown in its clinical description.

Since constipation is associated with neurasthenia in a large majority of cases, especially women, it follows therefore that membranous enteritis is also met with in hysterical and neurasthenic patients.

Membranous enteritis disappears as soon as constipation is cured, which fact is the best refutation of the theory of its nervous origin, since notwithstanding the cure of constipation, the hysteria and neurasthenia often become still more aggravated and persistent.

Mucous colic, or the *colica mucosa* of Nothnagel, is an acute exacerbation of chronic membranous colitis. For further details, see the subsequent chapter on Chronic Constipation.

2. *Meteorism and Flatulence* (Intestinal Flatulent Dyspepsia).—By meteorism, we designate the acute abnormal distention of the abdomen; by flatulence, the chronic abnormal fermentation and evacuation of gas. Although both are often observed in nervous, and especially in hysterical, individuals, they are,—with the exception of obstruction of the bowels,—symptoms of catarrh of the intestine and not of a nervous affection.

The escape of gas from the bowels is, in itself, normal; we speak of a pathological flatulence only when the patient suffers from discomfort, such as cutting pains, disagreeable distention, and fulness in the abdomen,—especially when unable to expel the gas.

The retention of gas causes very unpleasant conditions and symptoms,—such as mental dulness, palpitation of heart, dyspnoea, mental depression, insomnia, irregularity of the appetite, inability to work, and griping pains in the abdomen, especially in the flexures of the colon.

Whether these symptoms are of a reflex nature,—caused by the irritation of the splanchnic nerve,—or are the result of a so-called auto-intoxication—as many authors assume—we shall not attempt to decide.

The cause of abnormal accumulation of gas in the intestine is the stagnation and fermentation of liquid fæces, which are mixed with a pathological secretion of the intestine,—namely, mucus.

In simple constipation without catarrh, such as atonic constipation, flatulence does not occur, nor in cases of severe catarrh with profuse diarrhoea, for the reason that in each of these affections there is present only one of the two conditions essential to the formation of gas,—namely, constipation and mucus. Flatulence, however, becomes a symptom in catarrhal conditions of the jejunum, ileum, and large intestine as soon as the colon becomes spastic, as is very frequently the case. The spasm of the colon does not permit the gas to escape at all, or only with great difficulty, and then associated with pain (*colica flatulenta*); and the same condition of the colon offers a hindrance to the expulsion of the fermenting liquid contents of the ileum into the colon, or out of the cæcum and ascending colon into the transverse portion of the large intestine.

The principal locations of fermentation and the accumulation of gas are the cæcum and the ascending colon, where the pathological fæces stagnate. If the fermenting contents of the bowels enter the transverse or the descending colon, they are either rapidly evacuated or become so thickened by absorption that the fermentation-process is entirely absent, or slight, for the reason that fermentation is present only to a minimum degree in dry fæces.

The well-known meteorism which occurs in hysterical patients arises from spasm of the colon and fermentation of the stagnating catarrhal and liquid contents of the ileum. It generally occurs in hysterical persons with enteroptosis, who have suffered for years from chronic constipation, in consequence of which, as we shall see in the chapter on this subject, secondary catarrh of the intestine has developed.

It is an indication of flatulent dyspepsia, when distention and pain are relieved by the escape of gas. It is often necessary to question the patient carefully concerning this point,

since he usually considers and explains the pain to be due to "stomach-cramps" and "pressure in the stomach."

Flatulence is especially marked after the use of flatulent foods, such as all kinds of fresh fruits, cabbage, legume coarse bread, pastry, fresh beer, and other cold drinks. The more cellulose the food contains, the more troublesome is the symptom.

That persons in normal health have more or less flatulence is, of course, well known, and has no especial significance.

Diagnosis.—The diagnosis of flatulence cannot be mistaken if the examiner will keep in mind, in a case of acute meteorism, the possibility of intestinal stenosis or obstruction.

Treatment.—The therapy of this symptom-complex, which is not sufficiently appreciated nor considered in the text-books on the subject,—is as difficult as it is important in general practice.

The first task of the physician should be to cure the chronic catarrh of the intestine, or rather to mitigate the symptoms, since he can scarcely hope for a complete cure of chronic enteritis; second, to limit the use of fermentable foods; third, to facilitate the removal of intestinal gas. These indications are best fulfilled by the following treatment:

1. It should be emphasized that, in cases where all the above indications are established, we invariably have to do with slight or only moderately severe enterocolitis,—and never the severe form of the disease; for in the latter, owing to persistent diarrhoea, there is no stasis of the intestinal contents, while in slight and moderately severe cases, enterocolitis is associated with constipation of a spastic nature or with alternating diarrhoea and constipation.

Anti-catarrhal mineral water should be prescribed in small doses of Carlsbad, Vichy, or Homburg waters, according to the principles set forth in a previous chapter; or the anti-fermentative remedies that are, at the same time, astringent to the mucous membrane of the intestine,—such as tannocol, tannalbin, menthol, resorcinol, vegetable char-

(one teaspoonful three times daily), or the calcium salts,—according to the following prescriptions:

1. ℞ Tannalbin, ℥iiss 10.0
Sig.—Four to eight grains, t.i.d.
2. ℞ Calcii carbonatis,
Calcii phosphatis, āā, ℥vi 25.0
M. Sig.—One teaspoonful, t.i.d.

When there is constipation, mineral water should be given at a temperature of 28° to 30° R. [96° to 100° Fahr.]. When there is a tendency to diarrhœa, it should be given hot. The use of the mineral water should be continued for several months. Warm abdominal poultices should be worn during the day and the Priessnitz compresses at night, as in enteritis.

2. The above-mentioned foods of a flatuous nature should be strictly forbidden, while the following are recommended: white bread, stale whole-wheat bread, meats (excepting goose, duck, fat pork, and ham), fresh eggs, spinach, cauliflower, asparagus, carrots, peas, rice, sago, noodles, macaroni, butter, baked potatoes (one or two tablespoonfuls), tea, weak coffee, cereal soups, red wine, sweet fruit-sauces, especially apple sauce, marmalades and lemonade.

Potatoes and milk should be allowed only in small quantities.

3. Carminative remedies which relax the spasm of the colon are always indicated. Belladonna and menthol in the following prescriptions are the most effective:

1. ℞ Menthol, gr. xlv 3.0
Extracti belladonnæ foliorum, gr. ivss 0.3
M. ft. pil. No. xxx. Sig.—One pill, t.i.d.
2. ℞ Extracti belladonnæ foliorum, gr. ii 0.15
Tannocol, ℥iiss 10.0
Sig.—One small knife-point, t.i.d.
3. ℞ Tincturæ belladonnæ foliorum, ℥iiss 10.0
Tincturæ valerianæ, ℥v 20.0
M. Sig.—Twenty-five drops in a cup of hot peppermint tea, t.i.d.

In mild cases, the following carminatives are sufficient:

1. ℞ Valerian,
Peppermint,
Fennel,
Caraway, āā, ℥vi 25.0

M. Sig.—One tablespoonful to a cup of hot water, morning and evening.

Eight or ten drops of the tincture of belladonna may be taken with the above.

CLINICAL CASES

1. *Catarrh of the Small Intestine*

CASE 1.—Geo. B., an officer 19 years old, had had an attack of diarrhoea six or seven weeks previous, at which time he was jaundiced for two weeks, since when he has suffered from distention and a feeling of fulness around the umbilicus, which was especially troublesome in the morning and was relieved by the escape of gas, which was sometimes painful. The appetite was poor. He defecated a soft, sausage-like stool once daily. In the evening the patient was often troubled by borborygmus and gnawing pains in the abdomen. All the above symptoms were increased after eating such foods as cabbage, baked potatoes, bread, etc. The patient was pale and emaciated. The liver was enlarged and the umbilical region was sensitive to pressure. After treatment with Carlsbad sprudel salts, a non-irritating diet and menthol combined with calumba, the patient made rapid improvement.

2. *Enterocolitis*

CASE 1.—Wm. F., a stone-mason 50 years old, had suffered for many years from profuse diarrhoea, pressure in the stomach after eating hard foods, and griping pains in the epigastric region. The test-breakfast was achylic,—total acidity being 6. The stools were of fluid consistency and contained much mucus. Improvement followed rest in bed, the use of hot poultices, a constipating diet, and the internal administration of belladonna, tannocol, hot teas, Rakoczy water and hydrochloric acid. Whenever the patient returned to his occupation, at which he worked half-naked, there was always a relapse.

CASE 2.—Bertha L., 38 years old, had for four or five years suffered from pressure in the stomach after eating hard foods, and for two or three years from diarrhoea. She had four or five stools daily, especially after taking flatuous foods and cold drinks. There was a catarrhal condition both apices. The stomach was completely achylic, and the stools contained much mucus. The patient was much improved by a constipating-diet and tannocol, which was continued for about six years.

CASE 3.—Emil R., a coachman 41 years old, had for two months suffered from pressure in the stomach after eating hard foods; and from gnawing sensations in the abdomen, and diarrhœa, after the use of flatuous foods. The total acidity of the test-meal was 8. After he was put on a constipating-diet, with hydrochloric acid, and Rakoczy water, all the symptoms disappeared. The rapid improvement in this case was due to the fact that it was of relatively short standing.

The above three cases were associated with *achylia gastrica*. The following are cases with hyperchlorhydria and acid gastritis.

CASE 4.—Carl K., a druggist 40 years old, had drunk a great deal of beer when a student at the university, since which time there had been a tendency toward diarrhœa and vomiting. For one year, the patient had suffered from pyrosis early in the morning, and also from vomiting, cramp-like pain, and diarrhœa. The stools had been of a semi-solid consistency for several years, and of a liquid consistency for the past year. The bowels moved from one to three times a day and the fœces were admixed with mucus, especially after the use of milk. The patient was not emaciated, since his appetite was good, and he ate heartily. The total acidity of the Boas-Ewald test-breakfast was 70. The physical examination was negative. Treatment consisted of small doses of hot Vichy water, and the use of tannocol. The patient was permanently cured.

CASE 5.—Siegmond T., a merchant 45 years old, stated that he had been nervous for four or five years, and had suffered every three or four months from burning sensations in the stomach and griping pain in the epigastrium (flatulent colic) for two or three weeks at a time. The stools were unformed and of a semi-solid consistency, or when formed were the size of the little finger and made up of short, sponge-like nodules of fecal matter, which the patient thought usually resulted from errors in diet and excessive smoking. At these times the patient was very nervous, and had a frequent desire to go to stool, but without results. After escape of gas from the intestine, the patient was always relieved of distress. Treatment at Carlsbad resulted in a cure.

Owing to the innumerable variations in the clinical history of chronic enterocolitis, it is impossible to introduce clinical cases illustrating the different types of the disease.

Ulceration of the Mucous Membrane of the Intestine

Ulcers of every form and extent,—varying from erosions no larger than a pin-head to deep ulcers the size of a dollar,—may occur anywhere in the intestinal tract, from the duodenum to the anus.

Etiology.—The etiology is widely diversified, there being peptic, catarrhal, decubital, toxic, embolic, uræmic, and malignant and infectious ulcers,—such as tubercular, syphilitic, typhoid, dysenteric, etc.

Peptic ulcers are found in the duodenum, and after gastro-enterostomy, in the jejunum. (See chapter on Gastric Ulcer.)

Catarrhal ulcers result from an increase in the severity of an inflammatory process of the mucosa, just as erosions and small ulcers of the gastric mucosa occur in acid gastritis.

Decubital ulcers arise from pressure of hard scybala, especially in the cæcum and in the hepatic and sigmoid flexures of the colon; also from pressure of neighboring organs, such as the uterus and gall-bladder, and from traumata.

Tubercular ulceration may involve the entire ileum and colon; and it seems to select, by preference, the cæcal region, where irregular tumors resembling neoplasms are found.

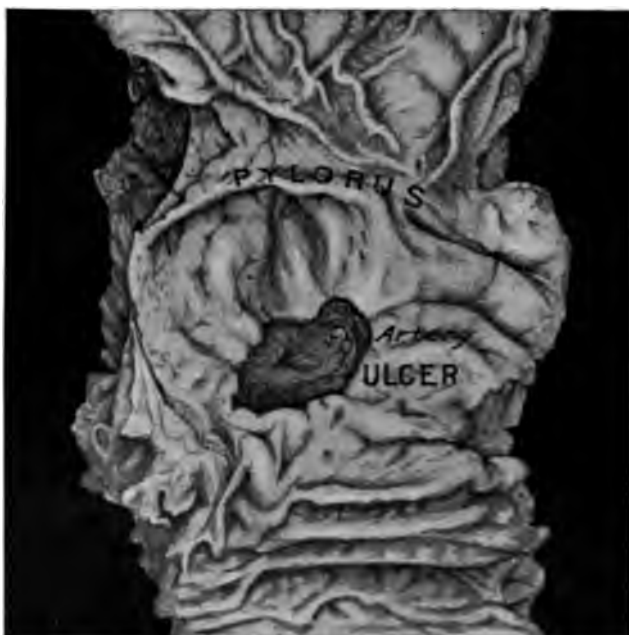
Diagnosis.—The diagnosis is usually made from the following symptoms, which I quote from Nothnagel: “Ulceration of the intestine often runs a course without symptoms. Even when a number are present, or when the ulcer is very large, the clinical symptoms are frequently not at all proportionate to the intensity of the anatomical changes. Significant signs . . . only are pus and fibrous tissue in the stools. A very important objective sign, also, is the presence of blood in the stool, although this must be interpreted with great caution. On the other hand, the number of stools passed, or the fact that they are of liquid consistency, will not aid in forming any direct conclusions as to the condition present.”

As a general thing, the physician should suspect intestinal ulceration if more than six or eight stools are passed in the twenty-four hours, and especially if the patient is suffering from tuberculosis of the lungs.

[This statement does not apply to ulceration of the duodenum, since constipation is often an early symptom in this condition, being indeed the symptom for which the patient frequently consults the physician.]

Further attention should be given to the symptomatology of duodenal ulcer.* The most frequent symptoms, according to Graham,† are pain, gas, vomiting, hyperacidity, hemorrhage, general weakness and nervous irritability. The presence of this combination of symptoms should always suggest the possibility of the presence of duodenal ulcer.

FIG. 43.



Ulcer of the duodenum. [Courtesy of Dr. Stanley P. Black, Hendryx Laboratory, University of California College of Medicine, Los Angeles Department.]

In the differential diagnosis, gall-bladder disease and peptic ulcer are most likely to lead to diagnostic confusion, for the reason that the symptoms of these affections so nearly parallel those of duodenal ulcer that the disease is most difficult of recognition.

In a general way, it may be said that the symptoms of duodenal ulcer simulate those of gastric ulcer very closely,—the pain being largely dependent upon food and occurring from

[* See chapter on ulcer of the stomach and duodenum, pp. 114-133.]

[† The Journal of the American Medical Association, February 9, 1907.]

two to five hours after meals, and being relieved temporarily by food, vomiting, bicarbonate of soda, or anything that neutralizes or removes the acid-acrid chyme from the ulcer-area.

Vomiting is less common in duodenal ulcer than in gastric ulcer, although when present it occurs most commonly from two to five hours after meals. It does not so frequently produce cessation of pain as in gastric ulcer.

Gas is a distressing symptom of duodenal ulcer. This symptom also is most marked from two to five hours after meals, and is relieved by the same factors that cause cessation of the pain.

The stomach-analysis furnishes about the same finding as does the gastric juice in ulcer of the stomach.

For the differential diagnosis between duodenal ulceration and gall-bladder disease, see editorial note, page 231

The physician should examine the stool microscopically or chemically for the presence of blood. It is necessary before performing the test for occult blood, to place the patient on a meat-free diet for two or three days, so that there can be no hæmoglobin introduced in the food, which might give rise to confusion in the diagnosis. I have found the alouin and benzidin tests for occult blood the most reliable (see pages 41 and 252).

If either of these tests gives a positive reaction, a gastric ulcer is excluded from the diagnosis, ulceration of the intestine may be considered as quite probable.

For the macroscopical and microscopical examination of the intestinal contents, the physician should spread out the entire stool over a black plate and examine its different parts with a magnifying glass for any small substances of a grayish or reddish color, the examination of which will often reveal large numbers of leucocytes and tubercular bacilli.

Pain, in ulceration of the intestine, may be entirely absent and there is less mucus than in simple enteritis.

If ulceration is associated with enterocolitis, involving a greater part of the intestinal mucosa, there will be severe diarrhœa, amounting to as many as twenty stools in 24 hours.

Prognosis.—The prognosis depends, naturally, upon the primary disease, and as a general rule, is not absolutely bad, since even in tubercular ulceration a clinical cure is often obtained,—frequently leaving, however, stenosis of the bowel at the scar of the ulcer.

Treatment.—The therapy is largely symptomatic. The diet should be the same as in the most severe forms of enteritis,—consisting, therefore, of cocoa, chocolate, rice, grits, blackberry wine, blueberry extract, cereal soups, etc.

Medicinally, 1.0 gram [gr. xv] of dermatol, three times daily; tannocol 1.0 to 3.0 grams [gr. xv to xlv], three times daily; bismuth subnitrate 1.0 gram [gr. xv], four times daily; bismutose $\frac{1}{2}$ teaspoonful, or calcium carbonate and calcium phosphate, equal parts, 1 teaspoonful three times daily.

Mechanical Treatment.—The bowels should be irrigated with $\frac{1}{2}$ to 1 litre of the following solutions at body-temperature: silver nitrate, 0.2 to 0.3 [gr. iii–ivss] to 1000; salicylic acid 1:300; or thymol 1:1000; or an enema consisting of a teaspoonful of tannin and a tablespoonful of starch in one litre of water.

Opium is indicated for the amelioration of pain and its styptic action, especially in cases offering a poor prognosis. I give 0.06 [gr. i] of the extract three times a day in pills. Belladonna may be used for the relief of the same symptoms, preferably the extract, 0.02 [gr. $\frac{1}{2}$] or the tincture, three times daily.

Codeine or heroine may be substituted for either of the above-mentioned drugs.

For severe cases, rest in bed and warm compresses are indicated. With cases in which a fatal termination seems imminent, it may be necessary to resort to surgery to produce an artificial anus in the ascending colon, in order to relieve the colon of all its functions.

Typhlitis and Appendicitis

Typhlitis and appendicitis are specific forms of inflammation and ulceration of the intestine, influenced by special anatomical conditions. We cannot discuss the pathological anatomy of the subject at this place.

From the clinical standpoint, it is first of all desirable to differentiate typhlitis stercoralis from appendicitis, and to classify the latter into the catarrhal, the purulent, and the perforative-gangrenous forms of appendicitis.

Etiology.—The most frequent causes of the above affections are acute and chronic enteritis, in which the cæcum and appendix are implicated and become filled with fluid fæces a portion of which remains in the narrow lumen of the appendix, and leads to the formation of concretions, or to ulceration and stenosis, which in their turn cause dilatation empyema, perforation, or gangrene of the organ.

Symptomatology.—The symptoms are so well known that their description may be omitted from a book designed for physicians in general practice.

Diagnosis.—In making a diagnosis of appendicitis, the following four symptoms are the most significant: *a*, pain; *b*, tumor; *c*, fever; *d*, condition of the bowels.

Differential Diagnostic Points.—From the clinical standpoint, the physician should always decide upon two questions

1. Does typhlitis stercoralis—or appendicitis—exist?
2. Is the affection a severe form, which require operation?

In a case of appendicitis where an operation is indicated it is vital to recovery that the operation be not postponed long; while it is equally important to remember that in simple typhlitis no operation should be performed at all. It is well known that, owing to the surgical tendencies of the present time, the contrary has been done from what has just been stated as indicated,—which error has aroused considerable prejudice in the minds of the laity against operative procedures for the relief of appendicitis.

The differential diagnosis is often very difficult. On this point, Boas remarks, “The diagnosis of typhlitis stercoralis, and its differentiation from appendicitis, must be made only with the greatest reserve, on account of the present status of our knowledge.”

The following diagnostic points have generally proven practical and reliable for me.

1. Typhlitis Stercoralis Acuta

a. Pain.—The pain is of a dull, stabbing or stinging character, and seldom colicky. Its location is apparently superficial, and it extends upward along the ascending colon. It is considerably relieved by the application of hot compresses, by movement of the bowels, or by the escape of flatus. The skin-area overlying the affected region is more sensitive to pinching than to deep pressure.

b. Tumor.—The tumor is usually sausage-shaped, corresponding to the cæcum or colon; in case diarrhœa is present, however, no tumor is palpable, and only a gurgling murmur is heard in the right iliac fossa.

c. Fever.—A febrile reaction is either entirely absent, or quite mild, corresponding to the temperature of a co-existing enteritis, and being about the same as is found in summer diarrhœa.

d. The Condition of the Bowels.—The bowels are rarely constipated. In typhlitis, diarrhœa,—which is rare in appendicitis,—is almost always present, although there are frequent exceptions to this.

2. Typhlitis Stercoralis Chronica

(Pseudo-appendicitis)

a. Pain.—The pain in chronic typhlitis is of variable intensity, and may continue for years. Pressure and tension are rarely severe; they are more often located behind than at McBurney's point, and are relieved by rest in bed, hot compresses, the escape of gas, and gentle upward stroking.

b. Tumor.—A sausage-shaped tumor may be palpated when the bowels are constipated.

c. Fever.—Fever is absent.

d. Condition of the Bowels.—The bowel-movements are alternately constipated and diarrhœic. There is much flatulence, the increase of which aggravates the pain.

