

THE
ECLECTIC
PRACTICE OF MEDICINE

BY

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PREFACE.

I offer neither apology nor excuse for placing before the profession another Practice of Medicine. Eclecticism has won its way into the homes of many thousands, since Wooster Beach and the "Fathers" taught a more successful way of treating the sick. The methods of the "New School" are being examined and tested as never before, and men from all schools are recognizing the efficiency of our splendid materia medica.

In writing a New Practice, I do not desire it to be understood that most of the material used is new, for it is one of the fundamental principles of Specific Medication (Modern Eclecticism), that when once the relation of drug action to diseased conditions is found, it is found for all time; that an agent that will correct a *specific* condition to-day, will correct the *same condition* to-morrow, next year, or a hundred years hence; therefore many of the remedies used twenty-five, thirty, or fifty years ago, are used to-day.

We have faith in the Eclectic Practice, and the desire on the part of the students of our colleges to use a Practice more modern than the older Eclectic works on Medicine, one that is up-to-date in etiology, pathology, description, diagnosis, and treatment, is responsible for the publication of this work.

The etiology and pathology must necessarily be the same in all works on Practice and this will only materially differ from other works of like character in presenting a treatment that is proving successful in the hands of more than ten thousand practitioners. I am indebted to a host of able workers, who have, at the bedside, tested and proven many of the agents used.

To W. B. Saunders & Co., Lea Bros. & Co., The Hahnemann Press, P. Blakiston's Son & Co., D. Appleton & Co., and P. A. Davis Co., I am particularly indebted for courtesies shown in the use of illustrations, I have endeavored to give explicit credit to each author where references are cited, and my thanks are due them for favors extended.

I trust that the reader will find the twenty-five years' experience of the writer, as well as those of his many brother practitioners, a help in

successfully relieving the sick.

ROLLA L. THOMAS, M. D.
CINCINNATI, O.
February 10, 1906.

PREFACE TO SECOND EDITION.

The disposal of the first edition within a year has been most gratifying to the author, and I desire to thank the Profession for the cordial reception of the work. With the exception of a correction of minor errors, which were overlooked in the hurried preparation of the manuscript, I have not found it necessary to revise the second edition. Owing to more recent knowledge of the transmission of yellow fever, the article on this disease has been rewritten.

While due attention has been paid to the etiology, pathology, and diagnosis of diseased conditions, the writer believes that the physician's greatest success in treating the sick is due to his knowledge of therapeutics and the readiness with which he is able to apply his remedies to diseased conditions. It is along these lines that he is to make his most enduring reputation with his patients and the public.

An experience of twenty-seven years, coupled with that of thousands of my fellow practitioners, enables me to present a treatment that is direct, pleasant, and attended with a minimum mortality.

ROLLA L. THOMAS, M. D.
CINCINNATI, OHIO.
September 1, 1907.

INTRODUCTION.

It may be well to state our position in the medical world, for there seems to be a great deal of confusion or ignorance as to what Eclectics teach and practice, the idea prevailing among a large class, that Eclecticism consists in choosing the best remedies from all the other schools, and while this is true to some extent, it applies equally to all schools, for every conscientious physician has and does exercise the same prerogative, choosing what he thinks is the best remedy.

Choosing the best therefore is not characteristic of Eclectics; neither is the use of vegetable remedies the distinguishing difference, though we have been developing a materia medica for the last seventy-five years, till to-day it stands without an equal, and it is not unlikely that we do use more remedies prepared from indigenous plants, than other schools.

Modern Eclecticism's most characteristic and distinguishing tenet is "Specific Medication." Thirty-five years ago, Dr. John M. Scudder wrote "The medicine of the future will be direct or specific," and published those little masterpieces, "Specific Diagnosis" and "Specific Medication;" and Eclectics, recognizing it to be the most rational method of prescribing, began testing and proving the system, till to-day, ten thousand physicians are successfully practicing Specific Medication.