3. Catarrhal Appendicitis

a. Pain.—The pain in catarrhal appendicitis is intense and of a cutting or boring character, radiating in all directions. It is increased by pressure over McBurney's point, or by hot applications, but is relieved by the ice-bag.

b. Tumor.—A tumor is usually present about as large as the fist, but it varies in size, and is extremely painful.

c. Fever.—The temperature is generally very high, being rarely lower than 40° C. [104° F.], but a chill is commonly an early symptom.

d. Condition of the Bowels.—There is usually constipation.

4. Suppurative and Gangrenous Appendicitis

a. Pain.—The pain in this form of appendicitis is very severe, resembling that of peritonitis. It radiates, and is generally of a tearing quality, relieved by the ice-bag, but intensified by hot applications.

b. Tumor.—A tumor as large as the fist is usually present, which increases rapidly in size, and is very painful to pressure.

c. Fever.—The disease is often ushered in with a chill. The temperature is extremely high, reaching to 40° C. [104° F.] and more.

d. The bowels are usually constipated.

5. Appendicitis Larvata of Ewald

a. Pain.—The pain is indefinite, and is often entirely absent in the ileocæcal region.

b. Tumor.—No tumor is present. The appendix is often thickened, palpable, and sensitive to pressure, especially during an acute exacerbation.

c. Fever.—There is no fever.

d. Condition of the Bowels.—There is periodical diarrhœa

6. Recurrent Appendicitis

a. Pain.—The pain is periodical, continuing for month with variable intensity, according to the character of the chronic appendicitis.

b. Tumor.—A tumor is either constantly present,—diminishing in the interval between attacks, and increasing again during a recurrence,—or it may be entirely absent.

c. Fever.—There is fever in nearly all cases.

d. Condition of the Bowels.—The bowels are generally sluggish.

Summary.—Diarrhoea, and also constipation, when fever is absent, are generally indicative of typhlitis. Constipation with high fever is indicative of appendicitis, as is also constipation with or without fever when a tumor is present,—as extracæcal tumors and also high fever are almost always indicative of appendicitis. Pain, alone, is of only a slight characteristic value in the differential diagnosis.

Treatment.—The treatment of typhlitis and appendicitis simplex should be conservative. In suppurative, perforative, or gangrenous appendicitis, it should be operative during the attack. In *appendicitis larvata* and in recurrent appendicitis, when the symptoms are annoying and attacks frequent, surgical treatment should be given in the interval.

A. CONSERVATIVE THERAPY

Diet.—Only fluids should be allowed, such as tea, milk, cocoa, cream, broths, oatmeal gruel, and wine with the yolks of eggs.

Medicinal.—Of the extract of belladonna 0.02 to 0.03 [$\frac{1}{4}$ – $\frac{1}{2}$ gr.] should be given three or four times daily; or if there is a tendency to vomiting, double this quantity should be given per rectum. If pain is very severe, 0.06 to 0.1 [gr. i to iss] of the extract of opium, or 15 to 20 drops of the tincture, should be given three or four times a day.

If there is diarrhoea without fever, the various styptics are indicated, for instance, tannocol; if with fever, a mixture of muriatic acid.

For constipation, oil enemata are prescribed.

In case of high fever, ice-bags should be applied externally; with moderate fever—38° to 39° C. [100.4 to 102.2 F.]—the Priessnitz compresses. In the absence of fever, hot

poultices, thermal coils, etc., should be used. In chronic appendicitis or typhlitis, the mud-baths or the mud-poultices such as are given at Franzensbad, are useful.

B. SURGICAL TREATMENT

Under this heading, naturally, only the indications for surgical intervention will be spoken of. Operation should be performed immediately in young persons when the attack begins with fever of 39° C. [102.2° F.] or more. With older patients, it is preferable to wait one or two days before operating, because in these cases adhesions usually exist which prevent the rapid spread of pus. If purulent appendicitis has already given rise to peritonitis or a subphrenic abscess operative procedures are usually without avail.

C. DIFFERENTIAL DIAGNOSIS

In the differential diagnosis, it is only necessary to mention that certain other pathological conditions need to be thought of, especially *invaginatio ileocolica*, neoplasms, renal colic, incomplete inguinal hernia, pyosalpinx, and other right-sided diseases of the adnexa, [gall-bladder diseases], etc.

CLINICAL CASES

Acute and Chronic Typhlitis

CASE 1.—Rosa E., 32 years old, had suffered from colic two weeks previous, after partaking freely of pears and beer. There was a boring pain in the cæcal region, and constipation, but no fever. Treatment consisted of the application of thermal coils, hot compresses, rest in bed, belladonna and oil-emata,—after which the patient gradually improved. Later, however, there was a recurrence of the trouble, following errors in diet.

CASE 2.—Mrs. H., 23 years old, had suffered for years from constipation associated with colic. For several weeks she had complained of dull pressure in the ileocæcal region, and for the past five days had suffered from colic pains in the right iliac fossa. She was constipated. A fecal tumor was palpable. There was sensitiveness to pressure, but no fever. Recovery occurred after rest in bed for eight days and the use of hot applications to the abdomen.

CASE 3.—Gustav L., a merchant 40 years old, had for one or two years suffered frequently from pain in appendix region, especially when obliged to stand for a long time. Temporary rest in bed always produced improvement. Later, an inguinal hernia developed; and after the application of a suitable hernia-truss, all evidences of the "appendix pains" disappeared.

Tumors and Neoplasms of the Intestine

If we except tumors of the rectum,—which will be considered separately,—neoplasms of the intestinal canal are comparatively infrequent. According to Von Leube, 80 per cent. of intestinal carcinomata are located in the rectum; 15 per cent., in the cæcum and colon; and only 5 per cent., in the small intestine.

Diagnosis.—The lower the location of a tumor in the intestinal canal, the greater is the possibility of an early diagnosis. A carcinoma of the ascending colon produces obstruction-phenomena much later than does a tumor of the sigmoid flexure; because, for instance, in the former case the intestinal contents are of a fluid consistency and therefore have less difficulty in passing the obstruction. The diagnosis is easily made from the following symptoms:

1. *Cachexia* and the other general symptoms of cancer, which cannot be accounted for by a carcinoma of the stomach, rectum, or other organ, may naturally suggest malignant disease of the intestine.

2. *Pain.*—If there is no stenosis, there are only indefinite painful sensations in the abdomen. If, on the other hand, stenosis of the intestine is present, there is intense pain of a colicky, contracting character, particularly if the tumor is located in the splenic flexure of the colon.

3. *Constipation or Pseudodiarrhœa.*—If the latter occurs, the patient must often go to stool from 6 to 10 times daily. Generally, nothing passes from the bowels but mucus, which may be mixed with blood and pus; and the stools if formed have a caliber about that of a lead pencil.

4. *Intestinal Hemorrhage.*—Hemorrhage, which is either microscopically or macroscopically demonstrable, occurring in a patient who has never had any previous intestinal trouble,—if hemorrhoids, etc., can be excluded,—is very suggestive of a malignant disease of the intestine.

5. *Intestinal "Stiffening."*—Intestinal "stiffening," that is, a visible peristaltic contraction of the colon above its narrowed portion, most frequently occurs in the transverse colon.

6. *Tumor*.—Tumors of the intestine are usually movable. They are palpable only relatively late, when the patient becomes cachectic and the abdominal walls relaxed. In enteroptotic individuals, or those with pendulous abdomen, a tumor is palpable considerably earlier than otherwise. Malignant neoplasms are hard and irregular in shape.

Differential Diagnosis.—The differential diagnosis is sometimes very hard to make, since we must exclude tubercula and stercoral tumors of the cæcum, scybala in the sigmoid flexure and the transverse colon, gall-stones, neoplasms of the stomach, tumors of the gall-bladder or pancreas, retroperitoneal cysts, carcinomata and echinococcic cysts of the kidneys, movable kidney or spleen, foreign bodies, etc.

Treatment.—The treatment is of a surgical nature, an operation should be resorted to as early as possible. In the event that the patient refuses operation, the treatment must become symptomatic,—care being taken to produce stools of soft consistency by the use of castor oil, Carlsbad salts, or rhubarb, every two or three days; or by oil enemata, containing $\frac{1}{2}$ litre, to be given every second or third day.

Diet.—The diet should be such as will furnish as little intestinal débris as possible, and should consist of milk, cream, butter, cereal soups and gruels, eggs, tender meats, fish broths, stewed fruits, fruit-juice, honey, etc.

In private practice, some of the artificial food-preparations may be used to great advantage,—such as somatos, roborat, puro, cucasin, sanatogen, etc.

Medicinal Treatment.—Medicinal treatment is indicated for the relief of colicky pain; 0.02 of the extract of belladonna, when given three times daily, is one of the most suitable medicaments for this purpose. If preferred, 0.1 of the extract may be given three times daily, per rectum. The use of opium is less satisfactory than the above.

CLINICAL CASE

CASE 1.—Carl H., a laborer 56 years old, had for about six months suffered from indefinite pains in the abdomen. He had passed from 12 to 15 stools daily, of a chocolate color and a semi-solid consistency, which of

contained brown and grayish-red particles. There had been a gradual aggravation of the symptoms, with increasing cachexia. Physical examination was negative, except that there was some blood in the stools. There was no tumor. The patient was cachectic. He grew gradually worse and died. An extensive ulcer which had undergone carcinomatous degeneration was found in the splenic flexure of the colon.

Displacements of the Intestine

(Pendulous Abdomen, Hang-Belly, etc.)

A. Congenital Malpositions, Anomalies, etc.

Apart from *situs inversus*, the displacements of the cæcum, with the appendix and the sigmoid flexure,—in consequence of extraordinary length of their mesenteries,—are of special importance.

Such congenital anatomical conditions account for appendicitis in the left iliac fossa and for volvulus of the sigmoid flexure. The cæcum has been found in the hernial sac of a congenital scrotal hernia; and as a curiosity, we may mention that congenital hernia of the diaphragm has been discovered at autopsy, when the stomach was found in the thoracic cavity.

In *habitus enteropticus*, which has already been discussed in detail in the section on Diseases of the Stomach, the position of the transverse colon corresponds to the abnormally low position of the greater curvature of the stomach, and gradually becomes lower with the age of the patient. The transverse colon, in this affection, is usually found at the umbilicus or a finger's breadth above or below it.

B. Acquired Displacements of the Intestine

1. *Total*: *a*, constitutional; *b*, due to local conditions.
2. *Partial*, such as herniæ, tumors, etc.

1. General Enteroptosis

a. A general displacement of the intestine results from a congenital *habitus enteropticus* if the abdominal walls have become relaxed following pregnancy, or from impairment of the general nutrition, or from absorption of the accumulations of adipose tissue in the abdominal cavity.

b. Pendulous abdomen is sometimes present without *habitus enteropticus* after pregnancy; or when rapid emaciation has occurred in a previously obese person, as in cases of phthisis, carcinoma, etc.

2. Partial Enteroptosis

a. Individual portions of the intestine may assume an abnormally low position, either from their own weight or from the extra weight given them by the presence of tumors or fecal accumulations. In chronic constipation, or in relaxation of the abdominal walls, the colon may assume the shape of a capital letter "M,"—the middle portion of the transverse colon standing immediately above the symphysis. I have seen several such cases.

b. In this category of partial displacements of the intestine belong external hernia, which, however, cannot be properly discussed in a work on internal medicine.

Diagnosis.—Anomalous positions of the intestine, as such, usually run a course without symptoms, and are occasionally discovered when palpating the abdomen of a patient suffering from other affections. Quite frequently, however,—as a result of such displacements of the intestinal tube,—ileus arises, whose exact diagnosis is generally impossible. It can be arrived at only with a certain degree of probability, because, in addition to internal herniæ, there is an unlimited number of other affections that may produce ileus. Only the autopsy *in vivo* or *post mortem* explains such anatomical abnormalities.

Treatment.—The treatment consists chiefly in the application of suitable abdominal bandages, supports, and abdominal corsets. In every case of "hang-belly," when there are unpleasant drawing sensations in the costal arch and a feeling of fulness in the abdomen, especially after eating, or when the patient is more uncomfortable in a horizontal position, I prescribe such abdominal support.

Achilles Rose, of New York, has recently made use of the application of four strips of adhesive plaster, 8 to 9 cm.

FIG. 43a.

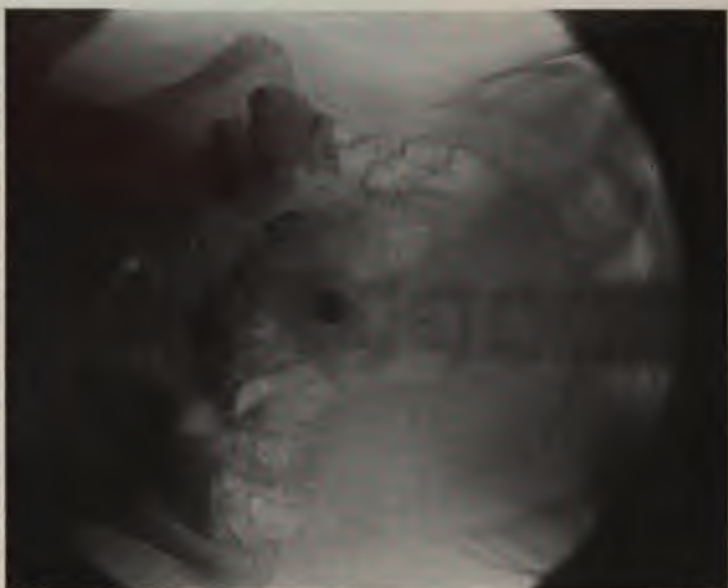
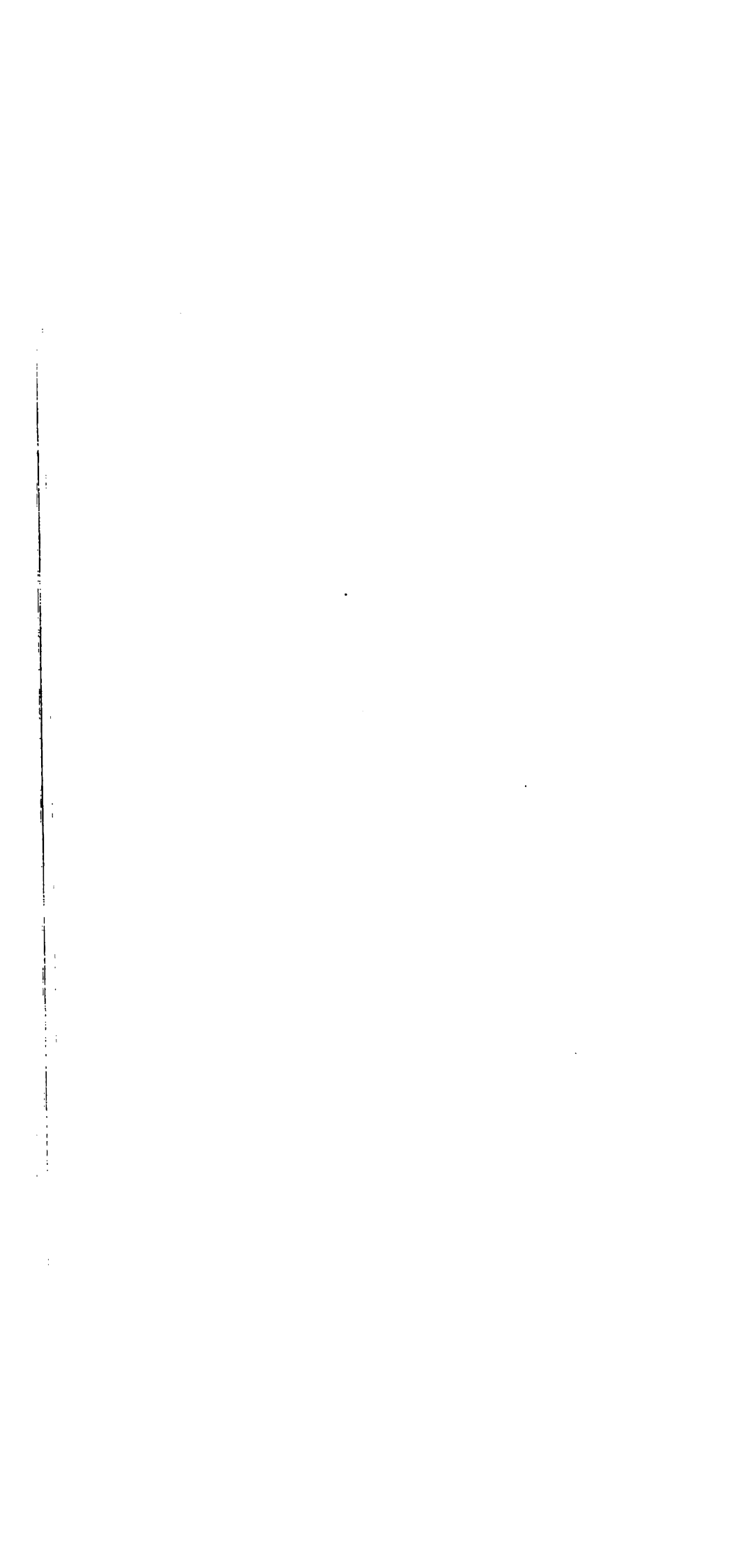


FIG. 43b.



FIG. 43a.—Radiograph of colon of female aged twenty-five years, showing moderate ptosis throughout, but especially of the hepatic flexure and caecum, and dilatation of the entire structure. A moderate ptosis of the splenic flexure has permitted the transverse colon to drop somewhat, and causes the lower portion of the descending colon to appear more or less redundant. The radiograph serves to illustrate also the unusual amount of detail obtainable through rapid exposure, which in this instance was about one-fourth of a second. Note that the positions of the structures are reversed, due to the use of an intensifying screen and the necessary reversal of the plate. [Courtesy of Dr. H. K. Pancoast.]

FIG. 43b.—Radiograph of colon of adult female, made fifteen hours after a meal, and showing extreme ptosis of the entire structure and redundancy of the transverse colon. The caecum is not propped. Recurrence after operation. [Courtesy of Dr. H. K. Pancoast.]



wide, for this purpose. The first strip, about 45 cm. long, extends from the symphysis to the sternum; the second and third strips, 50 cm. long, are applied from the symphysis diagonally around the left and the right thoracic walls to the spinal column; the fourth strip is applied across the abdomen above the symphysis from one iliac fossa to the other. The adhesive plaster may be worn for three or four weeks, when it should be renewed, to prevent disagreeable perspiration, eczema, etc.,—especially in warm weather. [See illustrations and further details, page 194.]

In addition to the above means, the physician should always devise treatment which will strengthen the musculature of the abdomen, such as heavy massage of the abdominal muscles, physical culture, and gymnastic exercises, such as raising and lowering the legs or trunk of the body. The condition may also be improved by a course of forced feeding, by which the relaxed condition of the musculature is improved and the abdominal space is made smaller by the deposition of adipose tissue.

The treatment of hernia is surgical.

SECONDARY ORGANIC DISEASES OF THE INTESTINE

Stenosis and Dilatation of the Intestinal Canal

(Not Including the Rectum)

General Remarks.—Just as stenosis of the pylorus and dilatation of the stomach are the results of some primary organic disease of the stomach,—such as peptic ulcer, carcinoma, perigastritis, etc.,—stenosis and dilatation of the intestinal canal may develop more or less quickly from similar primary affections,—such as ulceration, compression, new growths, adhesions, etc.

As a sequel to ulcer, cicatricial stenosis results, which in turn gives rise to hypertrophy and dilatation of that portion of the intestinal tube lying just above,—according to the general law of compensatory concentric hypertrophy.

Stenosis of the intestine is a chronic affection; although any aggravating cause,—such as the lodging of hard and

irritating remnants of foods or the inflammatory swelling of that portion of the gut,—may lead to the acute stage of total obstruction of the intestine.

Stenoses of the duodenum and of the pylorus have been discussed together in a previous chapter. The treatment is practically the same in both affections.

Acute dilatation of the intestinal canal without stenosis results from paralysis of the intestinal musculature, which will be considered in detail in the chapter on Intestinal Obstruction.

Etiology.—The stenotic factors are as follows:

1. *Intestinal.*—Neoplasms, cicatrices following tubercular, syphilitic, and decubital ulcers, hard scybala lodged in the folds of the intestine, partial volvulus, moderate invagination of the intestinal tube, or incomplete hernia.

2. *Peritoneal.*—The congenital and acquired formation of adhesion-bands, especially following trauma, laparotomies, cholelithiasis, peritonitis, appendicitis, and perimetritis.

3. *Neighboring Organs.*—Compression by a distended gall-bladder, enlarged lobe of the liver, echinococcic cysts, retroverted gravid uterus, abdominal and pelvic tumors, and especially ovarian cysts.

Symptomatology.—A stenosis, especially if located in the small intestine, or in the colon as low as the hepatic flexure, may exist for quite a long time without producing any symptoms, for the reason that:

1. The liquid fæces of these portions of the intestinal canal may pass through a relatively narrowed portion.

2. Hypertrophy of the musculature tends to overcome the effect of the obstruction, since the former increases proportionately to the diminution in the size of the lumen of the intestine. In this way, even a stenosis of the sigmoid flexure may be compensated for quite a while, until some excessive demand suddenly brings about a compensatory disturbance, and thereby introduces the evident signs and symptoms of intestinal obstruction.

The first subjective symptoms are a sluggish condition of the bowels, griping, a feeling of tension in the abdomen,

and severe recurrent attacks of colic which disappear for two or three days after a very free evacuation of the bowels. Usually the patient is nauseated and has a tendency to vomit, besides a general feeling of anxiety.

Objectively, the physician will observe that the stool is of small caliber,—about the size of a lead-pencil,—and is made up of broken, irregular, or square fragments of fecal matter. Diarrhœa is sometimes present if a secondary catarrh develops above the stenosis, which causes a liquefaction of the stagnating fœces.