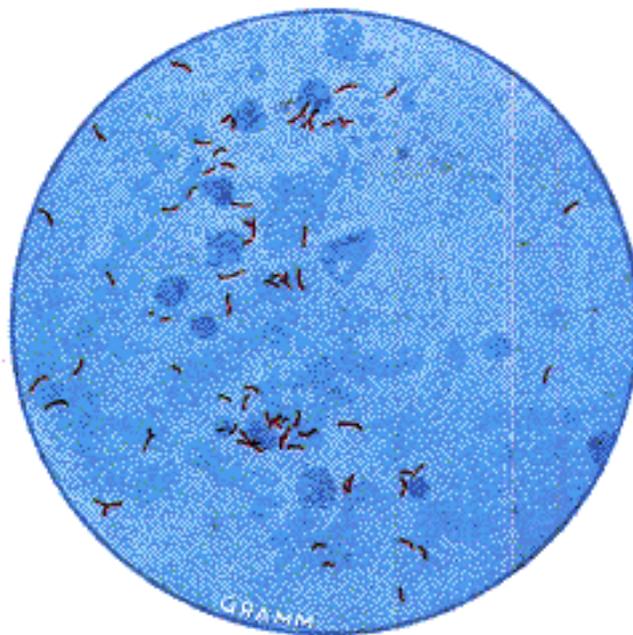
The prejudice against this system is due to the fact that it is generally misunderstood. Eclectics do not advocate or administer specific remedies for specific diseases, such as a remedy or combination of remedies for pneumonia, typhoid fever, dysentery, etc., but do prescribe specific remedies for specific pathological conditions.

Every change from the normal, or every pathological condition, gives expression to such change by symptoms, and experience has proven that the same pathological change is always expressed by the same set of symptoms, and having once learned to recognize such a condition, we have it for all time. Thus an excess of heart power as seen in *sthenia*, is always expressed by the full bounding pulse. Irritation and excitation of the cerebral centers in all *sthenic* conditions, is *always* evidenced by a flushed face, bright eyes, and contracted pupils. The pallid tongue with a white pasty coating *always* tells of acidity, while the dry, red tongue *always* tells of alkalinity of the blood. So, of *every* deviation from health, each change is expressed by definite symptoms. Now there is a direct

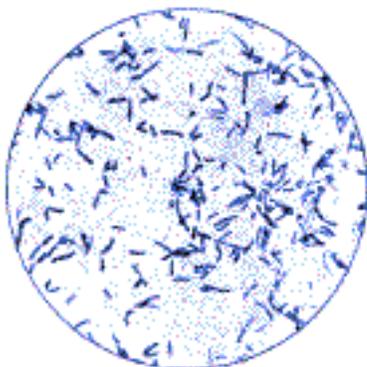
relation between drug action and disease expression, and having once learned this relation or the affinity that a remedy has for a specific condition, we have learned it for all time. Thus, if veratrum will influence the heart's action to-day, when there is a full bounding pulse, and this is the basal lesion, it will do it under the same conditions to-morrow, next year, or a hundred years hence. It will do it in pneumonia, in cerebritis, in nephritis, or wherever it is found. If gelsemium will relieve irritation of the cerebral centers, as shown by the flushed face, bright eyes, and contracted pupils, no matter what the disease, we have found the affinity or drug relation for this condition. So of every pathological change, and the diagnosis, so far as *treatment* is concerned, consists in determining the *pathological condition present*, rather than in naming the disease. While I recognize the importance of being able to diagnose the disease in its entirety, and believe that the best diagnostician, other things being equal, will be the most successful in the treatment of his patients, at the same time it were better for the doctor if he can *forget* that his patient has typhoid fever, pneumonia, dysentery, or whatever he may have, and study the *conditions* that are present. This may be wrongs of the circulation, of the nervous system, of the secretions, of digestion, of assimilation, or wrongs of the blood, but whatever the basal lesion, it must be overcome if the patient is to be benefited by medication. I appreciate that it may not always be possible to recognize the pathological condition, but until we do, we can not hope to treat our patient in a rational manner. This, then, is Specific Medication—Specific Remedies for Specific Conditions.

We are indebted to a host of able workers, pioneers in the field of rational medication, and who builded better than they knew. Especially are we indebted to Prof. John M. Scudder, who by pen and voice directed our school in this better way; to Prof. John Uri Lloyd, whose work in giving us Specific Medicines of such superior quality as to make success possible; to my colleagues and fellow practitioners who have so largely assisted in more firmly establishing the principles of Specific Medication.

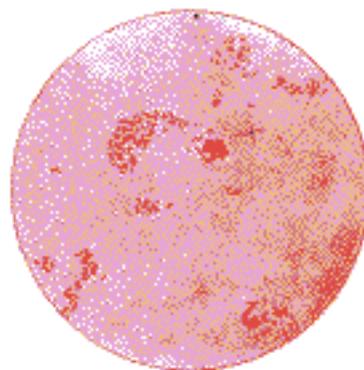
For the benefit of students and those who are not familiar with Eclectic methods, I have added a chapter on the indications of remedies, and also poisons and their antidotes, together with a table of weights and measures, and a list of incompatibles.



TUBERCLE BACILLI IN SPUTUM



DIPHTHERIA—PURE CULTURE



TYPHOID—PURE CULTURE

PART I.

INFECTIOUS DISEASES.

TYPHOID FEVER.

Synonyms.—Typhus abdominalis; Typhus nervosus; Ileo-Typhus and Autumnal Fever, are the most common terms, although Murchison's list includes forty others.

Definition.—An acute, infectious disease, derived from a specific cause and characterized pathologically, by inflammation and generally by sloughing of Peyer's glands, swelling of the mesentery and engorgement of the spleen.

Clinically, by a slow fever of gradual invasion, lasting from three to six weeks, a rose-colored eruption, diarrhea, tympanites and a characteristic delirium, typhomania.

History.—This is the most universal of all fevers. It is not confined to any country or climate; to any age, sex, or condition. Wealth has no power to bribe or beauty to charm this insatiable foe. Wherever civilization has made its way, there typhoid fever has been an unwelcome guest. Although its authenticity does not date back of the present century, we have every reason to believe that it can be traced to prehistoric times.

In 1813, Bretonneau of Tours recognized this fever as differing from other continued fevers and termed it Dothinentérite, while Petit termed it Enteromesenteric fever. In 1829, Louis offered the name Typhoid, but it remained for Gerhard, of Philadelphia, a student of Louis, to distinguish between typhoid and typhus as separate and distinct diseases. He published his views in the February number, *American Journal*, 1837. Drs. E. E. Hale and James Jackson, Jr., of Boston, also students of Louis, corroborated the observations of Gerhard, and typhoid fever was recognized, especially in America, as a distinct disease. In Europe, however, there was still doubt as to its identity, many believing that the two were only different phases of the same disease.

Stille, of Philadelphia, who was house physician to Gerhard, assisted largely in making clear to the people of France the distinction between

the two diseases, during his careful study of typhoid while in Paris.

Shattuck, of Boston, visited the London fever hospital, studied the disease in all its minutiae, which he carefully tabulated and presented to the Societe Medicale d'Observation. These observations were accepted by prominent writers from various countries, and since 1850 there has been a general acceptance of the truth, that typhoid fever is a distinct disease. It will be observed that to America belongs the honor of isolating one of the most common and prevalent of all fevers.

Etiology.—The predisposing causes are twofold. On the one hand are all the conditions that favor the growth of the infective material and its accumulation. On the other hand are all the conditions that impair the vitality of the individual, rendering him susceptible to the poison.

Age.—One of the most frequent predisposing causes is age, over seventy-five per cent of its victims being between fifteen and thirty years of age. It was formerly believed that children were exempt, but since Murchison, in 1864, presented to the London Pathological Society the intestines of a child six months old, who had died from the disease, all doubt has been removed, and nearly every physician of experience can bring his own evidence to substantiate the fact, that from infancy to old age there is no exemption.