Another very important objective sign is the so-called “stiffening” of the intestine, which was first described by Nothnagel, and consists of visible and palpable tonic contractions of that portion of the intestine above the stenosis.

A third sign is meteorism.

All the above-mentioned symptoms will disappear after a free evacuation of the bowels.

Diagnosis.—In any given case, the following points must be decided:

1. Does a stenosis actually exist?
2. What is its location?
3. What is its pathology?

“Sometimes,” says Nothnagel, “the diagnosis of stenosis of the intestine may be made with absolute certainty, and sometimes this is simply impossible; between these extremes there exists a large number of cases in which the diagnosis can be made with greater or less probability.”

1. We may assume the occurrence of a more or less rapid narrowing of the intestinal lumen, when a person who has formerly had normal functions of the bowels begins to suffer from constipation, colicky pains and meteorism, or when intestinal “stiffenings” are observed, or when the stool itself is of small caliber and composed of broken fragments of hard fecal matter.

2. If “stiffenings” of the colon are visible, the location of the stenosis is usually in the region of the sigmoid flexure;

while a strong peristalsis of the small intestine,—commonly observed only when there is a diastasis of the recti muscles or relaxation of the abdominal walls,—usually indicates that the lesion is in the ileocæcal region.

3. Only long observation will make clear the nature of the stenosis. Blood and pus in the stool, as well as the palpability of a tumor, are indicative of a malignancy. In order to diagnose a compression stenosis, it is necessary to make an accurate examination of all the neighboring organs of the abdomen and pelvis, especially the rectum and the female genital organs. (See discussion on Palpation, in the General Section.)

Differential Diagnosis.—Practically one condition only will give rise to confusion in the diagnosis, *i. e.*, spastic constipation, when hard stools of small caliber are passed, associated with colicky pains. The following points will assist in the differentiation of this affection from stenosis of the bowel:

Preceding spastic constipation, there is almost always a long period of atonic constipation. In spastic constipation, the stool is surrounded by membranous mucus, and the entire colon is palpable as a sensitive, hard, band-like stricture about the size of the little finger. After suitable diet and oil enemata for three or four weeks, there is usually an improvement. Sausage-shaped stools of large caliber are then passed without difficulty, and the intestinal “stiffenings” entirely disappear.

Treatment.—The internal treatment has already been detailed in the chapter on Ulcer of the Intestine. The diet should be as free as possible from foods leaving a heavy residue in the intestine, but should be rich in butter and fats, and should contain a large amount of stewed fruit.

Laxatives, antispasmodic remedies,—such as 0.02 to 0.03 [$\frac{1}{3}$ – $\frac{1}{2}$ gr.] of the extract of belladonna per mouth, or 0.03 to 0.05 [$\frac{1}{2}$ – $\frac{3}{4}$ gr.] per rectum,—and oil enemata, should be administered.

Frequent and repeated attacks are an indication for surgical treatment; and in any case where the abdominal pathology is doubtful, it is the duty of the physician to obtain the opinion of an experienced surgeon.

Recently, the use of thiosinamin has been recommended in cicatricial stenosis of the intestine; $\frac{1}{2}$ to 1 c.c. of the following solution should be subcutaneously injected daily in the interscapular region.

R̄ Thiosinamin, ℥ii 8.0
 Glycerini, ℥iii 12.0
 Alcohol dil., ℥v 20.0

M. Sig.—To be used by the physician.

Whenever syphilis is suspected, sodium iodide should, of course, be prescribed.

Intestinal Obstruction

General Remarks.—Ileus, or acute intestinal obstruction, above all other diseases of the intestine, demands a wide personal experience for its early diagnosis, and for the selection of the proper therapeutic procedures. One of the most difficult tasks in the diagnosis and therapeutics of these conditions is to decide, in a given case, whether a purgative or a narcotic should be prescribed, whether ice or hot compresses should be used, and whether an operation is indicated.

In any case, the responsibility is so great that no physician should neglect to have consultation with either a clinician or a surgeon of experience as early as possible, in order that through mutual and repeated observations the developments of the case may be carefully followed and the indications thoroughly established before secondary symptoms have developed which might cloud the picture of the disease in such a way that it would become unrecognizable. In addition to this, it is always best, if possible, to have an experienced nurse in constant attendance upon the case.

Etiology.—Precisely the same etiological factors as lead to stenosis of the intestine will lead also to the gradual aggravation of stenosis until intestinal obstruction results. The importance of the subject justifies a repetition of these etiological factors.

The most frequent causes are external or internal herniæ; malignant or benign stenoses of the intestinal lumen; volvulus and acute flexures from bands of omentum; invagination,

spasmodic contracture or paralysis of the intestinal musculature; and the compression produced by a pathological condition of some neighboring organ,—among which the retroflexion of the gravid uterus must not be forgotten.

The subject will be more clearly comprehended after classifying it into three principal groups of cases:

1. Ileus resulting from mechanical occlusion of the bow
2. Compression ileus. 3. Strangulation ileus.

Symptomatology.—An absolute retention of fæces and gases develops more or less acutely; while nausea, eructations, meteorism, singultus, colicky pains, fecal vomiting, cold perspiration, peritonitis, fever and collapse gradually appear; in short, there arises the well-known clinical picture of *miserere*, with the so-called *facies Hippocratica*.

Diagnosis.—Nothnagel, in speaking of intestinal obstruction, says, “Even the most expert surgeon, as well as the most experienced internist, must acknowledge that every new case may bring with it unexpected developments. Care in the examination, all diagnostic discrimination, and even all personal experience, will frequently leave one in the lurch. The difficulties in such cases are simply insurmountable.”

Before proceeding with an analysis of a concrete case two points should be carefully considered:

1. The hernial rings, the rectum, and the uterus should be carefully palpated in order to determine: whether there is a possibly existing strangulation hernia, or a rectal stricture which has previously run a latent clinical course, or whether a retroflexed gravid uterus is giving rise to the symptoms.

2. Whether there is an accumulation of fæces results from spasmodic contraction or paralysis of the intestine without the presence of an anatomical lesion.

Spasm of the intestinal musculature occurs in lead colic and in spastic constipation, which has been mentioned above and will be described in detail later on; and it also occurs in acute colitis caused by the lodgment of irritating food-remnants—such as cucumbers or pears which have been poorly masticated,—in the folds of the mucous membrane of the intestine.

Such patients have, as a rule, suffered for a long period from chronic constipation. The internal administration of atropine and the use of high rectal enemata of oil will generally give relief in these cases.

The causes of paralysis of the intestinal musculature are as follows:

Opium-poisoning; peritoneal shock following trauma to the abdomen; laparotomy; ruptured tubal pregnancy; perforation of the stomach or intestine; the same causes as produce peritonitis; and finally, chronic atonic constipation.

The presence of fever is always suggestive of peritonitis as a cause of paralysis of the bowels; and especially when it is associated with persistent vomiting, diffuse pain in the abdomen,—especially when vomiting,—and generalized sensitiveness to pressure over the abdomen. These symptoms are significant of peritonitis as a causal factor, even if fever is absent.

If, from employment of the above-mentioned principles, the physician can exclude, as etiological factors,—hernial rings, peritonitis, affections of the rectum or uterus, and spasmodic contraction or paralysis of the intestinal musculature, he may then naturally assume the presence of an anatomical obstruction, the exact nature of which will frequently not be recognized before operation or autopsy.

If the patient has been under observation since the beginning of the illness, the location of the trouble can usually be established with a fair degree of success. A consideration of the following symptoms will best serve to diagnose the position of the lesion:

1. Pain.
2. Meteorism.
3. Vomiting.
4. The effect of enemata.
5. Temperature.

1. *Pain*.—In obstruction of the colon, there is a frequently-recurring colic,—resembling labor-pains,—of from one to five minutes' duration, which, according to the location, begins on the right or the left side, and radiates in all

directions, especially toward the back. The affected portion of the colon is especially sensitive to pressure.

In obstruction of the small intestine, distress is more constant and is associated with rumbling of gases in the middle of the abdomen in the region of the umbilicus,—where parts are also sensitive to pressure.

In peritonitis, there is constant cutting or boring pain.

In paralysis of the intestine, there is no pain, but dull feeling of pressure, fulness and distention, corresponding to the meteorism.

2. *Meteorism*.—When a stenosis of the intestine, which has been gradually developing, suddenly becomes a complete stenosis, or ileus, it gives rise to visible and palpable local meteorism. In this condition, the so-called intestinal “sphenings” also become manifest above the point of obstruction.

This is rarely present in cases of sudden obstruction of the bowels, for the reason that hypertrophy of the muscles has had no time to develop.

If, within 24 or 36 hours after the onset, the peripheral region of the abdomen which corresponds to the course of the colon becomes tympanitic and distended, and the middle portion of the abdomen is sunken, the conditions are indicative of an obstruction of the colon, and especially of the sigmoid flexure or descending colon.

If, on the other hand, the peripheral portion of the abdomen is not distended, and the middle portion is tympanitic, this is indicative of an obstruction at some point above the ileocaecal valve, provided that this symptom corresponds with the character of the pain.

This is equally true, even if gas still escapes from the intestine, and if enemata are successful in showing the presence of some fecal matter.

Two or three days after complete stenosis has set in, the entire intestinal tube will be distended, so that by that time meteorism will be of no value in localizing the lesion.

3. *Vomiting*.—Constant, non-feculent vomiting of everything eaten, and of bile, is indicative of either peritonitis

an obstruction located high up in the intestinal tube,—for instance, in the jejunum or the duodenum.

If fecal vomiting occurs within twenty-four or thirty-six hours after the onset of the trouble, it is significant of obstruction of the small intestine; and if after two or three days, it indicates an obstruction of the large intestine. In a deeply located obstruction,—for instance, one between the sigmoid flexure and the rectum,—vomiting may be entirely absent, or it may appear six or seven days after the illness, or not until a short time before death.

4. *Enemata*.—If the injected fluid,—water or oil,—returns after the injection of from five to seven hundred cubic centimetres, it is probable that the obstruction is located low in the large bowel, or that there is insufficiency of the sphincter ani. If, on the other hand, one or two litres can be injected, it is quite evident that the seat of the occlusion lies above the colon.

5. *Temperature*.—Fever at the beginning of the illness is indicative of peritonitis; while if the febrile reaction occurs at a later period, it indicates some other condition which is complicated by peritonitis.

It is self-evident that one may establish a fairly accurate diagnosis only when all of these five symptoms harmonize with one another.

Differential Diagnosis.—It is impossible to describe in detail, in this book, all of the many varieties of ileus.

Treatment.—Internal medication is ineffective in volvulus and strangulation; but in mechanical occlusion and invagination of the gut, it will often produce good results.

Laxatives should be given only when there is neither colic nor fever. Three or four tablespoonfuls of castor oil, or one tablespoonful of Carlsbad salts, dissolved in a pint of lukewarm water, should be given, besides using high enemata, consisting of two or three litres of warm water at a temperature of 30° to 32° R. [100°—104° F.], since in such cases it is highly probable that there is only a fecal impaction.

If colic, with or without moderate fever, is a symptom, 0.001 to 0.0015 [$\frac{1}{4}$ — $\frac{1}{5}$ gr.] of atropine sulphate should be

given every three hours by mouth, or subcutaneously if there is vomiting; and an enema of one to one and one-half litres of warm sesame oil should be introduced, if a movement of the bowels does not follow enemata of water.

If fever is present from the onset of the illness, the ice-bag should be used, and suppositories containing 0.1 [gr. iss] of the extract of opium and 0.05 [$\frac{3}{4}$ gr.] of the extract of belladonna should be introduced into the rectum three times daily.

Diet.—The only foods allowed are champagne, ice-cold milk, cream, lemonade, peppermint-tea, and egg-cognac.

It is safe to continue the above-mentioned therapy for five or six days, in case no alarming symptoms occur,—such as stercoral vomiting, singultus, fever, severe sensitiveness to pressure, thread-like pulse or collapse.

The physician should always, under the last-named conditions, advise operative treatment, unless it is evident that an inoperable cancer is the cause of the obstruction, in which case,—to prevent pain,—opium or morphine should be given by mouth, or subcutaneously if there is vomiting.

In some instances it may seem advisable, as a palliative measure, to create an artificial anus.

Since the clinical picture of ileus presents such varied phases, I consider it quite useless to attempt to illustrate the disease by clinical cases, for two given cases will very rarely run the same clinical course.

Acute and Chronic Peritonitis

Since the peritoneum is so often diseased as the result of acute and chronic organic affections of the digestive tract, it seems advisable to discuss briefly the clinical characteristics of peritonitis, especially since it must be differentially diagnosed from ileus, as has been mentioned in the previous chapter.

Etiology.—With the exception of the rare idiopathic form, peritonitis is always secondary to an inflammatory affection of the serous membrane covering any of the abdominal or pelvic organs.

First to be discussed is Circumscribed Peritonitis, which is limited to a relatively small area of the peritoneum.

Circumscribed peritonitis,—as has already been mentioned above in discussing perigastritis,—results from deep-seated ulceration of the stomach or intestine, from malignant neoplasms of the intestine, from pericolitis, perityphlitis, periduodenitis, pericholecystitis, perisigmoiditis, from trauma, or from inflammation of the uterus and its adnexa. The adhesions which form between the serous membranes of the various organs often prevent the diffusion of an inflammation, even after perforation.

Diffuse General Peritonitis results from perforation at a time when there are insufficient adhesions or none at all, to prevent the spread of the infection.

Chronic Circumscribed Peritonitis accompanies chronic ulceration of the stomach or intestine.

Generalized Chronic Peritonitis is usually of a tubercular nature.

In peritonitis, as in pleurisy, there is a dry, adhesive form, and also an exudative form. The exudate in the latter is either serous or purulent, according to the type of the infection. Finally, there may be both circumscribed and diffuse general peritonitis, as in subphrenic abscess, associated with a generalized purulent peritonitis.

Diagnosis.—The symptoms in the different forms of the disease are often so atypical, that an exact diagnosis is sometimes impossible.

1. Localized Peritonitis of the Adhesive Type

The onset is gradual. The first symptoms usually appear after sudden and active exercise, heavy lifting, coughing or straining; later, pain becomes spontaneous, especially if the patient lies on the side opposite to the seat of the lesion, which produces traction upon the adhesion. Pain is increased by pressure over the seat of the disease, as well as by active peristalsis, or distention of the bowels by gas. There is no fever, and nausea and vomiting are rare.

Sometimes the abdomen over the diseased portion of the peritoneum,—especially in patients with relaxed abdominal walls,—appears thickened on palpation.

Many times, such patients are mistakenly considered to be hypochondriacal or hysterical,—notwithstanding the fact that actual and severe pain in the abdomen occurs only in organic diseases.

The above-described circumscribed adhesive peritonitis occurs with especial frequency in perigastritis, pericolitis, or following strangulated herniæ and laparotomies.

Rest in bed, hot applications, and treatment which controls meteorism and lessens peristalsis, will relieve the pain incident to this form of disease.

2. Circumscribed Exudative Peritonitis

The exudation may be serous or purulent, as in fecal abscesses, and may rupture into the lumen of the intestine, the urinary bladder, or externally.

The onset of the affection is usually quite sudden, with severe pain over a localized area,—so severe that the patient must immediately assume a recumbent position; this pain is increased by pressure, and there is a distinct, balloon-like resistance to palpation. Certain movements or positions of the body, and also hot compresses, will increase the pain, which however is relieved by the ice-bag. Either moderate or high fever is present. Vomiting is generally absent, although nausea is a common symptom.

This form of peritonitis is associated with chronic ulceration of the stomach and intestine, which have perforated through adhesive inflammation into an already encysted cavity; and it also occurs after trauma which has ruptured some internal organ, when, under favorable circumstances, adhesions rapidly form.

3. Diffuse Exudative (Serous or Purulent) Peritonitis

This is characterized by intense, constant, cutting, boring, but rarely colicky pain in the entire abdomen, which is most intense at its point of origin,—for example, in the

appendix or gall-bladder. It radiates in all directions, and is increased by the slightest touch or movement. Vomiting is very frequent. Usually there are,—besides a small, thread-like pulse,—singultus, and the *facies Hippocratica*.

Scarcely any relief from suffering is obtained by the use of the ice-bag or by moderate doses of narcotics. Micturition is painful, and meteorism gradually develops to enormous proportions. There is almost complete paralysis of the bowels, so that neither feces or gas can escape from the rectum. The temperature is rarely high, and may fall to normal in collapse, as it always does before death.

This form of peritonitis is caused by perforation of any part of the gastro-intestinal canal, gall-bladder, Fallopian tubes, etc., when no adhesions are present to limit the spread of the inflammation.

4. Diffuse Chronic Peritonitis

This is usually of a tubercular nature, and is characterized by stabbing, cutting pain which occurs now in one part of the abdomen, now in another, and which is caused by intestinal peristalsis, and is increased by heavy movements or pressure. Alleviation of the pain is usually experienced from the use of the ice-bag and the administration of belladonna,—which lessen the peristaltic action of the gut.

The amount of exudate is usually moderate, and is frequently encapsulated.

There is little or no fever, the stools are regular or moderately constipated, and there are occasional nausea and vomiting. Other signs of tuberculosis are usually present.

The course of the disease may extend over a period of several months or a year, sometimes resulting in recovery, but usually in death from debility.

TREATMENT

1. The treatment of Circumscribed Adhesive Peritonitis consists in absolute rest in bed, the application of hot oatmeal compresses, mud-poultices, a thermal coil, etc.; the internal administration of 0.03 [gr. $\frac{1}{3}$] of extract of belladonna three

times daily, administered by mouth or rectum, according to the location of the affection; and the application of one or two leeches over the seat of the lesion.

Prophylactic treatment consists in the use of abdominal bandages, suitable hernia trusses, and the avoidance of violent demands upon the musculature of the abdominal wall, as in hard manual labor, sports, etc.

2. *Fecal Abscess*.—In this condition treatment should consist of rest in bed and the use of the ice-bag; belladonna as above indicated; the application of one or two leeches; and eventual incision.

3. *Diffuse Purulent Peritonitis*.—Internal treatment should be limited to the use of anodyne remedies,—of which the best is morphine, given three times daily in doses of 0.02 to 0.03 [$\frac{1}{3}$ – $\frac{1}{2}$ gr.], or atropine sulphate 0.001 [$\frac{1}{100}$ gr.], given subcutaneously three times daily. Ice-compresses are preferable to the ice-bag. Sometimes painting the abdomen with oil of turpentine is helpful.

The decision as to whether an operation should be attempted should be left to the judgment of the surgeon.

4. *Chronic Peritonitis*.—The treatment giving greatest relief to the patient consists in the application of towel wrung out of ice-water, the internal administration of 0.0 [$\frac{1}{3}$ gr.] of belladonna, or 0.0005 [$\frac{1}{100}$ gr.] of atropine sulphate three times daily, the occasional use of leeches, and smearing the abdomen with green soap.

Incision should eventually be made, in case the exudation is circumscribed.

Diet.—In the first two forms of peritonitis, the diet should be limited to assimilable and nourishing foods of liquid or semi-solid consistency,—such as broth, tea, or coffee with cream, beef-tea, fruit ices, lemonade, egg-cognac, and champagne.

In the third form, the diet should be stimulating,—containing wines, etc.

In the fourth form of the disease, the food should be non-irritating, but strengthening, in order to increase the patient's resistance against the infection; the most suitable

dietary consisting in the daily use of a pint of cream in tea or coffee, three or four yolks of eggs, 100 to 150 grams of butter, puddings with fruit-sauces, besides chicken, pigeon, white bread, rice, noodles, or light vegetables in purée form, caviare, and Hungarian wine.

FUNCTIONAL DISEASES OF THE INTESTINE

Chronic Constipation

We speak of chronic, habitual obstipation, or constipation, when there is a diminution or a complete cessation of spontaneous evacuations of the stool. There are, therefore, complete and incomplete forms of chronic constipation, according to whether the patient must constantly, frequently, or only occasionally resort to the use of a laxative or an enema.

The incomplete, associated with the formation of so-called residual fæces, is generally the forerunner of complete constipation.

There are many individuals that have used laxatives for decades, even from childhood, and have never been ill nor suffered any serious consequences,—satisfactory results having been obtained from the use of one laxative after another, recommended by physicians or by the laity.

Patients have rarely consulted me for constipation at a time when laxative remedies were still, even to a slight degree, effective.

There comes a time, early or late, however, when all laxative remedies and enemata become ineffective. It is then that such persons, having formerly considered their condition as unimportant, realize that they are ill, and consult a physician.

It is self-evident that the earlier the patient has rational treatment, the more successful will be the results. Cases which have existed for several years, or for decades, often require many months' treatment in a sanitarium to be cured.

The therapy depends entirely upon the variety of constipation, and upon the physician's ability to find the etiological factors in each individual case. When these are

established, it is easy to determine the rational therapy, which results successfully in by far the majority of cases.

In the following discussion, therefore, I have laid the chief emphasis on these two points.

Etiology.—The causes of chronic constipation are naturally grouped as follows:

1. *Bad Habits; Neglect; Prudery; Lack of Time; Indolence, etc.*

In this group belong many school-girls and women living in boarding-houses, who, on account of prudery, do not go to stool regularly; also office-people and business men, who, at the time when the need manifests itself, are too busy to respond. In such persons, the normal sensation of the rectum has gradually been lost through the unnatural suppression of the desire to go to stool; hence they resort to purgatives and laxatives, as a matter of convenience, and so habituate themselves to their use that they are gradually obliged to employ stronger and stronger remedies, until finally all have lost their effect.

2. *Insufficient Exercise, Sedentary Occupations and Obesity*

To this group of patients belong many officials, book keepers, coachmen, students, etc., who are seated the greater part of the day, and also obese persons who take too little exercise and who do not go to stool as frequently as they should, because of the inconvenience or because it is difficult for them to use the abdominal muscles at stool.

3. *Diminution of Power of Expulsion of the Intestinal Musculature and Abdominal Pressure*

To this group belong patients with congenital or acquired enteroptosis, especially women who have borne children and who have diastasis of the recti muscles and pendulous abdomen, and also those who have a relaxed perineum following lacerations.

Whether in these cases the musculature of the colon is indeed anatomically weakened, or only badly innervated, cannot be determined with positiveness.

It is most probable that the condition of the colon corresponds to that of the rest of the body in such patients as are under-nourished and anæmic. Since, however, the constipation entirely disappears by proper therapy, it may be quite positively assumed that the trouble was of a functional nature.

To this group belong a large majority of patients suffering from chronic constipation. Very frequently the physician is able to trace the beginning of the trouble to the first pregnancy and puerperium. But this form of chronic constipation occurs equally often in *nulliparæ* and in men who have the *habitus enteropiticus*, associated with a general malnutrition.

This intestinal condition corresponds to anæmic-gastropototic dyspepsia. It need only be mentioned here that the stomach and intestine are often involved simultaneously, or an affection of the one follows that of the other, as a result of these disturbances of the functions of the gastro-intestinal tract.

4. *Insufficient and Unsuitable Food*

Most of the patients in this group are those with poor or perverted appetites,—such as phthisical or neurasthenical individuals, or those who through ignorance have subsisted largely on proteid foods, avoiding vegetables and fruit because they did not consider them nourishing and strengthening. Children especially suffer from constipation as the result of such a diet-error.

5. *Disease of the Stomach in which the Nourishment taken is either too Limited in Amount or Too Bland and Non-Irritating in Quality*

In this group should be mentioned first the organic diseases of the stomach,—such as chronic gastritis, ulcer, ectasia, and carcinoma,—in which the patient, partly on account of the loss of appetite and partly from fear of eating, or because the motility of the stomach is disturbed by an organic obstruction, has, upon the advice of a physician, avoided those foods which give bulk to the fæces, and this in turn has caused constipation.

In functional diseases of the stomach, patients suffer from constipation as a result of taking insufficient amounts of food, because they fear the resulting pressure and fulness in the epigastrium,—symptoms which they often consider due to chronic catarrh of the stomach.

6. *Diseases of the Intestine, such as Catarrh, Inflammation in the Ileocæcal Region, and the Misuse of Laxatives*

In this group we should first mention typhlitis and appendicitis, because they are often treated with large doses of opium, which frequently leaves behind a persistent constipation. Laparotomies have the same effect, for in addition to the paralyzing influence of narcotics and anæsthetics upon the intestine, there is a weakening of the muscles involved in the downward abdominal pressure.

Another common disease of this group is chronic catarrh of the intestine, which frequently causes chronic constipation, as a result of a spastic condition of the musculature of the colon, as has been pointed out in the chapter on Enterocolitis

7. *Nervous Influences: Hysteria, Tabes Dorsalis, Lead Intoxications, etc.*

Chronic constipation occurs in hysteria from impairment of the innervation of the intestinal wall. The musculature may be either too much relaxed or too strongly contracted. A period of atonic constipation usually precedes the spastic stage, which does not appear until pathological alterations in the mucous membrane of the colon have occurred.

In general, it may be said that the stage of spastic constipation occurs earlier in hysterical individuals than in those who have no neurotic tendencies.

Disturbances of intestinal innervation which lead to chronic constipation frequently occur in cases of tabes dorsalis, because such patients have largely lost the normal desire to go to stool.

Chronic lead-poisoning also causes spastic constipation

It is assumed, at the present time, that this occurs as a result of paralysis of the splanchnic nerves, which are the inhibitory nerves of the automatic ganglia of the intestinal wall. In severe cases of lead-poisoning, the spastic condition of the bowels frequently develops into the well-known lead colic, which represents merely an acute exacerbation of the intoxication.

8. *Local Obstructions,—Stenoses, Dilatations, and Neoplasms of the Intestinal Tract*

In such cases, the constipation is merely a symptom of the primary disease. In any given case, the presence of a tumor which narrows the lumen of the intestine from within, or compresses it from without, should always be thought of, as well as hypertrophy of the prostate gland, displacements of the uterus, and also peritonic adhesions with neighboring organs,—such as the liver, the anterior abdominal wall, and the female genital organs. Laparotomies and traumata also produce the same results.

That portion of the intestine above the seat of the obstruction becomes dilated, just as does the stomach when there is a stenosis of the pylorus.

The atonic dilatation of the sigmoid flexure should be mentioned here, since it is observed with especial frequency in children and may lead to enormous sack-shaped dilatation of this portion of the intestine. The excessive length of the mesentery is responsible for this condition, since it allows a kinking of the colon at this place. This condition has been given the name of "Hirschsprung's Disease," after the clinician who first described it.

THE DEVELOPMENTAL STAGES OF CHRONIC CONSTIPATION

To be successful in the treatment of any given case of constipation, it is essential for the physician to be able not only to find its etiological factor, but also to recognize the stage of its development.

I recognize that the classification of constipation which I shall present in the following pages is somewhat schematic, and the arrangement of the different forms may not, in some

instances, be strictly correct; yet the plan of the subject as outlined has proven so satisfactory to me in practice, that I do not hesitate to adhere to it in this book.

1. *Atonic Stage*

Except in neurasthenically-disposed individuals, chronic constipation always begins with this stage, in which the musculature of the colon is relaxed.

[It appears, from the investigations of Schmidt and Strassburger, that this stage of constipation is due, not to atony of the intestinal musculature, but to too complete digestion and absorption of food in the intestine. As a result of this, the intestinal bacteria have not food enough left for their growth, and are therefore unable to form gases, acids, and other substances which appear to be normal stimulants to the intestinal wall; and the intestine, lacking this stimulation, fails in its peristaltic action. Lohrisch* has undertaken the systematic investigation of the stools of patients suffering from constipation, while on the test-diet. He found that the normal dried substance of the stools of three days' diet averaged 59.3 grams, while in constipation it averaged but 33.9 grams. This indicated that the digestion and absorption had been too perfect. He found that when he gave opium to normal persons,—which would produce a condition simulating atony of the bowels,—only the watery elements of the stool were reduced, while the dried substance was not altered. This indicates that lack of peristalsis cannot, of itself, produce the condition that has been called atonic constipation. No doubt, weakness of the muscles of the bowels plays some part in the production of constipation, but it does not appear to be the most important factor.]

The most prominent causes seem to be a too perfect digestion and absorption of food, poor growth of the normal bacteria of the bowel, and a consequent lack of the normal products of fermentation.]

[**Deutsch. Arch. f. klin. Med.*, 1904, Bd. 79, p. 383.]

2. *Catarrhal Stage*

This follows after the atonic stage has existed for years or decades, as a result of the irritating effect of the scybala upon the intestinal mucosa, or from the abuse of laxatives.

The diagnosis of this stage is made possible by the presence of membranous mucus surrounding the scybala.

We do not accurately know the real condition of the small intestine at this stage. We must assume, however, on the occurrence of flatulence during this period, that a catarrhal condition is gradually developing in this part of the intestinal canal.

3. *Spastic Stage*

This stage of constipation occurs as soon as the secondary enterocolitis, or the abuse of laxatives, has irritated the colon so that a persistent hypertonicity of its musculature has developed. In nervous, and especially in hysterical, individuals this stage sets in considerably earlier than in a person whose nervous system is in a normal condition.

4. *Membranous Enteritis*

This stage of constipation is still designated by a few authors as a "myxoneurosis" of the intestinal canal; but, as has already been mentioned, it is merely an advanced stage of chronic colitis.

The more marked is the stagnation of scybala in the colon, the more active is the secretion of mucus from Lieberkühn's glands of the mucosa; and since the fæces are often retained for several days, on account of the contracted condition of the colon, there is produced a large amount of mucus as a result of the absorption of the fluid constituents, as well as from the astringent effect of the acid fæces, and the mucus assumes a membranous formation which may be evacuated as an isolated cylinder of mucus, or may be expelled together with the fæces, completely surrounding the latter.

5. *Mucous Colic*

The so-called "mucous colic" is merely an acute exacerbation of membranous colitis. When the contraction of the

colon is too strong, obstructing the lumen of the gut, nature attempts to expel the mucus by violent peristaltic contractions of the colon, which cause great pain.

During these attacks, the patient often expels a glassful of mucus, which, when suspended in water, reveals its membranous formation.

After the evacuation of large masses of mucus, the patient is generally free from pain for some time, and presents during this period only the picture of simple spastic constipation, until another attack occurs.

6. *Stercoral Diarrhœa*

In very advanced cases of secondary catarrh of the intestine, chronic constipation may develop into diarrhœa. Such patients then generally suffer from alternating constipation and diarrhœa; for instance, after diarrhœa has existed for about a week, there is a period of absolute constipation.

These clinical cases are rather rare, but are found with some frequency in neuropathic individuals, or in patients who have been improperly treated for constipation. The secondary catarrh occupies the foreground in the clinical symptoms so prominently that only by the most careful anamnesis and examination can the physician trace its origin to a previous chronic constipation.

DIFFERENTIAL DIAGNOSIS OF THE VARIOUS STAGES OF CHRONIC CONSTIPATION

Atonic.—In this period of the disease, patients complain of nothing more severe than constipation, a dull feeling in the head, lack of desire to work, etc. Enemata and laxatives are both effective, but the latter must be changed frequently. There is no pain, flatulence, nor meteorism.

In the objective examination, the physician will find the stool of normal form and consistency, *i.e.*, of large calibre and covered only with the normal amount of mucus.

The sigmoid flexure, and usually the transverse colon as well, will be found filled with fœces which may usually be palpated.

Catarrhal.—This stage is recognized subjectively by the occurrence of flatulence after the use of irritating foods, such as flatulent vegetables, pastries, fat meats, cold drinks, etc.

Objectively, it is recognized by the admixture of mucus with the stool.

Spastic.—This stage of chronic constipation occurs almost simultaneously with membranous enteritis, and is easily differentiated from the atonic stage by the following signs and symptoms:

1. Colic is a frequent symptom. In slight cases, patients have flatulent colic; and in severe cases, mucous colic.

Every case of chronic constipation that runs its course with attacks of pain belongs to the spastic variety, in which inflammatory and catarrhal changes of the intestinal tube are demonstrable.

2. Laxatives are either not effective at all, or only so when given in very large doses, which produce great pain. Enemata likewise are usually ineffective.

3. Objectively, on palpation, the contracted transverse colon and the sigmoid flexure of the colon are found to resemble a hard cord, about the size of the little finger. The colon in this condition is sensitive to pressure.

4. Digital examination of the rectum reveals the fact that it is either entirely empty and contracted, or else is filled with fæces the size of the little finger; while in atonic constipation the rectum is, as a rule, entirely filled. In spastic constipation, the physician can frequently feel the contraction of the intestinal tube around the palpating finger.

5. The stool is of small caliber,—about the size of the little finger. It is sometimes ribbon-shaped, or its transverse section may sometimes be quadrangular. It would be an error, however, to assume from this that an organic stenosis exists in the lower portion of the colon, since these configurations of the fæces may likewise be caused by a spastic contraction of the intestinal musculature. In many instances, the stool consists of individual, short segments; while in the atonic form it is of large caliber and tubular.

6. Very frequently, besides the above symptoms, the physician will observe the above-mentioned membranous mucus. In a doubtful case, to demonstrate whether this is present, the patient should insert a soap suppository into the rectum and examine the resulting stool, placing it in warm water, when the mucus will spread out upon the surface of the water and thus be easily recognized. Or the examiner may follow the procedure of Boas,—flushing the intestine with one or two litres of water, small amounts at a time, and examining the return lavage-water for mucus. The lavage-apparatus described by Zweig may also be used for this purpose.*

By these subjective and objective signs and symptoms it is possible in most cases to determine the stage of the disease in any given case of chronic constipation.

Mucous colic is very easily recognized, especially since the patient will frequently bring the characteristic defecations to the physician, with the mistaken idea that he has a tapeworm.

The stage of mucous diarrhœa, or so-called stercor diarrhœa, is also easy of recognition. It is necessary, however, to prove by the anamnesis that constipation has existed for several years previous to the diarrhœal stage.

TREATMENT

For the rational treatment of chronic constipation, it is unqualifiedly necessary to have, in every concrete case, a clear understanding of the etiological factors and the stage of the disease from which the patient is suffering.

ATONIC STAGE OF CONSTIPATION.—The sole indication for treatment of this period of constipation is to produce spontaneous movements of the bowel.

The application of the following fundamental principles will accomplish this in the majority of cases:

Hygiene.—The physician should regulate the life of the patient by written directions, so that all causative factors of constipation, such as sedentary habits and occupations, are

* *Therapie der Gegenwart*, April, 1906.

FIG. 43c.



FIG. 43d.



FIGS. 43c, d. Exercise for consumption and to strengthen the abdominal muscles.

FIG. 43e.



Massage for constipation.

be avoided; and the patient should be advised to take up gymnastics, swimming, riding, walking to and from business or school, etc.

Gymnastic exercises are especially suitable for women with relaxed and weakened abdominal muscles. Exercises should be carried out night and morning, as follows:

With the hands clasped behind the head, the patient should raise and lower the trunk six to ten times, and then bend the trunk forwards and backwards, besides rotating the trunk and flexing and extending the legs.

Mechanical Treatment.—Patients with enteroptosis, “hang belly,” and diastasis of the recti muscles should wear a suitable abdominal bandage or support, and should have massage,—at first daily and later only two or three times a week. As a rule, 25 or 30 treatments are required, which should be given as follows:

The hand should be lubricated with vaseline and placed flatly extended upon the ileocæcal region, and the entire colon should then be stroked along its course to the sigmoid flexure, over which quite strong downward pressure should be exerted, when the hand should be returned to the cæcum and the routine movement repeated. The treatment should last from five to eight minutes. *

In the first one or two weeks of treatment, it will generally be necessary to resort to the use of enemata, consisting of $\frac{1}{4}$ litre of lukewarm water, every second day after breakfast.

It must be emphasized, however, that laxatives should be strictly forbidden and patients should be directed to go to the toilet every morning after breakfast.

Hydrotherapy.—Hydratic treatments,—such as cold friction, douches, half-baths, and fresh-water baths,—are useful only in the atonic form of constipation.

Electrotherapy.—In cases which respond to treatment stubbornly, it is often useful to apply a strong faradic current for about five minutes, using a flat electrode upon the abdomen, and a rectal electrode in the rectum. One of the older and most useful methods was that of introducing into the

* I have not entered into the remaining movements and details, for the reason that massage cannot be theoretically learned.

lower bowels 100 to 150 c.c. of lukewarm water, through a glass funnel and Naunyn's intestinal tube, in order to establish a contact between the membrane of the rectum and the metal of the electrode.

I have obtained especially good results in the constipation of *tabes dorsalis* by this treatment.

Diet.—The diet must be such as will furnish an abundance of waste matter in the intestine, and should therefore be rich in cellulose and of such a character as will mechanically stimulate the mucosa. In arranging the dietary for such patients, cold drinks should be included, such as a glass of cold water upon arising in the morning, soda water, Apollinaris, etc., with or without fruit-juices, such as raspberry, lemon, etc.; also tea and malted coffees (bean coffee being excluded), buttermilk, sour milk, sugar of milk, koumiss (twice daily), butter, all kinds of fruits and vegetables in every form,—cooked or raw,—legumes, pumpernickel, honey-cake and meats of all kinds, but in limited amounts; the only wines allowed should be the white varieties, such as Moselle, Rhine, or White Bordeaux, Hautes Sauternes, etc.

Constipating foods,—such as red wines, cocoa, cereal soup, rice, grits, sago, etc.,—are contraindicated. For full details the reader is referred to the special diet-tables in the Appendix.

Medicaments.—Only in cases in which chronic constipation is not the primary trouble, but only a symptom of some other disease of the intestine, stomach, or other organs of the body, may the patient be allowed to avoid a severe dietary regime and resort to the use of laxatives. Such is the case in arteriosclerosis, diseases of the heart, kidney affection, marked obesity, diabetes, and especially in *habitus apoplecticus*, diseases of the female genital organs, and naturally also chronic appendicitis and stenosis of the intestine.

For temporary relief, the most suitable remedies are castor oil in doses of two or three tablespoonfuls or 8 or 10 capsules, in a glass of one of the laxative mineral waters, or a teaspoonful of Carlsbad salts dissolved in a glass of lukewarm water, to be taken on the empty stomach.

The following preparations are the most desirable laxatives for extended use:

1. Grillon's or Kanoldt's tamarind tablets, $\frac{1}{2}$ to 1 tablet in the evening.
2. Wine of cascara sagrada, one or two teaspoonfuls in the evening.
3. Compound licorice powder, $\frac{1}{2}$ to 1 teaspoonful in the evening.
4. Rhubarb tablets, each containing 0.5 [gr. viiss], in the evening.
5. St. Germain tea, 1 tablespoonful to a cup of hot water, in the evening.
6. Cortex frangulæ, 1 tablespoonful in a cup of water in the evening.
7. Cascara tablets.
8. Marienbad and Schweizer pills.
9. Extract of rhubarb 10.0 [3iiss], sodium sulphate 20.0 [3v], and bicarbonate of soda 20.0 [3v], taken in $\frac{1}{2}$ to 1 teaspoonful doses in the evening.
10. As alternatives: Purgen, exodin, regulin, etc.

For acute cases, aloes and jalap may also be recommended.

SPASTIC STAGE OF CONSTIPATION.—The treatment of this form of constipation is essentially different from that of the above, for the reason that in addition to the constipation, the membranous enteritis and mucous colic must also be simultaneously treated. The cases associated with mucous or stercoral diarrhoea require anticatarrhal treatment.

In the therapy of the spastic variety of constipation, it must be kept in mind that the intestine is in an irritable condition, that the mucous membrane is inflamed, and that the intestinal musculature is in a state of hypertonicity.

Hygiene.—As much rest as possible should be prescribed, especially after eating. In severe cases, especially in neuropathically-inclined individuals, two or three weeks' rest in bed,—preferably in a sanitarium,—is absolutely essential if the patient is unable to secure the necessary rest at home. Natur-

ally, this requires freedom from all worry and anxiety,—otherwise favorable results will not be obtained from the treatment.

Mechanical Treatment.—Massage is contraindicated, because its use would aggravate the spasmodic contraction of the colon. The abdomen should be kept warm by woolen bandages, while abdominal supports are necessary only in cases associated with enteroptosis or “hang-belly.”

In this stage, Fleiner’s oil-treatment is of great value.

My usual procedure is to introduce 300 to 400 c.c. of sesame or olive oil, at body-temperature, into the rectum about 10 o’clock in the evening, just before the patient retires. The patient should assume the left-side position, and the oil should be allowed to enter the bowel slowly through a Naunyn rectal-tube connected with a glass funnel. After the introduction of the oil, the patient should lie on the abdomen for about a quarter of an hour. The introduction of oil into the rectum with an ordinary hard rubber syringe is ineffective since the oil does not reach high enough. The physician should never neglect to advise the patient to protect the bed from becoming soiled by the treatment, since otherwise, because of its uncleanness, he might become disgusted and refuse to carry it out. The oil should be retained in the intestine at least until the following morning.

In the beginning of treatment, oil should be introduced every other day; and later, every third day. I generally instruct patients to omit the treatment on those days when there has been a spontaneous evacuation of the stool, and to resort to its use again in the evening of the first day when the bowels have not moved.

The oil dissolves the hard scybala which have remained in the folds of the colon, often for several days, and which have maintained the spasm of the musculature. In addition to this, the oil is decomposed into fatty acids, which excite peristalsis and produce both mechanical and chemical stimulation of the bowels.

Hydrotherapy.—Cold procedures are contraindicated. Inasmuch as it benefits the general neurasthenical condition, I advise p

tracted lukewarm baths, at a temperature of about 25° to 30° R. [88°–100° F.], lasting about $\frac{1}{2}$ hour; or the pine-needle baths, containing $\frac{1}{4}$ litre of the extract in each bath; besides moist, warm abdominal bandages, consisting of a wet towel covered first by oiled paper or oiled silk, then by a woolen bandage, and worn during the night.

Diet.—In contraindication to the coarse constipation-diet indicated in the atonic form, the mild constipation-diet should be used in this stage of the disease, for the reason that the coarse foods, rich in cellulose, would aggravate the spasm of the colon, and might easily cause secondary membranous enteritis of the intestine, or give rise to very frequent or persistent diarrhoea.

The mild constipation-diet consists of the following: Tea, malted coffee, and fruit-juices, which should never be taken cold; milk, white wines, white Bordeaux,—such as Hautes Sauternes,—cream, koumiss, buttermilk, sour milk, soft cheese, and a tablespoonful of sugar-of-milk three times daily dissolved in liquid foods; only light vegetables,—such as peas, carrots, asparagus, cauliflower, spinach, and Brussels sprouts, chestnuts and potatoes,—all to be served in the purée form. The patient should eat freely of sweet fruit-sauces, honey, and marmalades made from the raspberry, orange, plum, grape, apple, date, etc.

The diet in spastic constipation should stimulate peristalsis chemically; in atonic constipation, mechanically.

The following foods should be forbidden: Coarse breads, acids, sour fruits, flatuous vegetables,—such as cabbage, peas and beans,—red wine, goose, duck, eel, salmon, and sardines in oil.

Balneological Treatment.—Treatment at a mineral-water resort need be considered only in severe cases of spastic constipation.

Before sending a patient to such a place, it is advisable to examine the gastric contents by means of a test-breakfast, in order to determine whether hydrochloric acid is secreted in normal, diminished, or increased amounts.

When the hydrochloric secretion is normal or increased in spastic constipation, with a secondary membranous enteritis and gas or mucous colic, I send the patients to Carlsbad, Fran-

zensbad, Neuenahr, or Vichy, where they drink the thermal waters and have the hot mud-poultices applied to the abdomen.

When hydrochloric acid is diminished or absent, such patients should be sent to Kissingen, Homburg, or Wiesbaden. The details of treatment should be directed by the attending physician at the watering-place.

Medicinal Treatment.—Purgatives are contraindicated because they are very often the cause of the trouble, because they increase the secondary catarrh of the intestine, and because they are effective only in very large doses.

Sedatives, on the contrary, just as in lead colic, are indicated as in the following prescriptions:

1. ℞ Extracti belladonnæ foliorum, gr. ivss-vij 0.3-0.5
M. ft. pil. No. xxx. Sig.—One pill after meals, t.i.d., in simple spastic constipation with gas and mucous colic.
2. ℞ Tincturæ belladonnæ foliorum, gtt. lxxx-℥iiss 5.0-10.0
Spiritus menthæ piperitæ, gtt. lxxx 5.0
Tincturæ valerianæ, ℥iv-℥v 15.0-20.0
M. Sig.—Thirty drops in a cup of hot carminative tea, t.i.d.
3. ℞ Extracti belladonnæ foliorum, gr. ivss-viiss 0.3-0.5
Extracti opii, gr. vi-xii 0.4-0.8
M. ft. pil. No. xxx. Sig.—One pill t.i.d. for very nervous patients.
4. ℞ Extracti belladonnæ foliorum, gr. ivss 0.3
Spiritus menthæ piperitæ, gtt. xv 1.0
Tincturæ valerianæ, ℥i 30.0
M. Sig.—Twenty-five drops t.i.d.

A cup of carminative tea, as hot as possible, taken morning and evening for several months is very helpful. (A tablespoonful of equal parts of valerian, peppermint, fennel and caraway, steeped in a cup of hot water, is a very suitable preparation. A glass of hot water taken night and morning also tends to relax the spasm of the bowels.

For patients who suffer very severely from colic, and those who travel, I prescribe a compressed tablet of atropine sulphate containing 0.0005 [$\frac{1}{2000}$ gr.], twice daily after eating, the temporary use of which is not injurious.

Morphine should not be prescribed in these cases.

PROGNOSIS AND COURSE

Successful results are obtained in most cases, the patient being permanently cured, or at least remaining well for a number of years. I have obtained the least satisfactory results in treating persons who were excessively obese, or very nervous, or in the case of women in the climacterium.

Very successful results are quickly obtained from diet and massage, in enteroptotic and under-nourished patients suffering from the atonic form of constipation. It is very frequently the case, that after the first week of treatment their bowels become normal.

Cases of spastic constipation are more difficult to treat, for the reason that, in addition to the constipation, there is the catarrhal factor to combat, as well as the increased reflexibility of the nervous system. I have, however, obtained most satisfactory results,—even after constipation had existed for fifteen years or more,—through rest, hot applications, belladonna, oil enemata, and a suitable mild constipation-diet.

It is particularly necessary in this disease to individualize in the selection of the proper therapy. Until the physician's experience is large, it is well for him to follow the above-mentioned differential diagnostic principles, namely:

Constipation without pain indicates atonic constipation; constipation associated with gas and mucous colic indicates spastic constipation.

The therapy directed according to the above will usually be correct.

To treat atonic cases with oil enemata is superfluous; and to treat spastic constipation with a coarse constipation-diet is an error, since it would aggravate the associated catarrhal condition of the mucosa.

PROPHYLAXIS

Only the family physician, who knows accurately the pathogenesis, the symptoms, and the course of the disease in the individual, is in a position to prevent the later stages by

the timely institution of suitable therapeutic measures. For instance, in enteroptotic individuals he can prescribe a sufficiently nourishing diet, exercise, fresh air, and a yearly outing and vacation.

CLOSING REMARKS

There are few diseases so strikingly the result of our over-refined civilization, and directly attributable to insufficient exercise, diet containing too little waste matter, loss of appetite, and disturbances of the stomach, as *chronic constipation*.

It would be interesting to know whether this disease is as widely prevalent among the wild tribes who subsist largely on raw foods. It may safely be assumed that such is not the case.

CLINICAL CASES

1. *Atonic Constipation*

CASE 1.—Minnie F., 45 years old, had been constipated from 15 to 20 years and had used all kinds of laxatives, which had lately been ineffective, unless taken in very large doses. She had suffered no pain, but had experienced lassitude and loss of appetite. The physical examination was negative. The patient had a *normal habitus*. The treatment consisted of massage, a coarse constipation-diet and faradization. After two weeks, the stools became normal and remained so for the five years the patient was under observation; and during this time she increased 15 or 20 pounds in weight.

CASE 2.—Clara B., 30 years old, had for ten years been unable to obtain any action of the bowels by natural means, always having resorted to laxatives or enemata. For one year the patient had complained of pressure in the epigastrium after eating, for relief of which she sought treatment at the polyclinic. The patient had never suffered from pain in the abdomen. Examination showed her to be enteroptotic, and suffering from emaciation and anæmia. Otherwise the findings were negative. The patient was prescribed a heavy fattening-constipation diet, bitters and massage. After eight days the stools became normal. The patient afterward gained 12 or 15 pounds in weight and remained permanently well.

CASE 3.—Mrs. H. W., 38 years old, had not had a spontaneous evacuation of the bowels for 10 or 12 years. The abdomen was large and pendulous. After two or three weeks of treatment, the patient was permanently cured, since which time she has increased considerably in weight.

2. *Spastic Constipation*

CASE 1.—Mrs. O. S., 40 years old, had been constipated for 15 or 20 years, during the early part of which period she had never had abdominal pains. For the past several years she had suffered from colicky pains, vomiting, and the evacuation of mucus and gases from the bowel. The patient alleged that on several occasions she had had stercoraceous vomiting, and that she was sent to the hospital for operation for ileus, should the latter become necessary. At this time laxatives were effective only when given in very large doses, and then accompanied by violent colicky pains. Enemata were unsatisfactory. The patient was very anæmic and emaciated, and there was a marked gastroptosis. In palpation, the colon was of the size of the little finger, and very sensitive. The bowel-movements consisted either solely of membranous mucus, or of mucus admixed with fæces, of the caliber of a lead-pencil. Treatment consisted of the administration of oil enemata, at first every third day, and later less frequently, continued for three or four months. 0.015 [$\frac{1}{4}$ gr.] of the extract of belladonna was given three times daily and a mild constipation-diet used. The patient was under observation for three or four years, during which time she remained entirely well.

CASE 2.—Mrs. Emily P., 55 years old, had had a laparotomy performed, twelve years previously, since which time she had been continuously constipated. For the past four or five years, the patient had passed much mucus from the bowels, and suffered a great deal from "wind colic." She was permanently cured by the treatment outlined in the previous case.

CASE 3.—A coachman 50 years old had suffered for years from sluggishness of the bowels, being obliged to resort to the use of laxatives very frequently. After errors in diet,—such as eating cucumbers and heavy cheese,—the patient always suffered from violent colic. After treatment for two weeks,—consisting of rest in bed, hot applications, oil enemata, and the mild constipation-diet,—the patient was permanently cured.

3. *Mucous Colic*

CASE 1.—Mrs. Clara B., 30 years old, had for several years suffered from constipation; and for one or two years, from mucous colic and periods of mucous diarrhœa. The latter would continue about eight days, when it would be succeeded by about one week of complete constipation. The patient was an hysterical subject. Enormous quantities of mucus and epithelial cells were mixed with the fæces, and the stools had a caliber about that of a lead-pencil. Treatment with atropine gave some relief, but the patient was not cured. Temporary improvement followed residence in the country.

APPENDIX

The Relationship between Constipation and Diarrhœa

Although constipation and diarrhœa appear to be two diametrically opposed symptoms, they are sometimes observed either simultaneously in the same individual, or the one following the other,—which will not seem paradoxical to the careful reader of the previous chapter. For a clear and correct understanding of the relationship between the two, however, a few remarks should be made.

The factor by which both constipation and diarrhœa are associated in the same individual is a chronic catarrhal condition of the colon.

Colitis of a mild degree runs a course with constipation as a result of hypertonicity of the musculature of the bowel caused by an irritation of the mucosa. If, at this time, any such factors as indigestion, exposure to cold, or irritation caused by the stasis of fœces in the bowels appear, the inflammation of the mucosa is increased, which causes diarrhœa.

I have had under observation a business man 40 years old, who was treated for acid gastritis and a mild catarrh of the small and large intestine. When the patient was on a non-irritating diet, two or three stools partly formed and partly of semi-solid consistency were passed daily. Whenever the patient indulged in errors in diet, such as over-loading the stomach, the use of acids, or eating fried potatoes, etc., there was constipation for two or three days, associated with meteorism; while after gross errors in diet, such as the free use of cold beer,—gnawing, stabbing pains immediately appeared in the abdomen, accompanied with diarrhœa.

Another patient, a manufacturer, 54 years old, who suffered from achylia and intestinal catarrh, was ordinarily constipated. Profuse diarrhœa always occurred immediately after eating food containing coarse meat-fibre.

In ileocœcal catarrh, the alternation of constipation and diarrhœa is the rule.

In spastic constipation with membranous enteritis, a period of four to six weeks of constipation is frequently followed by an attack of mucous diarrhœa.

In chronic intestinal catarrh associated with diarrhœa a period of total constipation often follows an improvement in the former condition.

Stercoral diarrhœa occurring in the course of habitual constipation has already been mentioned, and is well known to every practitioner.

Diarrhœa alternating with constipation can scarcely be caused by purely nervous influences. An exception to this condition may perhaps be mentioned here, namely, the intestinal symptoms which occur in exophthalmic goitre.

Naturally, patients suffering from paradoxical symptoms should receive anticatarrhal treatment, consideration and attention being given at the same time to the irritability of the sympathetic nervous system usually present in these cases.

Neuroses of the Intestine

When compared with gastric neuroses, purely nervous affections of the intestine are relatively less frequent, if we except habitual constipation, the nature of which has been described in detail in the foregoing chapters. In an affection which, in individual cases, is greatly modified by the irritability or weakness of the intestinal nerves, the nervous factor often determines whether the constipation will assume the atonic or the spastic form.

In a neurasthenical or hysterical individual suffering from an intestinal neurosis, a great variety of symptoms in the mesogastrium and hypogastrium are complained of. It is an interesting fact, however, that an accurate examination of the fœces will reveal the presence of an anatomical lesion, usually of a catarrhal nature, in the majority of these cases. As a further proof that these cases are due to organic alterations of the mucosa rather than to neuroses, the fact may be mentioned that such patients improve if given a treatment adapted to an organic affection, while no improvement of the symptoms results from purely antinervous treatment.

It seems certain, at the present time, that such conditions as arteriosclerosis and syphilis also play a causative rôle in the production of many of these vague disturbances in the abdomen, which were formerly considered as of nervous origin. Our

present methods of investigation, however, are too imperfect to inform us fully as to the exact anatomical changes present.

The physician must, for these reasons, use the greatest caution in making a diagnosis of a neurosis of the intestine, and should arrive at such a conclusion only when, (1) all evidences of an organic disease are absent, and (2) when in any given case the symptoms are not influenced in any way by dietetic treatment; while, on the other hand, depending upon the condition of the nervous system, the patient's condition is better or worse.

It is self-evident that a neuropathic individual with markedly increased reflex irritability will react more strongly to slight pathological irritations than an individual with a stable nervous organization.

Also the fact that *habitus enteropticus*, which has already been frequently mentioned, is of considerable importance in the diagnosis of intestinal conditions, need not be especially emphasized.

It is a fact that severe enterocolitis, with its unpleasant symptoms of flatulence, meteorism, colic, etc., is observed with especial frequency in enteroptotic and neurasthenical individuals. That in such cases we have an organic disease of the intestinal mucosa to deal with is proven by the presence of mucus in the fæces in most of these cases. One may even go a step further, and maintain that a great number of the nervous symptoms are dependent upon the organic affection of the bowels, the treatment and removal of which almost always cause a complete disappearance or an amelioration of the nervous symptoms.

The diagnosis of "nervous diarrhœa" is often erroneously made along the same line. This is an extraordinarily rare affection; in by far the majority of cases we have to do rather with a combination of neurasthenia and intestinal catarrh.

The intestinal neuroses may be conveniently divided into: (a) motor, (b) sensory; and (c), secretory.

From the practical standpoint, only the following are of importance and significance:

Atony of the Intestine.—We have considered chronic atony in the chapter on Habitual Constipation; and the acute weakness of the intestine, in the chapter on Intestinal Obstruction. The latter occurs primarily only in either marked congenital or acquired enteroptosis, and secondarily after trauma, laparotomy, peritonitis or shock, which cause acute paralysis of the intestine.

The diagnosis of acute intestinal paralysis, or the so-called paralytic ileus, is made from the absence of violent pain, fever, and intestinal "stiffenings."

Chronic intestinal atony is identical with atonic constipation, the diagnosis and therapy of which have already been discussed.

The therapy of the acute form consists in the administration of laxatives and in high irrigations of the colon.

The following combination is the most suitable for use in the latter:

Castor Oil, 2 tablespoonfuls;
Cod-Liver Oil, 1 tablespoonful;
Bicarbonate of Soda, $\frac{1}{2}$ teaspoonful;
Warm Water, 1 to 2 litres.

The above should be well emulsified and introduced with the patient in the knee-elbow position.

The best laxatives are castor oil, laxative mineral waters, rhubarb, and jalap.

Intestinal Spasms.—Spasm as an intestinal neurosis is extremely rare; much more frequently we find a catarrhal condition associated with it, as evidenced by the presence of mucus in the stools, and the occurrence of diarrhoea after errors in diet, taking cold, etc. I wish to emphasize again, as has already been mentioned in the chapter on Constipation, that in nervous individuals an enterocolitis will produce a contraction of the intestinal musculature earlier than in non-nervous persons.

Symptoms.—Patients have a feeling of pressure or tension across the abdomen, similar to the "girdle-symptom" of locomotor ataxia, in consequence of spasm of the transverse

colon. This spasm is usually associated with frequent colicky, cutting, and sometimes cramp-like pains around the umbilicus, generally radiating from right to left, lasting a few minutes, and disappearing after the escape of gas. By palpation, the colon, and especially the transverse colon and the sigmoid flexure, will be found to resemble a hard cord or band about the size of the little finger, and sensitive to pressure.

Intestinal obstruction, or the so-called spastic ileus, may result from a very severe spasm of the intestinal musculature (see below).

Treatment.—Since intestinal spasm is usually a symptom of intestinal catarrh, the latter should always be treated as the primary condition; although sedatives and antispasmodics, such as bromide and belladonna, are indicated, from the fact that the spasmodic feature is more frequent in hysterical and neurasthenical subjects.

1. ℞ Potassii bromidi, ℥i 30.0
Sig.—A knifepoint in milk or water night and morning.
2. ℞ Extracti belladonnæ foliorum, gr. $\frac{1}{4}$ – $\frac{1}{2}$ 0.01–0.02
Ft. pil. or chart. i, No. xii. Sig.—One t.i.d.
3. ℞ Extracti opii, gr. $\frac{1}{4}$ – $\frac{1}{2}$ 0.02–0.03
M. ft. pil. i, No. xii. Sig.—One t.i.d.

The dietetic, balneological and hydropathic treatment is the same as in mild enterocolitis associated with constipation.

The patient should, therefore, be put on a light constipation-diet and Wiesbaden or Vichy mineral water, and the use of mud-poultices applied to the abdomen, and a Priessnitz bandage at night. Nervous patients should be given Carlsbad water,—which contains Glauber's salt,—with caution, and then only in small doses.

Lead Colic.—Lead colic is the result of an actual spasm of the intestinal musculature, occurring in painters, plumbers, boxmakers, etc.

A diagnosis of the condition is very readily made if constipation associated with colicky pains occurs in one engaged in any of these occupations. Patients with lead colic have usually passed dry hard stools of very small caliber for a long time, until they have finally become completely constipated. Severe mesogastralgia occurs, which is intensified by the use of laxatives.

The intestine is contracted and the blue line on the gums is usually demonstrable, or at least the anamnesis generally shows that the patient is engaged in some occupation in which he comes into contact with lead.

The treatment of lead colic consists in the use of hot compresses, oil enemata, or 0.06 [gr. i] of the extract of opium three or four times daily, and the later use of potassium iodide and sulphur baths.

Nervous Diarrhœa.—Acute nervous diarrhœa is the result of greatly increased peristalsis, caused by intense emotional excitement, especially fright. At first the stools are formed, and later they consist only of watery evacuations in which almost the entire contents of the bowels may be expelled in from half an hour to an hour, without any evidence of their being pathological.

Chronic or frequently recurring diarrhœa is hardly ever of purely nervous origin, but is generally associated with a catarrhal inflammation of the intestinal mucosa, with the exception of the diarrhœa which occurs in Basedow's disease.

Acute nervous diarrhœa does not require treatment, while the chronic form should be treated with a catarrhal diet and catarrhal medication. The catarrh of Basedow's disease should be treated in connection with the primary disease.

Peristaltic Unrest of the Intestine.—This condition is treated by various authors as an intestinal neurosis. I must say, however, that I have never seen an undoubted case of this sort. The peristalsis of the small intestine, which is so frequently seen in women with pendulous abdomen or with broad diastases of the recti muscles, is normal; on the other hand, the so-called intestinal "stiffenings," considered by Nothnagel as a symptom of stenosis or obstruction of the intestine, are pathological. Borborygmus is a sign of abnormal fermentation of food in catarrh of the small and large intestines.

From the practical standpoint, peristaltic unrest of the intestine is of no importance.

Flatulence and Meteorism.—I have already shown that these conditions are symptoms of enterocolitis. The fact that they occur very frequently in hysterical persons is no evidence that the affection is not of a catarrhal nature. They are

frequent in nervous women with enteroptosis who have suffered from habitual constipation for a number of years, which in turn has caused a secondary membranous enteritis and a spasmodic condition of the colon. It is quite clear that, through a rapidly developing spasm of the colon, stagnation of the fluid fæces occurs, which gives rise to meteorism.

Membranous Enteritis.—This condition, which is still regarded by some authors as an intestinal neurosis, must be considered at the present time as merely a colitis secondary to habitual constipation.

Mucous colic is an acute exacerbation of a chronic colitis.

The same relation exists between chronic colitis and mucous colic as between cholecystitis and gall-stone colic.

For further details concerning membranous enteritis, the reader is referred to the special chapter on Chronic Constipation.

Intestinal Neurasthenia.—In this condition it is more accurate to speak of the neurasthenia which occurs in patients suffering from intestinal affections. The subject requires a special consideration.

Hypochondriasis and melancholia are accompanying phenomena in many cases of chronic constipation. Such patients have their minds continually upon their intestinal functions, anxiously and accurately noting all symptoms almost despairing if the chosen purgative does not produce the expected results, etc., etc. Actual psychoses may develop in this way, which may even lead to suicide.

If constipation has already existed for several years and has led to enterocolitis, or to its incipient stage, the abdominal symptoms of fermentation will cause much anxiety and suffering. The patients complain of tremor, of their hands' being hot, of cerebral congestion, a feeling of heaviness in the extremities, tension in the abdomen, lack of desire to work, insomnia, anorexia, nausea, emaciation, sensations of fear and mental depression. These secondary symptoms are most frequently associated with enterocolitis which runs

course with spastic constipation. They occur more rarely in other forms of the disease, because the fermenting fæces are rapidly evacuated by the associated diarrhœa.

This entire symptom-complex has been designated as **Flatulent Intestinal Dyspepsia**.

These symptoms must be explained as a reflex irritability of the splanchnic nerve; I will only mention the fact that many authors assume autointoxication as their cause, and while this is quite possible, it has not yet advanced beyond the stage of a hypothesis.

Treatment.—The therapy of intestinal neurasthenia consists in those measures which will cure the constipation and the resulting flatulence. If the physician is successful in doing this, the hypochondriasis disappears and the vasomotor and reflex troubles become considerably better, being often entirely relieved. The tendency to relapse, however, generally remains in these cases.

It would be a great mistake to endeavor to cure the neurasthenical affection solely by hydrotherapy, electricity, massage, etc., without taking into consideration the associated intestinal condition.

INTESTINAL DISTURBANCES IN DISEASES OF OTHER ORGANS

In the absence of anatomical affections of the intestine, the latter shows much fewer symptoms than does the stomach, when other organs of the body are diseased.

The diarrhœa which occurs in exophthalmic goitre and tabes dorsalis need only be mentioned. If diarrhœa or intestinal hemorrhage occurs in tuberculosis, arteriosclerosis, cardiac disease, nephritis, cirrhosis of the liver, pericarditis, or diabetes, these are the result of secondary catarrh or ulceration of the intestine,—both of which have already been described.

Parasites of the Intestine

It is not one of the tasks of this book to give a systematic discussion of the parasites of the intestine. For a full consideration of this subject, the reader is referred to the larger

works of Mosler and Peiper, Braun, Von Jacksch, etc. Some of the diagnostic and therapeutic suggestions, merely, will be given here.

Diagnosis.—The subjective symptoms of intestinal parasites in children are nausea, vomiting, loss of appetite, and itching of the nose or anus, particularly at night. The presence of a tapeworm, or of a large number of smaller worms, may produce colicky pains, although these are generally of rare occurrence. Adults who have tapeworms frequently experience unpleasant sensations after such foods as herring, soured pickles, coffee, light beer, etc.

The above-mentioned symptoms are, however, so uncertain and are observed in so many other affections, that the physician should never undertake the treatment of tapeworm without objective proof of the presence of the parasite.

The objective symptoms are as follows:

The macroscopic demonstration of the worms themselves, or of some of their mature segments, or the microscopic demonstration of their ova or of Charcot-Leyden crystals in the stool (see illustration, page 250).

The segments of the worms are generally brought to the physician, who, in order to best examine them, should press the segments out flat between two cover-glasses fastened at both ends.

But few ramifications of the uterus will be observed in the *tænia solium* of pork; while a great many, number from 30 to 40 on both sides, are observed in the *tænia saginata* of beef.

A person infected with the *tænia solium* is in constant danger of infecting others, so that unless precautions are used both the patient himself and his family are liable to cysticercosis. For this reason, the differentiation between the two tapeworms is of considerable practical importance.

In children who are suspected of having worms, the examiner should wipe the anal mucous membrane with a spatula and examine the specimen microscopically, where oxyuriasis or their ova are frequently found.

If nothing is observed from the macroscopical examination of the stool, the latter should be examined for ova and Charcot-Leyden crystals, according to the methods outlined in the General Section on the Examination of the Fæces.

The microscopical examination is of especial value to ascertain, in cases of tapeworm, whether the head has been found or not, as it is only by this means that the physician may anticipate a recurrence.

It should be mentioned that occasionally, for some unknown reason, the ova are not detected, even when the tapeworm is present.

If the examiner does not have access to a microscope, and desires to assure himself whether or not a worm is present, he should administer castor oil or worm-lozenges before instituting the actual cure.

TREATMENT

1. *The Smaller Worms, such as Ascarides, Oxyurides, etc.*—The most certain vermifuge is santonin, which should be given alone in troches, or in powder form combined with calomel, as in the following prescriptions:

1. ℞ Santonini,
Calomel, āā, gr. ʒ-iss, 0.03-0.1
Saccharianin, q.s.
M. ft. pulv. Dos. vi. Sig.—A powder night
and morning.
2. ℞ Olei chenopodii,
Mucilaginis acaciæ, āā, gtt. xc
Aquæ destillatæ,
Syrupi aurantii corticis, āā, gtt. xc
M. ft. emulsio. Sig.—One-half teaspoonful t.i.d.
3. ℞ Olei chenopodii, ℥i 30.0
Sig.—Eight to fifteen drops t.i.d., after a laxative.

This treatment should be repeated every three to six months in children, until the worms are expelled; and it is more effective if irrigations are given every evening while the remedy is being taken, so that the benumbed parasites of the

colon may be washed out before they again become active. The most suitable preparation to be used in this way is an infusion of three or four garlic leaves in a cup of water.

In cases of oxyuris, it is useful to anoint the anus every evening with gray salve, which will kill the worms that escape from the rectum during the night. The tincture of absinth is also effective when taken in doses of $\frac{1}{2}$ to 1 teaspoonful three times daily.

2. *Tapeworms*.—It is often very difficult to bring about the expulsion of tapeworms, especially in patients who vomit the administered vermifuge. As a general rule, I conduct the treatment as follows:

At 8:00 o'clock in the morning, the patient is given a dry roll; at 12:00 o'clock a plate of soup and a small amount of vegetables, but no meat; at 4:00 o'clock, a cup of coffee; at 7:00 o'clock, some herring, or an Italian herring salad; at 10:00 o'clock in the evening, he should take two tablespoonfuls of castor oil, which will usually oblige him to go to the toilet during the night. The next morning about 6:00 o'clock, he should take four or five capsules, each containing 1.0 [gr. xv] of the fresh oleoresin of aspidium. At 6:30 o'clock, A.M., the patient should again be given four or five capsules and at 8:30 A.M., two tablespoonfuls of castor oil, a glass of mineral water or a tablespoonful of an infusion of senna every half-hour.

The movements of the bowels resulting from the above treatment should be deposited in a closed vessel and thoroughly examined for the head of the tapeworm.

If the physician does not wish to conduct the examination personally, he may instruct the patient that the head is nodular thickening on the tapering end of the worm and that it shows four dark points.

If only segments of the worm are passed, or if only one end of the worm protrudes from the anus after the second dose of castor oil, a thorough irrigation with two or three litres lukewarm water should be given, when usually the head of the worm, which has been lying benumbed in the intestine, will be obtained.

During the treatment, the patient should remain in bed.

If the results are negative after one or two "cures" have been given, the patient should place himself under the immediate

diate observation of the physician, who should supervise the irrigation and procedures of treatment at the correct time.

The expulsion of a tapeworm is especially difficult in children. The extract of male fern should not be administered simultaneously with oil, as the latter renders the constituents of this poison soluble, which if absorbed might cause hepatitis and intoxication.

In addition to the above-mentioned extract of male fern, the administration of which should always be tried first, the following vermifuges may be used:

1. ℞ Extracti filicis maris æther., gtt. xlviij to lx 3.0-4.0
 Chloroformi, gtt. vi
 Olei ricini,
 Mucilaginis acaciæ, āā, ℥i 30.0
 Aquæ destillatæ, q. s. ad ℥viss 200.0
 M. ft. emulsio. Sig.—Introduced through a stomach-tube early
 in the morning.

2. ℞ Granati corticis, ℥i-℥iiss 30.0-50.0
 Mac. per hor. xii cum 200-300 aq. dest. deinde coque ad remanentiam 150.0
 Sig.—Drink the above or, preferably, introduce it through a stomach-tube, early
 in the morning.

CONTRAINDICATIONS.—The contraindications against the use of the tapeworm remedies are gastro-enteritis, or a condition of emaciation and weakness, because the tapeworm treatment is extremely exhausting to the patient, and not only aggravates the existing catarrh but also is frequently the cause of a gastro-enteritis, which might become permanent.

Since the life of the tapeworm is about six or seven years, it is always better to await the death of the parasite than to weaken an already enfeebled patient by a radical cure. I have several times observed the final disappearance of a worm in cases where two or three inefficient treatments had been given and the trouble had always recurred.

There should be an interval of three or four months between two treatments for tapeworm, to allow the mucous membrane of the intestine to return to its normal condition,—otherwise the tapeworm would be the lesser evil.

COMPLICATIONS.—Complications in the treatment of tape-worm are intoxications. Death has resulted from the use of male fern, but usually only after excessive doses of 15 to 20 grams or more.

Symptoms of intoxication are a severe, painful, and ever bloody diarrhœa; enlargement of the liver, jaundice, fever, coma, albuminuria, amaurosis, and collapse.

The treatment consists in the administration of stimulants. If the patient survives immediate danger, the condition should be treated as any other toxic gastro-enteritis or hepatitis.

Poisoning from santonin causes vertigo, cramps, yellow vision, etc.

REMARKS

Concerning the other parasites of the intestinal canal, we cannot go into detail. A discussion of the various infusoria is of no practical importance, for the reason that a patient thus infected always suffers from intestinal inflammation or ulceration, which should be treated as such.

Ankylostomiasis should also be treated with male fern, while trichocephaliasis, in which the eggs are frequently found in the stools, should be treated with santonin. The remaining parasites are curiosities in Germany.

DISEASES OF THE RECTUM

Although exactly the same diseases affect the rectum as the other portions of the intestinal tract, I will, for practical purposes, devote a special chapter to their consideration.

Here again we have primary, organic diseases,—such as catarrh, inflammations, ulcerations, and new growths,—and secondary organic conditions,—such as stenoses, dilatation, fistulæ, abscesses, prolapsus of the rectum; and finally functional-nervous diseases of the rectum,—such as relaxations, spasms, crises, etc.

I have considered only the individual affections that are of interest to the internist. Many of the diseases of the rectum must be left to the treatment of the surgeon.

One of the most important things to emphasize in this place is, that the physician should never permit himself to neglect making a digital examination of the rectum.

For an accurate examination, a rectoscope,—preferably that of Strauss,—is essential.

Method of Examination of Rectum and Sigmoid with Sigmoidoscope

[Any of the recently perfected instruments—such as Tuttle's or Strauss's rectoscopes or Stern's colonoscope—are suitable. The instrument should be of sufficient length (13 inches) to reach well into the sigmoid, and should be equipped with an electrical lamp situated in the exploring end of the sheath of the instrument.

Preparation of the Patient.—The successful use of the sigmoidoscope demands that the sigmoid and rectum be empty at the time of the examination. To insure this, oil or a saline should be administered from 12 to 18 hours in advance; also a thorough cleansing enema should be given, preferably one or two hours before the examination, to allow sufficient time for all the water to be expelled. If diarrhœa exists, the administration of 15 minims of the deodorized tincture of opium an hour before the insertion of the instrument will usually suppress the watery discharges for the time being. The bladder must be emptied before the examination. The external parts should be carefully inspected and palpated and a digital examination of the rectum made before the introduction of the sigmoidoscope.

Position of the Patient.—The knee-chest position is better adapted for the use of the sigmoidoscope than any other posture.

Before introducing the instrument the lamp should be tested and the desired amount of current passing through the controller be determined. The instrument should be warmed and its entire surface—as well as the anus—well lubricated.

The examiner should stand behind or to the left of the patient. With gentle pressure the instrument should be held in an approximately horizontal position and introduced three or four inches into the rectum, when the obturator should be withdrawn, electrical contact be established, the eye-piece inserted, and the inflating apparatus attached.

The further introduction of the instrument should be by inspection alone.

Very gentle pressure should be used for the advance of the instrument through the bowel. It is well, in case the lumen of the gut becomes lost, to withdraw the sigmoidoscope an inch or two, when by slight inflation of the bowel the lumen again comes into view.

FIG. 43f.



Position of sigmoidoscope in normal sigmoid.

The instrument should be withdrawn very carefully, not only on account of the opportunity it affords to inspect the bowel, but also to permit the slow escape of air, and therefore to prevent injury to the mucosa.

The slow withdrawal of the sigmoidoscope permits a more accurate inspection of the gut than does the introduction.

The location of any pathological lesion can be determined by measuring the distance on the sheath of the instrument.]

1. Catarrh and Inflammation of the Rectum

Inflammation of the rectum is found in widely varying intensity, from the simple hypersecretion of mucus to the formation of erosions. Very mild cases may run a clinical course without symptoms; while severe cases present very striking objective and subjective symptoms, which may even progress to ulceration.

Etiology.—Acute proctitis is usually caused by gonorrhœal infection from using rectal tubes, etc.; or it may simply be a local symptom of severe gastro-enteritis.

The causes of chronic proctitis are: Fecal accumulations in chronic constipation, especially when the patient has hemorrhoids; too frequent enemata of various solutions; and the presence of parasites, especially oxyurides.

Intense catarrh, *i.e.*, that which is associated with frequent tenesmus and the passage of mucopurulent fœces, with or without blood, is the symptom of a general catarrh of the intestine. The condition is likewise a symptom of other severe affections of the intestine,—such as ulcer, carcinoma, and stenosis.

Symptomatology.—In acute proctitis, besides diarrhœa the patient has tenesmus, with passages of purulent, bloody mucus.

The mucosa of the rectum is reddened and swollen.

In mild cases of chronic catarrh, the scybala that are passed are covered with opaque or yellowish-brown clumps of mucus in which many epithelia are found, but few leucocytes.

In severe cases of chronic proctitis, the patient is obliged to go to stool from six to ten times in twenty-four hours, usually, however, without results, except the passage of one or two tablespoonfuls of a turbid fluid in which large clumps of white corpuscles and isolated red cells are found.

The mucous membrane of the rectum, which is normally quite smooth and of a rosy color, presents itself in the rectoscope as puffed, wrinkled and cyanotic, often covered with small erosions which bleed easily if stroked lightly with the applicator.

Chronic eczema of the anal margin is frequently observed in proctitis.

Diagnosis.—The diagnosis of catarrh of the rectum is made from the tenesmus, from the frequent escape of mucous or purulent secretion, and from the examination of the rectum with a tubular rectoscope, such as that of Strauss or Herzstein.

Differential Diagnosis.—The physician should always think of the insidious development of a new growth when the patient suffers from chronic or subacute proctitis. A rectoscopic and digital examination must be made to eliminate such conditions from the diagnosis.

Treatment.—Acute proctitis responds readily to rest in bed, a non-irritating diet, prolonged warm sitz-baths, hot compresses, and antispasmodic remedies. Sitz-baths should be taken for a half-hour three times daily, of a temperature of 30° R. [100° F.]. If tenesmus is severe, the following suppositories will be found helpful:

1. R	Extracti opii, gr. i.	0.01
	Extracti belladonnæ foliorum, gr. ʒ	0.05
	Olei theobromatis, gr. xxx	2.0
	Ft. suppos. i. Sig.—To be introduced t.i.d.	

The application of leeches to the anal region also affords the patient considerable relief. Rosenheim recommends irrigation with a mucilaginous solution or with a linseed decoction to which 10 drops of the tincture of opium have been added.

The following should be given in gonorrhœal proctitis:

Zinc sulphate, gr. iiii-v to ʒviss,	0.2-0.5 to 200;
Silver nitrate, gr. iiss-ivss to ʒviss,	0.1-0.3 to 200;
or alum or tannin solution,	0.5 to 2.0 per cent.

For certain cases, where all the above treatment has proved ineffective, Rosenberg has recently employed the following powder, sprayed through the rectoscope:

Tannic acid, ʒiv	15.0
Magnesia usta, ʒiiiss	100.0
(or bismuth subnitrate or xeroform.)	

In erosions or ulcers of the rectum or of the sigmoid flexure, after the diseased areas have been cleansed with hydrogen peroxide solution, they should be cauterized with $\frac{1}{2}$ to 1

cent. solution of silver nitrate, after which they should be touched lightly with a solution of sodium chloride.

Slight cases of chronic proctitis do not require any special treatment; they disappear when the etiological factor, such as habitual constipation or intestinal parasites, has been eliminated.

Severe cases of chronic proctitis require local treatment. It is best to try, at first, irrigations with chamomile tea or normal saline solution, morning and evening. If these produce no successful results, irrigations should be made with at least 200 to 250 c.c. of the following solutions:

Tannin, 5 to 1000; silver nitrate, 1 to 1000; bismuth emulsion, 8 to 250.

In very stubborn and persistent cases, silver nitrate 1.0–5.0 [gr. xv–lxxv] to 100 should be locally applied.

A well-oiled Nélaton catheter and the ordinary rubber syringe should be used for irrigations and to be most effective, the fluid should be retained in the intestine for a few moments.

Irrigations should be continued once or twice daily for a few weeks. During this time, the patient should have as complete physical rest as possible, and a mild constipation-diet, to which he should occasionally add mild laxatives, —such as rhubarb or licorice powder,— if the diet is ineffectual in causing spontaneous evacuations of the bowels.



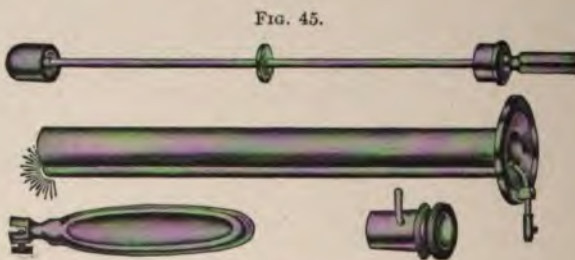
FIG. 44.—Rectal irrigator (Strause). The irrigator is inserted and the rubber balloon is introduced past the sphincter and then inflated, which prevents the escape of the irrigation solution.

In very stubborn cases, Rosenheim resorts to treatment with salves, applying zinc or bismuth ointment with the American ointment-injector, which the patient can use himself.

Franzensbad, Elster, and other chalybeate watering-places are indicated.

2. Ulceration of the Rectum

Ulcers of the rectum are of the most varying intensity and extent, from flat, pea-sized erosions to deep ulcerations as large as a five-cent piece.



Tuttle's rectoscope.

Etiology.—Severe irritation of the rectum may lead to erosion and ulceration, as may be seen in the previous chapter. The most frequent causes of ulceration are infections from gonorrhœa, syphilis, tuberculosis, dysentery, typhoid fever, pyæmia, etc.

Gonorrhœal infection occurs most frequently in women through taking enemata with an infected syringe.

The causes of infection in tubercular and syphilitic ulceration are less clear, although in tuberculosis an ulcer frequently arises from the breaking through of a peritoneal abscess. Ulcers of the rectum rarely result from intoxications.

Symptomatology.—The subjective symptoms consist of tenesmus and severe pains in the rectum which radiate to the sacrum.

Objective signs are muco-bloody and purulent discharges, hemorrhages, and the macroscopic demonstration of ulcers through the rectoscope.

Diagnosis.—Fissures, erosions, and ulcers situated in the anal margin may be easily recognized; while to discover those located higher in the intestine, a rectoscope is required. An accurate diagnosis,—especially a differentiation from severe inflammation,—is not possible without direct inspection of the mucous membrane of the rectum.

Treatment.—The treatment of catarrhal ulceration, which usually consists of superficial erosions, has been given in the previous chapter.

Excoriation and ulceration from gonorrhœal infections should be treated with warm sitz-baths, injections of alum, tannin, silver nitrate, or other astringent solutions, and cauterization with zinc chloride, 20 to 100, applied with a cotton applicator through the rectoscope.

3. Fissures and Erosions of the Anus

Erosions and fissures are located in the circumference of the anus. The fissures present flat breaks in the mucous membrane, sometimes about the size of a bean, with swollen edges and purulent bases.

Etiology.—These lesions most frequently arise from one of the following causes:

Inflammation of hemorrhoidal tumors; rupture of the mucous membrane caused by straining at stool, or the passage of extremely large-sized stools; or the above-described gonorrhœal proctitis.

Symptomatology.—Erosions usually cause nothing more than itching and burning around the rectum; while the fissures, in spite of their small size, very frequently produce extreme pain around the anus and its region, this pain often radiating to different parts of the pelvis. Usually after defecation, spasm of the *sphincter ani* occurs, which may persist for hours; so that patients, from fear of this suffering, delay going to stool as long as possible. Small amounts of blood and pus frequently appear in the stool.

Diagnosis.—The symptoms are so characteristic,—especially the spasmodic contraction after defecation,—that they

immediately suggest the necessity of examining the rectum. A fissure is often very difficult to see, because it is painful for the patient to press down sufficiently to expose the fissured surface. But by carefully drawing out the anal folds, when the patient is in the knee-elbow position, the fissures may usually be brought to view. They often lie deeply within the folds of the mucous membrane.

Treatment.—The stools should be kept soft by the use of a suitable diet, laxatives, and irrigations of oil. Before defecation, the rectum should be lubricated with oil as thoroughly as possible with the finger.

It is best at first to try two medicaments,—silver nitrate and pure ichthyol. After cocainizing or anæsthetizing the patient, the fissure should be thoroughly cauterized with caustic potash, after which the patient should stay in a recumbent position for two or three days, during which time constipation should be induced by the administration of opium.

Ichthyol should be applied twice daily to the fissure, using a match or an applicator wrapped with cotton. A great many of the milder cases may be cured in a few weeks by the use of ichthyol alone.

Boas treats stubborn cases as follows:

After a thorough evacuation of the bowels by the use of castor oil, the patient should lie in bed for eight days and be given 10 to 15 drops of the tincture of opium three times daily. The diet should be light, such as will furnish as little intestinal débris as possible. After the eight days, the patient should be given a large dose of castor oil.

Rosenbach recommends that the patient himself dilate the rectum with the little finger, when in the squatting position. This treatment should last about one-quarter of an hour, and should be performed night and morning. Chronic cases that refuse operation should especially make use of this dilatation-treatment, because the spasmodic contraction of the sphincter is thereby relieved.

Finally the dilatation and incision of the sphincter comes into question. Under narcotics, the rectum should be thor-

oughly stretched by means of the two thumbs introduced into the rectum. Incision should then be made, after which the fissure will generally be completely healed in from one to two weeks.

Erosions and anal eczema are best treated with dusting powders, such as orthoform, xeroform, or with an ointment composed as follows:

Orthoform,	
Xeroform, ãã, gr. xv	1.0
Zinc oxide, ℥iiss	10.0
Vaselinol, ℥iiss	10.0
(or Thigenol, gr. xlvi)	3.0
Lanolin, ℥iv	15.0

After cleansing the affected areas at night, a bit of ointment the size of a bean should be thoroughly rubbed in.

4. Neoplasms of the Rectum

Of the benign tumors of the rectum, the polyps have especial clinical significance, from the fact that they may lead to profuse hemorrhage.

Rectal polyps are most frequently found in women after gonorrhœal infection.

Very frequently the bleeding which results from these polyps is for a long time considered to be of hemorrhoidal origin, until digital examination renders the diagnosis clear.

The treatment is surgical.

The other benign tumors,—such as cysts, fibromata, etc.,—rarely occur; the only ones deserving especial consideration being the angiomas, *i.e.*, hemorrhoids.

Hemorrhoids

Hemorrhoids are caused by the dilatation or the new formation of blood-vessels, brought about by sedentary habits, obstruction of the portal circulation, or chronic constipation (see Etiology of Chronic Constipation).

Symptoms.—Slight cases very frequently run a clinical course accompanied by no pain, and perhaps by only a little itching; the patient notices only that sometimes the toilet-paper is colored bright red with blood.

The symptoms of the disease begin acutely when the hemorrhoidal nodules become inflamed, before which time the patients rarely consult a physician.

The pain is of a burning, boring, pricking, and occasionally cramp-like character,—especially after stools,—and is usually increased by the sitting posture.

The anal mucous membrane is swollen and of a bluish-red color. By pressing down, tense nodules ranging in size from that of a bean to that of a hazel-nut are caused to protrude from the anal margin; while the finger will usually palpate similar hemorrhoids situated within the bowel.

Profuse hemorrhage often occurs.

If there are breaks in the continuity of the mucous membrane, spasm of the rectum is a prominent symptom.

Diagnosis.—In the diagnosis three tasks should be fulfilled:

1. To demonstrate the source of the bleeding; whether it is actually caused by hemorrhoids or by a polyp, carcinoma, or ulceration.
2. Whether isolated hemorrhoids exist; or whether the entire mucosa, both internal and external, is diseased.
3. Whether the hemorrhoids are inflamed or not.

It is scarcely possible for confusion to occur in the diagnosis if accurate inspection and careful digital examination of the rectum are made.

Therapy.—There are three indications for treatment:

1. To reduce the inflammation of the hemorrhoids.
2. To bring about a contraction of the hemorrhoids.
3. To prevent their recurrence.

I generally institute the following measures, and have thus obtained permanently good results in a large number of cases:

1. For three to six days, I have the patient apply cold compresses to the rectum when in the dorsal position with hips elevated. In mild cases, this should be done three times daily for one-half hour,—early in the morning, at mid-day,

and in the evening; while in severe cases, the compresses should be worn the entire day. Lead and opium water, or aluminum acetate, one tablespoonful to a cup of water, may be added to these compresses. During the treatment, the patient should expose the hemorrhoids as much as possible by downward pressure.

During this period the bowels should be regulated by low enemata.

After three or four days of this treatment, the hemorrhoids are no longer swollen and painful.

To control the bleeding from external hemorrhoids, tannin 1 to 2 per cent. and alum 1 to 3 per cent., should be applied; while for internal hemorrhoids, the same preparation should be injected with a rectal syringe. Prolapsed hemorrhoids should, according to Rosenheim, be touched with the following:

R. Potassii iodidi, gr. xxx	2.0
Iodi, gr. iii	0.2
Glycerini, ℥xii	40.0

Erosions should be painted with zinc amyllum paste.

2. To reduce the size of the hemorrhoids, I have found extract of hamamelis the most suitable. I usually prescribe twelve suppositories, each containing the following:

Extr. of hamamelis virg., gr. ivss	0.3
Orthoform (if painful), gr. ivss	0.3
Cocoa butter, gr. xxx	2.0

M. Sig.—Suppository, introduced night and morning.

For three or four weeks, I prescribe $\frac{1}{2}$ teaspoonful of the fluidextract of hamamelis, to be taken after meals.

For frequently recurring or for chronic hemorrhages from internal hemorrhoids, cold irrigations with Arzberger's "refrigerator," as employed in diseases of the prostate, are very useful.

The diet throughout the treatment should be the coarse constipation-diet if atonic constipation is present; or the mild constipation-diet, if there is spastic constipation. If rectal spasms are troublesome, oil enemata should be given every other night.

3. To prevent recurrence, the patient should take a colic-bath every day, lasting ten minutes, and use the Hautmann pessary with a central perforation for the escape of gases. The hamamelis suppository treatment should be repeated every three months, with the diet adapted to the nature of the constipation; when it is atonic, I occasionally prescribe compound licorice powder, rhubarb tablets, laxative mineral water, or Glauber's salt; when the constipation is of the spastic variety,—oil enemata, and the mineral-water treatment at Kissingen, Marienbad, Carlsbad, Franzensbad, Elster-Tarasp, Homburg, etc., or the grape-cures afforded at the health-resorts along the Rhine near Lake Geneva,—at Vevey, Montreux, Territet, etc.

The injection of carbolic acid in the treatment of hemorrhoids should be discarded, because of the danger of embolism.

Boas has recently recommended the use of a 10 per cent solution of calcium chloride, 10 c.c. of which he injects once or twice daily.

For the relief of painful, itching and bleeding hemorrhoids the following prescriptions are recommended:

1. R	Chrysarobini, gr. 1½	0.08
	Iodoformi, gr. ½	0.02
	Extracti belladonnæ foliorum, gr. ½	0.01
	Olei theobromatis, gr. xxx	2.0
	M. ft. suppos. i, No. xv. Sig.—Use one or two suppositories daily.	

2. R	Chrysarobini, gr. iss	0.1
	Acidi tannici, gr. iss	0.1
	Iodoformi, gr. iii	0.2
	Extracti belladonnæ foliorum, gr. ½	0.02
	Olei theobromatis, gr. xxx	2.0
	M. ft. suppos. i, No. xii. Sig.—Use two or three daily.	

3. R	Chrysarobini, gr. xii	0.8
	Iodoformi, gr. ivss	0.3
	Extracti belladonnæ foliorum, gr. viiiss	0.6
	Vaselini, ʒiv	15.0
	M. ft. unguentum. Sig.—Apply several times daily.	

A large number of old, persistent cases have improved by this treatment in my clinic to such a degree that all the symptoms disappeared. However, there are always cases that can be cured only by operation,—especially internal hemorrhoids.

Prognosis.—The prognosis of hemorrhoidal affections is good. The sufferer generally becomes weakened only by loss of blood or by severe continuous pain. Otherwise, the general condition of the patient rarely suffers, although in some cases the hemorrhoids become so severe and the constitutional reaction is so marked that the patient has a cachectic appearance.

Complications.—The most important complications are inflammation, fissures, erosions, rectal fistulæ, or abscess, occasionally thrombosis and embolism, and finally prolapsus of the mucous membrane of the rectum, with hemorrhoidal tumors.

Sometimes hemorrhoids are the result of constipation, and sometimes its cause.

When the disease has existed for years, the patient frequently becomes hypochondriacal and neurasthenical.

CLINICAL CASE

CASE I.—Mrs. S., a widow 36 years old, had suffered from constipation for ten years. Purgatives and enemata had been effective only when taken in large amounts. For about nine months, the patient had had severe rectal pains and hemorrhages. Every four or five weeks, she lost three or four teaspoonfuls of blood daily. Examination showed the presence of external and internal inflamed hemorrhoids.

Treatment.—The patient was given rest in bed for one week, with the application of lead and opium water compresses; every second day oil was introduced through a Nélaton catheter; hamamelis suppositories were used during the second week of treatment; the third and fourth weeks, a teaspoonful of the fluidextract of hamamelis was given three times daily. A mild constipation-diet and oil enemata were continued for three months, after which the patient was completely cured.

Malignant Neoplasms of the Rectum

From the practical standpoint, only carcinomata of the rectum need be considered, for the reason that other neoplasms of a malignant nature are very exceptional.

Cancer of the rectum most commonly attacks persons whose previous digestion has been almost faultless. The disease begins insidiously, the patient generally coming to the physician too late for operation. The general health of the patient may be undisturbed, the appetite remaining excellent.

Symptomatology.—The subjective symptoms are aggravated tenesmus, drawing, boring pains in the rectum and left side of the abdomen, and painful distention. When going to stool, instead of fecal matter, only mucus,—or sometimes blood,—will appear after hard straining; the patient frequently believing he has hemorrhoids.

Objectively, a malignant neoplasm is revealed by digital examination and the use of the rectoscope.

It is generally crater-shaped in advanced cases, and in the form of a ring. It may involve any part of the rectal mucosa. The cancerous growth is usually found to be more extensive than appears on palpation. The diagnosis is very difficult when the new growth is located high up in the bowels between the rectum and the sigmoid flexure.

The most important part of the physical examination, even in slightly suspicious cases, is to make a digital exploration of the rectum, with the patient in the knee-elbow position, and when necessary to resort to the rectoscope. If the attending physician is in doubt as to the nature of a lesion, he should always consult with a specialist in rectal diseases as early as possible.

It is very suggestive of cancer of the rectum to find bloody, purulent mucus-discharge of a dirty brown color and of the consistency of cream.

Cachexia does not occur until the last stages of the disease. Sometimes colonic "stiffenings" are observed in the region of the sigmoid flexure, as in obstruction of the bowels from any other cause.

Diagnosis.—The diagnosis of cancer of the rectum can be made only by the actual inspection and palpation of the malignant neoplasm, because the other symptoms are found in a number of other affections of the rectum.

Prognosis.—The prognosis is, *quod vitam*, naturally absolutely bad; but in regard to prolonging life, it is not so unfavorable as one might assume, even when operative treatment is refused. I have seen quite a number of patients that were able to attend to their business and felt relatively well, had a good appetite, and only occasionally needed to resort to the use of a purgative, for a period of one to one and one-half years after a positive diagnosis of cancer of the rectum had been made.

Treatment.—A carcinoma of the anterior wall of the rectum, which is in close intimacy with the prostate gland and the bladder, should not, as a rule, be operated, especially if the malignant neoplasm is adherent and is already as large as a dollar. It is more conservative to produce an artificial anus at a later period in the disease,—which is more favorable for both the comfort and the life of the patient than a premature radical operation, the outcome of which is always uncertain.

Small carcinomata of the entire rectum and cancers of larger size, when not adherent and located on the lateral or posterior wall of the rectum, should be immediately referred to a surgeon for operation.

In addition, it should be said that in every case the physician should, early in the disease, consult a surgeon to decide whether or not an operation is indicated.

Extensive carcinomata situated in the anterior wall of the rectum should be treated symptomatically, with the possible creation of an artificial anus, if indicated, later in the disease.

The internal treatment is the same as for Stenosis of the Intestine, to which chapter the reader is referred.

I generally prescribe a diet as non-irritating as possible, and rich in fruit and fats. Vegetables should be used only in purées. There should be plenty of fruit, besides butter, cream, tender meats, eggs, white wine, and lemonade. Laxatives should be given every second evening,—either castor oil or salts with rhubarb; besides oil enemata, each containing $\frac{1}{2}$ litre, twice a week.

If the affection is painful and tenesmus marked, one to three suppositories,—each containing 0.04 to 0.06 [$\frac{1}{4}$ to 1 gr.] of the extract of belladonna,—should be given one to three times daily.

Complications.—The most important complication of carcinoma of the rectum is the formation of the rectovaginal and rectovesicular fistulæ, the treatment of which is surgical.

5. Benign Stenoses of the Rectum

A constriction of the lumen of the rectum occasionally results from external compression, as by retroflexion of the uterus, pelvic tumors, or from the accumulation of an exudate. The most common stenoses of the rectum result from cicatricial formation following ulceration,—especially of a venereal nature.

Syphilitic strictures of the rectum are most frequent in women, and are a very severe affection. They develop insidiously and may lead to total atresia of the rectum, by the formation of a diaphragm-like, radiating scar just above the anal opening.

Symptomatology.—The symptoms of benign stenosis of the rectum consist of pressure, tenesmus, mucous diarrhœa, hemorrhage, and borborygmus.

Objectively, the stenosis itself may easily be palpated. The scar-formation is usually ring-shaped, resembling a funnel whose end presents a round opening, the lumen of which varies in thickness from the diameter of a knitting-needle to that of the finger. The mucosa above the strictured area is reddened and inflamed. The stool is, of course, delayed in expulsion; and in advanced cases, the stricture may develop into complete ileus.

Diagnosis.—The diagnosis is easily made by palpation.

Treatment.—When a benign stenosis is of recent formation, and the little finger can still be introduced, the stricture should be dilated with the well-known English bougie, which has a receding conical end. The dilatation should be made every day for several weeks. There is always a tendency toward relapse when the dilatations are discontinued.

As an additional treatment, a tablespoonful of a 6:200 solution of iodide of potassium should be given three times daily, if the scars are recent and still have some elasticity.

Injections of a ten per cent. solution of thiosinamin (see page 289) into the tissues around the anus may be tried if other therapy seems hopeless.

For the relief of pain, suppositories of cocaine and belladonna should be given; and as laxatives, castor oil or saline mineral-waters should be used in connection with oil enemata two or three times a week.

Mild cases respond quite favorably to this treatment; but in severe cases, the patient has no choice but to submit to either the extirpation of the stenotic area, or the creation of an artificial anus.

6. Other Organic Diseases of the Rectum

In addition to those already discussed, there are many diseases of the rectum,—such as abscess-formation, fistulæ, prolapsus, and congenital malformation,—the treatment of which belongs so naturally to the domain of the surgeon that their discussion may reasonably be omitted in a work on internal medicine.

7. Nervous Diseases of the Rectum

The rectal symptoms that sometimes occur in the course of locomotor ataxia need be only briefly mentioned,—the most important being incontinence of the rectum and the so-called rectal crisis, which is characterized by periodically occurring tenesmus, unassociated with anatomical lesions of the rectum.

Rectal incontinence should be treated with cold sitz-baths and endofaradization.

As accompanying phenomena in diseases of the entire intestinal canal, relaxation and spasmodic contraction of the rectum occur, which may lead to functional dilatation or stenosis.

The reflex irritability of the rectum in hysterical patients is sometimes so pronounced that the anal sphincter strongly

contracts upon the palpating finger. Such cases should be treated with irrigations of warm oil or chamomile tea, and with belladonna suppositories. Relaxation of the rectal sphincter should be treated with prolonged cold enemata, of 100 to 150 c.c. of water, cold sitz-baths, carbonic-acid full-baths, rectal douches, etc.

Sensory neuroses of the rectum are so very rare that their discussion may be omitted.

APPENDIX

TABLE TO ASSIST IN THE DIAGNOSIS WITHOUT THE USE OF THE TEST-BREAKFAST.

	General Findings.	Pain.	Pressure.	Vomiting.	Stool.	Habitus.
Gastritis	In the beginning, good, especially in acid gastritis; later, debility with variable appetite.	Only in gastritis associated with stenosis of the pylorus.	Aftersolids	Unusual, except after errors in diet.	Irregular, with frequent diarrhoea.	Normal.
Ulcer	Appetite very good, except during the period of pain. General state of health may be good.	Violent $\frac{1}{2}$ to 4 hours after eating.	None.	After improper diet.	Sluggish.	Normal.
Dilatation	Appetite good, except in dilatation due to cancer. General health good except during acute attacks.	Of gnawing character, which is relieved by vomiting.	Constant.	Copious, 5 to 8 hours after eating.	Sluggish.	Normal.
Carcinoma, without stenosis.	Poor, aversion toward meats.	None.	Aftersolids	None.	Sluggish.	Normal.
Atony	Poor.	None.	After all kinds of food.	None.	Sluggish.	Enteroptotic.
Nervous stomach affections	Poor or variable.	None.	Most of the time.	Often immediately after eating.	Sluggish.	Enteroptotic.
Enteritis	Poor.	None.	Constant in the entire abdomen.	None.	Soft, spongy consistency.	Either normal or enteroptotic.
Colitis	Poor.	Colicky.	Tension across the abdomen.	Unusual.	Pulpy, thin or mucous.	Either normal or enteroptotic.
Atonic constipation.	Fairly good.	None.	None.	None.	Hard and large, resembling sausage.	Usually enteroptotic
Spastic constipation.	Poor.	Colicky.	Distention and pressure.	Unusual.	Surrounded by mucus.	Usually enteroptotic.

Outline of Dietetic Treatment of Diseases of the Stomach and Intestine and of Metabolism

Although the dietary has already been considered in the individual chapters, the subject will once more be briefly outlined.

In general, the following ten Diet-Forms are sufficient for the treatment of the diseases of the digestive tract. If there is a complication, rather than a single affection, the physician should combine the diets; as an example, he will sometimes find it necessary to combine a constipation-diet with one suitable for gastritis, or a forced-feeding diet with one suitable for constipation, etc.

Every patient should be given a diet-list showing the exact time, quality and quantity of his meals; the time for baths, walking, gymnastic exercises, massage and enemata the hour of rising in the morning and of going to bed at night the periods of rest during the day, and the hours for taking medicine or mineral-waters.

The arrangement of the list should always be compatible with the occupation of the patient and the time he has at his disposal; working people must naturally have their meals at certain hours, while those who have no occupation can be at home any time.

The choice of foods also depends a great deal upon the financial circumstances of the patient. The physician must never, therefore, prescribe foods which the patient is unable to buy,—otherwise his directions will not be followed.

1. Stenosis-Diet

Indications.—In benign and malignant stenoses of the cardia, pylorus and duodenum. [Esophagus.]

Principle.—The diet must be of fluid consistency and rich in fats and albumins. In stenosis of medium degree, the diet may be semi-solid. In benign stenosis of the pylorus

where hyperpepsia exists, tender meats may be allowed,—which are contraindicated in malignant stenosis associated with achylia:

- 7:00 A.M. A wineglassful or 1 to 2 tablespoonfuls of olive or almond oil. (If there is a repugnance toward these, the patient may be given milk of almonds or butter.) When stagnation is present, these should be taken immediately after lavage.
- 8:00 A.M. One cup, or 200 to 250 c.c., of coffee, tea or cocoa with milk or cream.
- 10:00 A.M. Bouillon with 1 or 2 yolks of eggs, or a cereal soup rich in butter.
- 12:00 Noon Broth thickened with a finely-ground cereal, butter and the yolks of eggs.
- 3:00 P.M. Same as 8:00 A.M.
- 5:30 P.M. Same as 10:00 A.M.
- 8:00 P.M. Same as 12:00 Noon, with perhaps the addition of sanato-gen, etc.

As refreshments,—lemonade, wine with the yolks of eggs, egg-cognac, fruit-ice, especially vanilla ice, puro, meat-jellies, calves'-foot jelly, buttermilk, and raw eggs,—as desired.

In stenosis of moderate degree, in addition to the above, the following are allowed:

Finely-prepared purées of potato, spinach, carrots and peas, light puddings, scraped ham, chopped chicken, anchovy, butter, etc.

2. Gastritis-Diet

Indications.—Hyperacid gastritis, subacid gastritis, anacid gastritis, and carcinomata located extra-ostially.

Principle.—Such a diet should be non-irritating, of semi-solid consistency, and arranged according to the state of nutrition of the patient and the degree of constipation present. Obese persons should be given but little butter; emaciated persons, a great deal. Constipated persons should be given much fruit and vegetables; while patients with diarrhœa should, on the contrary, be given constipating articles of food.

- 7:00 A.M. Mineral water: In hyperacid gastritis, Carlsbad or Vichy; and Homburg, Kissingen, or Wiesbaden waters in subacid or anacid gastritis.
- 7:30 to 8:00 A.M. Tea with milk or cream, white bread and butter; or if diarrhoea is present, cocoa or chocolate with bread or toast.
- 10:00 to 11:00 A.M. Cereal soup or broth, white bread, butter, one egg cooked two minutes, and scraped ham.
- 12:30 P.M. Mineral water.
- 1:00 P.M. Dinner: Soup. Purée of peas, carrots, spinach, asparagus or cauliflower, cooked in butter; noodles, macaroni, or rice cooked in soup. The tender white meat of chicken; pigeon, veal or fish,—such as pike or perch; sweet fruit purées, served warm; and rice or sago pudding.
- 4:00 to 5:00 P.M. Same as at 7:00 or 8:00 A.M.
- 6:30 P.M. Mineral water.
- 7:00 to 8:00 P.M. Gruel or cocoa cooked in milk; white bread, butter with a white meat or two soft eggs.

Strictly Forbidden

Cabbage, legumes, smoked meats of all kinds, goose, duck, animal fats, salmon, acids, pastries, and cold drinks.

Condiments are forbidden in hyperacidity, but indicated in conditions associated with subacidity.

3. Ulcer-Diet

Indications.—Ulcers and erosions.

Principle.—A non-irritating diet which will leave the stomach quickly and excite the secretions as little as possible.

There are four forms, each of which should be continued from eight to ten days: (1) fluid; (2) semi-liquid; (3) soft or semi-solid; (4) non-irritating solids.

The subject is discussed in detail in the chapter on Ulcer of the Stomach.

Carcinoma, dilatation, and hyperchlorhydria need no special dietary.

A stenosis-diet is indicated for ostial carcinomata; a gastritis-diet, for extra-ostial carcinomata.

Dilatation should always be treated at first with the stenosis-diet.

In hyperchlorhydria (see below), a diet suitable to the primary disease is indicated; for instance, an acid-gastritis diet, an ulcer-diet, a constipation-diet, or a forced-feeding diet.

4. Diarrhœa-Diet

Indications.—Intestinal catarrh with diarrhœa, or a strong tendency toward diarrhœa.

Principle.—A diet which is non-irritating, astringent, free from food-débris and easily absorbed.

The diet-list is as follows:

- 7:00 A.M. Mineral water; hot, and taken in small doses of 75 to 150 c.c. The choice of the water depends upon the state of the gastric secretions. (See previous chapter.)
- 7:30 A.M. Eichel cocoa (2 teaspoonfuls to a cup) in water, and toasted white bread and butter.
- 10:00 A.M. A cereal soup with butter, toast with butter, eggs and scraped ham.
- 1:00 P.M. Broth with grits, noodles, macaroni, and white meat; in mild cases, vegetable purées, and one glass of blueberry wine.
- 4:00 P.M. Same as 7:30 A.M.
- 6:00 P.M. Mineral water.
- 7:00 to 8:00 P.M. Tea with red wine or blueberry wine, toast, butter, and cold white meat.
- 9:00 to 10:00 P.M. A cup of hot peppermint-tea.

In mild cases, when the stool is of a pulpy consistency,—or after improvement in severe cases,—white bread, carrots, filet, and baked fish may be allowed.

Strictly Forbidden

Cold drinks; any kind of coarse vegetables, like cabbage or potatoes; cheese, acids, cakes, coffee, all legumes (except when served in soups); goose, duck, salmon, animal fats, gravies, and raw fruits.

5. Forced-Feeding Diet

Indications.—Anæmia, general malnutrition, atony of the stomach (anæmic-gastroptotic dyspepsia), enteroptosis, and pulmonary tuberculosis.

Principle.—With rest in bed, the patient should be given much more nourishment than he needs for the reparation of tissue-waste, in order to increase the amount of adipose tissue. The diet, therefore, should be rich in carbohydrates and fats. During the first two or three weeks of the fattening-cure, the patient should remain in bed and the stomach should be massaged once daily after the heaviest meal.

- 7:00 A.M. One pint of milk, bread and butter.
 9:30 A.M. Tea or cocoa with cream, one piece of bread and butter, and ham. If constipation exists, koumiss and Graham bread should be given instead, with butter.
 12:00 Noon Vegetables cooked in butter, a small amount of meat, pudding with fruit-juice, and mineral water.
 3:00 P.M. Same as at 7:00 A.M.
 5:00 P.M. One plate of cereal soup or broth, or cocoa with cream if the bowels are regular.
 7:00 P.M. Tea with cream or milk, white or whole-wheat bread, butter, two soft eggs or cold white meat.

On this diet, even in the ambulatory treatment, the patient, as a rule, gains two or three pounds a week. A bitter for the excitation of the appetite should always be given from 15 to 30 minutes before eating.

6. Constipation-Diet

Indications.—Habitual atonic and spastic constipation, and mild enterocolitis which runs a clinical course with constipation.

Contraindications.—Cardiac disease, *habitus apoplecticus*, abdominal plethora, diseases of the female generative organs.

Principle.—In the atonic variety, a diet rich in food-débris which chemically and mechanically excites intestinal peristalsis; in the spastic variety, a diet non-irritating in character, which chemically excites peristalsis.

A. DIET IN ATONIC CONSTIPATION

- 7:00 A.M. One glass of cold water.
 7:30 A.M. Malt coffee or tea with milk, one teaspoonful of milk-sugar, whole-wheat bread with butter, honey or marmalade.

- 10:00 A.M. Buttermilk two days old, kefir, koumiss, or sour milk, whole-wheat bread, butter and ham.
- 12:00 to 1:00 P.M. Vegetables, including cabbage, small amounts of meat, an abundance of sweet fruit sauces, and one glass of cider sweetened with one tablespoonful of milk-sugar.
- 4:00 P.M. Malt coffee or tea with milk, whole-wheat bread and butter.
- 7:00 P.M. $\frac{1}{2}$ litre of two days' old kefir or koumiss, Pilsner beer, bread and butter, eggs or cold sliced meat.
- 9:00 to 10:00 P.M. Fruit or honey cakes.

Strictly Forbidden

Rice, gruel, sago and cereal soups.

B. DIET IN SPASTIC CONSTIPATION

- 7:00 A.M. One glass of hot peppermint and valerian tea.
- 7:30 A.M. Tea with cream and a tablespoonful of milk-sugar, and fine white bread with butter and raspberry jelly.
- 10:00 A.M. Koumiss or kefir two days old, white bread and butter, and one egg.
- 12:00 to 1:00 P.M. One small plate of soup, tender vegetables cooked in butter, meat, stewed fruits, and one glass of raspberry lemonade.
- 4:00 P.M. Same as 7:30 A.M.
- 6:00 P.M. $\frac{1}{2}$ litre of kefir or koumiss.
- 7:00 to 8:00 P.M. Tea with cream, one tablespoonful of milk-sugar, white bread, butter, and cold meat.
- 9:00 to 10:00 P.M. Purée of fruit.

Forbidden

Cabbage, coarse bread, goose, duck, and all raw fruits.—except sweet apples, oranges and grapes.

7. Obesity-Diet

Indication.—Obesity.

Principle.—Small amounts of fats and carbohydrates, a liberal supply of proteids, and muscular exercise. Four meals daily:

APPENDIX

- 7:00 A.M. One glass of cold water, if constipation exists; gymnastic exercises.
- 8:00 A.M. Coffee with a small amount of milk, $\frac{1}{2}$ pound of lean roast beef, some toast and cheese.
- 12:00 Noon Green vegetables cooked with salt, lean veal and beef, sour salads,—such as cucumber,—red whortleberries, and one glass of cider.
- 4:00 P.M. One cup of coffee with milk, toasted whole-wheat bread with plum sauce or cheese.
- 7:00 to 8:00 P.M. Beef-steak or other lean meat, 1 or 2 pieces of toast, or 2 tablespoonfuls of baked potatoes, tea with lemon, or 1 glass of Pilsner beer.

Forbidden

Fats, rice, farinaceous food, hot breads and potatoes.

8. Diabetes-Diet

The amount of carbohydrates allowed depends upon the severity of the disease. Under no circumstances should all carbohydrates be excluded, since otherwise acidosis and diabetic coma would develop. I allow, in all cases, small amounts of toast, baked potatoes, and green vegetables.

- 7:00 A.M. One teaspoonful of Vichy salts dissolved in a glass of warm water.
- 8:00 A.M. Tea or coffee with milk, toast with plenty of butter, and two eggs.
- 10:00 A.M. Cocoa with cream, bouillon, one piece of toast, butter, ham or lean meat.
- 1:00 P.M. Consommé, green vegetables,—such as spinach, peas, carrots, asparagus, Brussels sprouts, sauerkraut, cabbage cooked in butter, meat of all kinds, salads and one glass of wine.
- 3:00 P.M. One teaspoonful of bicarbonate of soda.
- 4:00 P.M. Same as at 8:00 A.M.
- 7:00 P.M. Tea, cream, butter, cold meat or filet, chicken and fish.
- 9:00 to 10:00 P.M. One teaspoonful of bicarbonate of soda.

Strictly Forbidden

Bread, potatoes (unless baked), rice, grits, noodles, macaroni, farinaceous foods, milk, sugar, honey, cake and legumes.

9. Gout-Diet

Forbidden.—All raw meats and the glandular organs, such as the liver, thymus, spleen, lungs, etc., in order to avoid the formation of the purin bodies.

Allowed.—Chicken, squab, veal, lean fish, milk, carbohydrates in every form, fruit and vegetables.

10. Nutrient Enemata

Indications.—Corrosive strictures, malignant atresia of the œsophagus and pylorus, severe ulcers of the stomach, hyperemesis in pregnancy, and hysterical vomiting.

Method of Employment.—An enema of the following composition, recommended by Boas, should be given three times daily, preceded by a cleansing enema:

250 c.c. of milk; 1 or 2 yolks of eggs; 1 tablespoonful of white flour; 1 to 2 tablespoonfuls of red wine; 1 knifepoint of salt; 6 to 8 drops of tincture of opium.

The nutrient enema is best given with a Naunyn rectal tube, connected with a glass funnel.

Outline of Balneotherapy

The choice of a suitable health-resort is one of the most difficult tasks of the physician. If patients would take the time and money for a trip to a suitable place of this kind, they would at least obtain some beneficial results. If, for any reason, an aggravation of the symptoms of the disease should occur, the attending physician is usually held responsible.

In the choice of a resort there are so many factors involved,—such as expense, distance, attractions, the divergent interests of the different members of the family, etc.,—that advice is sometimes very difficult. For example, if the husband has acid gastritis and the wife neurasthenia, there is nothing to do but send them both to some quiet summer resort, where the husband may have access to a suitable mineral water.

In the following, we can touch only upon the principles that will assist the physician in selecting a resort most likely to prove satisfactory to the patient.

The details and routine of the treatment should always be left to the resident physician.

A. ORGANIC DISEASES OF THE STOMACH AND INTESTINE

1. *Carlsbad, Neuenahr, Vichy, Bertrich, Franzensbad, Marienbad, Elster or Tarasp* [*Buffalo Lithia Springs, West Virginia, Crab Orchard, Kentucky*], the waters of which contain principally sodium bicarbonate and sodium sulphate.

Indications.—Acid gastritis, ulcer of the stomach, all forms of hyperchlorhydria, gastrosuccorrhœa, perigastritis, cholelithiasis, cholecystitis, enlargement of the liver, catarrhal icterus, diabetes, and enterocolitis when the gastric juice has a normal acidity or hyperacidity.

Contraindications.—Ectasia, carcinoma, subacid and anacid gastritis.

Special Indications.—Obese or vigorous persons should always be sent to Marienbad, Tarasp or Carlsbad; emaciated patients to Vichy; and those who are at the same time

nervous,—particularly women,—to Bertrich or Franzensbad; while Neuenahr is the most suitable for diabetics.

2. *Kissingen (Rakoczy Spring), Homburg (Elizabeth Spring), Wiesbaden (Kochbrunner), Ems, Pyrmont, and Baden-Baden [Champion, Congress, and Hawthorn Springs, Saratoga, New York, and Blue Lick Springs, Kentucky]*, the waters of which contain sodium chloride as their principal mineral ingredient.

Indications.—Subacid or anacid gastritis, catarrh of the small and large intestines when the gastric juice has a sub-acidity or anacidity, chronic constipation (on account of the carbon dioxide baths), and hemorrhoids.

Special Indications.—Kissingen is recommended for patients with hemorrhoids and constipation; Homburg is more suitable for those with gastritis; Wiesbaden for cases of enteritis with a tendency toward diarrhœa; while Pyrmont is best adapted for very anæmic and nervous patients.

Contraindications.—Hyperchlorhydria, ulceration, carcinoma, ectasia, neurasthenia and hysteria.

3. *Marienbad*, the waters of which contain sulphate of magnesium and sulphate of sodium.

Indications.—Obesity associated with constipation.

4. *Franzensbad, Pistyan, Nenndorf, Polzin, or Muskau*, for mud-baths used in conjunction with the local application of hot mud-poultices.

Indications.—Chronic appendicitis, perigastritis, and circumscribed peritonitis.

If the drinking of some other spring water is indicated during a residence at one of these resorts, a bottled water, such as Carlsbad, may be prescribed.

5. *Flinsberg, Pyrmont, Franzensbad (Eger Salts Spring) [or Sharon Chalybeate Springs, New York, Schuyler Chalybeate Springs, Illinois, New Almadá Vichy, California]*, the waters of which are rich in iron.

Indications.—The after-treatment in diseases of the gastrointestinal tract, associated with chlorosis and other anæmic conditions.

B. FUNCTIONAL DISEASES OF THE STOMACH AND INTESTINE

General Indications

Patients with enervated and relaxed nervous systems should be sent to the seashore or to the high mountains.

Well-nourished individuals should be sent to the North Sea, and anæmic women and children to the Baltic,—especially to those resorts surrounded by forests.

Patients with marked irritability of the nervous system should be sent to mountain ranges of only moderately high altitude.

1. *Westerland, Norderney, Borkum, Engadin, Berner Oberland.*

Indications.—For individuals who have become enervated and over-worked, such as bankers, physicians, lawyers, etc.

2. *Kolberg, Swinemünde, Rügen, Zoppot, Warnemünde Haupten, etc.*

Indications.—For anæmic, emaciated patients,—especially women and children.

Patients with increased reflex irritability of the nervous system should be sent to some quiet resort in a forest, with an elevation of from 1000 to 1500 feet. Schreiberhau and other resorts situated at the foot of the Riesen Mountain fulfil these conditions, as do also Oberbayern, Thüringer Harz, and the resorts in the middle of the Black Forest; as well as Genfersee, where the grape-cure is given, and Abbazia.

For many diseases of the stomach and intestine, a vacation in the country or in the forest, combined with a simple outdoor life, is all that is required.

Indications for Hydrotherapeutic, Mechanical and Electrical Treatments

Hydrotherapy

COLD PROCEDURES.—Sea bathing, fresh-water bathing, cold wet packs, friction, half-baths, the Scotch douche, and carbon dioxide baths.

Indications.—Enteroptosis, nervous dyspepsia, and general neurasthenia, with a relaxed condition of the nervous system.

WARM PROCEDURES.—Lukewarm tub-baths, pine-needle extract baths and saline baths.

Indications.—Hysterical dyspepsia and a general weakness of the nervous system.

Hot mud-baths, hot mud-poultices, hot gruel or flaxseed poultices, thermal coils, etc.

Indications.—Chronic inflammatory conditions of the large and small intestines, appendicitis, cholecystitis, ulcer of the stomach.

In acute inflammatory conditions of the stomach, intestine, and appendix, without fever,—hot, moist poultices of chamomile, etc.

The ice-bag in ulceration with hematemesis, or acute appendicitis, with high fever; and ice-compresses in diffuse peritonitis.

PRIESSNITZ MOIST ABDOMINAL BANDAGE, which consists of the application of a moist towel covered with oil paper or oil silk, bandaged with a woollen cloth, and worn during the night.

Indications.—Chronic enterocolitis, spastic constipation, and chronic appendicitis.

Mechanotherapy

Abdominal bandages and supports in enteroptosis, “hang-belly,” or large hernia of the linea alba.

The Hantel pessary, in prolapsus of the anus and hemorrhoids.

Umbilical hernia-truss, for small hernia of the epigastrium.

Massage

Indications.—Heavy massage of the stomach and intestine is indicated in atonic conditions, such as atonic constipation, enteroptosis and relaxed abdominal walls; light massage,—such as stroking,—in nervous dyspepsia, nervous vomiting, and spastic constipation; and massage of the entire body, in general relaxation of the musculo-nervous system.

Lavage

Indications.—Lavage of the stomach in stasis of the gastric contents from any cause, in severe dyspepsia, for the relief of nervous anorexia, vomiting, etc.

IRRIGATION OF THE INTESTINE.—Lukewarm irrigations are indicated in atonic constipation; hot irrigations and oil enemata, in spastic constipation and catarrh of the colon; astringent enemata, in chronic uncontrollable diarrhœa.

Electrotherapy

Endofaradization of the rectum is indicated in atonic constipation; endogalvanization of the stomach, in nervous eructations, nervous vomiting, and hysterical disease of the stomach; endogalvanization (1 to 2 M. A.) of the rectum, in spastic constipation.

Clinical A B C of the Most Important Disturbances of the Digestive Tract

Chronic Acid Gastritis

Pressure in the stomach after eating solids, epigastralgia only in complications. Pyrosis. Gastric analysis shows hyperacidity,—T. A. from 60 to 120.

Carlsbad, Vichy, semi-solid diet, antacids, belladonna. Smoking forbidden.

Subacid Gastritis

Pressure in the stomach after eating solids, but not after liquids. Pyrosis absent. Vomiting only after gross errors in diet,—such as cheese, cabbage or smoked meats. Tendency to diarrhoea.

Homburg, Wiesbaden, Kissingen, soft diet, hydrochloric acid and bitters.

Ulcer of the Stomach

The appetite may be good, but the patient is often afraid to eat. Epigastralgia $\frac{1}{2}$ hour to 4 hours after eating, which is often relieved by warm drinks, or vomiting of the gastric juice. The localized point of tenderness in the epigastrium is to the left of the tenth to the twelfth dorsal vertebrae.

Leube's rest and fasting-cure. When this is impossible, the use of silver nitrate in recent chlorotic ulcers, and bismuth subnitrate in chronic ulcer. Oil for severe epigastralgia; Carlsbad water for ulcer following acid gastritis.

After-Treatment.—Carlsbad or Vichy water for six weeks, followed by the milk of almonds for three months. In chlorotic ulcer, iron spring water.

Cancer of the Stomach

This occurs in previously healthy stomachs, or follows chronic ulcer. The onset is insidious, beginning with loss of appetite, repugnance toward meats, anæmia and weakness.

Cancer of the Cardia

Difficulty in swallowing, obstruction at the cardia.

Cancer of the Pylorus

Stagnation of the stomach-contents with lactic acid fermentation, or hydrochloric acid present in carcinomatous degeneration of ulcer of the pylorus.

Extra-ostial Carcinoma

The gastric juice is achylous; blood and pus are found in the fasting stomach.

Suitable therapy, either that of stenosis of the pylorus or *achylia gastrica*.

The treatment of carcinoma of the pylorus is surgical.

Gastrectasis

Acute dilatation following acute paralysis of the stomach, severe indigestion, or ileus of the jejunum or upper ileum.

Chronic dilatation is caused only by obstruction of the stomach-outlet. Vomiting of stagnating foods; gnawing and cramp-like pains in the epigastrium; heartburn. Remnants of food with hydrochloric acid and sarcinæ are always found in the fasting stomach.

Lavage, oil-treatment, stenosis-diet. If stasis of food persists after medical treatment, and the daily quantity of urine secreted is below 500 c.c., the treatment should be surgical.

Atony

(Anæmic-Enteroptotic Dyspepsia)

General anæmia, neurasthenia, hysteria, *habitus enteropticus*, and often tuberculosis. Weakness, loss of appetite, feeling of fulness and pressure after eating any kind of food, rapid satiation of appetite, regurgitation, but no vomiting; constipation. Secretory and motor functions of the stomach normal. Low position of the greater curvature of the stomach. Loud splashing sounds in the epigastrium.

General, rather than local treatment, forced feeding with rest in bed, change of scene, hydrotherapy, massage, and bitters. No special health-resort is indicated.

Nervous Dyspepsia

Secondary to hysteria or neurasthenia, even in patients who are well nourished. Periods of normal digestion alternate with a constant feeling of pressure in the epigastrium. Objectively, the stomach is normal. There is frequently a disturbance in the genito-urinary system.

Change of scene, and suggestion; bromide of potassium and valerian, and the treatment of the primary disease.

Gastric Crises

These are usually caused by syphilis, which have received insufficient or no mercurial treatment. In this affection there are periodical attacks of pain and vomiting, following which the patient has a period of normal digestion. The symptoms of *tabes* are usually present, although they sometimes do not appear until two or three years later.

Treatment should include morphine, cerium oxalate, and gastric lavage. If *tabes* has not yet positively developed, inunction treatment with mercury.

Cholelithiasis

Generally with obesity, and following pregnancy. There are sporadically occurring epigastralgia,—located principally on the right side,—vomiting, and frequent jaundice. Following the attack, the patient digests ordinary food without trouble. There is a tendency to relapse, following errors in diet and emotional disturbances.

In an acute attack the treatment includes leeches, morphine subcutaneously, or the extract of belladonna, and hot fomentations. In chronic cases the treatment should include Carlsbad water, Neuenahr, Vichy, or Bertrich at these places, or the water used at home; olive oil, chologen or eunatrol.

The treatment is also surgical.

Angina Pectoris

Arteriosclerosis, myocarditis, cramp-like pain after overloading the stomach or after violent physical exercise,—the

pain being behind the sternum and in the cardiac region, radiating into the left arm.

The treatment should consist of rest, iodide of potassium, nitroglycerin and diuretin.

Nervous and Reflex Vomiting

This is variously caused by retroflexion of the uterus, masturbation, helminthiasis in children, bronchitis, or emotional disturbances. Vomiting follows immediately or within 10 or 15 minutes after eating. It is independent of the quality of food eaten. There is no pain. The secretion and motility of the stomach are normal.

The treatments most effective are suggestion, mild massage, and bromide of potassium and valerian.

Catarrh of the Small Intestine

Caused by repeated indigestion or gastritis. There is a feeling of fulness and distention in the entire abdomen, especially around the umbilicus, after excesses in eating, and often in the morning before breakfast. There is much flatulence, which is relieved by the escape of gas. Generally the colon is simultaneously inflamed. The stool is of a semi-solid consistency, or alternately hard and semi-solid, or often of a liquid consistency. In slight catarrh of the small intestine, the stools often present no objective findings. Microscopical findings are fat-needles and free starch-cells.

Catarrh of the Colon

This is most frequently caused by over-loading the digestive tract, and constipation of several years' standing.

a. Slight Cases.—Constipation with membranous enteritis.

b. Moderately Severe Cases.—Alternating constipation and diarrhœa, with shreds of mucus in the stool.

c. Severe Cases.—Persistent pulpy or liquid stools containing much mucus.

Therapy

a. Laxative mineral water, mild constipation-diet, Priessnitz compresses, belladonna.

- b. Bland diet, hot mineral water in small doses.
- c. Constipating diet, tannocol, etc., hot compresses, hot enemata of a solution of tannin or of Carlsbad water.

Atonic Constipation

Insufficient amounts of food on account of anorexia or disturbances of the stomach, enteroptosis, etc. The only symptom is constipation. The stool is of large caliber; the sigmoid flexure is well-filled with fæces; laxatives and enemata are effective.

A heavy diet, rich in cellulose, strychnine, cold hydrotherapeutic treatments, massage and endofaradization.

Spastic Constipation

The result of atonic constipation, especially in neuropathic individuals. Laxatives and enemata ineffective. Feeling of tension and cutting pains in the abdomen. Stools of small caliber, surrounded by membranous mucus. The sigmoid flexure is palpated as a contracted, painful cord.

Hot applications, belladonna, oil enemata, mild diet, and hot aromatic teas.

Typhlitis

Pain in the ileocæcal region, generally diarrhœa, and gurgling sounds in the right iliac fossa; fever rare.

Hot compresses.

Appendicitis

Diffuse pain and the presence of a diffuse, painful tumor. Generally fever. No diarrhœa.

Ice-bag, opium, operation.

Peritonitis

Tympanites. The slightest movement,—especially coughing and urinating,—excruciatingly painful. Fever. Constant gnawing and cutting pains in the abdomen.

Ice-compresses, opium, operation.

Stenosis and Obstruction of the Intestine

Intermittent pains, resembling labor pains. No fever, or not until late. Tympanites. Vomiting. Fecal vomiting. Enemata ineffective.

If pain is absent, and there is only a simple temporary constipation,—laxatives. If colic exists, large doses of belladonna, or the subcutaneous use of atropine and high oil enemata. If medicinal treatment is ineffective,—operation. The uterus, rectum and abdominal rings should be carefully examined.

Hemorrhoids

At first, lead- and opium-water compresses, followed by hamamelis per rectum and mouth.

After-Treatment.—That of habitual constipation,—**Homburg**, **Kissingen**, etc. (see above).

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