Sex.—Some have tried to prove that males are more prone to the disease than females, but the cause is rather to be found in the fact that men are more exposed to the infection than women, and not to any difference in the sexes.

Season.—Typhoid fever prevails most frequently in the fall, hence the term Autumnal Fever. Hirsch found that of five hundred epidemics twenty-nine occurred in the spring, one hundred and thirty-five in summer, *two hundred and fifteen* in the fall, and one hundred and forty in the winter.

Weather.—The condition of the weather plays some part as a predisposing factor in this disease. Hot and dry seasons favor it, while cold and wet seasons tend to check it.

Exciting Cause.—The exciting cause is now generally recognized by the medical world as being due to the entrance into the system, of one susceptible to the poison, of a specific germ, the bacillus of Eberth,

which he has termed the bacillus typhosus. These micro-organisms, taken into the system through the digestive tract, when not destroyed by the acid of the stomach, pass into the alkaline constituents of the intestine, where the conditions are favorable for their multiplication and development.

The bacilli penetrate the solitary follicles and Peyer's patches, and there form colonies. These migrate by way of the lymphatic vessels to the mesenteric ganglia, and by way of the radicles of the superior vein to the liver, to be finally distributed by the blood current to the spleen and other organs. Such is the view held by a large part of the profession. That these bacilli are found in the contents of the intestine, the stools, in the urine, in the mesenteric glands and spleen, none can deny, although many contend that they are the result, rather than the cause, and that the toxins are not generated from the micro-organisms. Of these doubters the most prominent authority on fevers is Murchison. Unfortunately they are unable to furnish a tangible substitute to take the place of the specific germ. The life of this bacillus is very tenacious. (See frontispiece.)

Pruden found that after being frozen for over three months it was capable of growth, and that it maintained its vitality after being heated to a temperature of 132 C., and that after repeated freezing and thawing its vitality was unimpaired.

Modes of Conveyance.—While it is possible to receive the poison by inhalation, by far the most frequent mode of entrance is through the digestive tract in eating and drinking. Contaminated water ranks first as a carrier. Of two hundred epidemics that were studied, polluted water was found to be the source of infection; only two will be named, however, to show the direct relation to this source.

In 1885, in Plymouth, Pa., twelve hundred persons, out of a population of eight thousand, were attacked with the fever. The water supply was taken from a reservoir which received its supply from a mountain stream, upon the side of which resided a typhoid fever patient. During the months of January, February, and March the stools were emptied near the banks of the stream that supplied the city with water. Typhoid fever at the rate of fifty cases per day broke out, and did not cease until the number reached twelve hundred.

In 1898, at Maidstone, England, an epidemic occurred, in which

eighteen hundred cases out of a population of thirty-five thousand could be traced directly to contaminated water.

Milk.—Milk is also a common carrier of the infective material, although nearly always the result of polluted water being used, either in diluting the milk or in washing the cans. Several epidemics have been traced to this source in France.

Oysters. — Articles of food may also contain the poison; notably, oysters, more than one hundred cases being attributed to the luscious bivalves, which had been fattened on contaminated water.

Dr. Conn, of Middletown, Conn., traced the cause of the epidemic which prevailed among the students of Wesleyan University in 1894 to this article of diet. The oysters came from a creek where they had been fattened by being kept in brackish water, the oyster-bed being only three feet from the mouth of a sewer which emptied the contents of two typhoid fever patients. Students from Amherst College, who received oysters from the same locality, also developed typhoid fever. The oysters were eaten raw in every case. Thus we find that polluted water, either directly or indirectly, is the common carrier of the infection, whatever that may be.

Pathology.—The lesions resulting from this fever may be divided into two parts. First, those which are primary and distinctly characteristic; viz., the lesion of the intestinal canal, Peyer's patches, the solitary glands of the ileum and cecum, and more rarely of the colon and rectum, the mesenteric glands, especially those opposite the ileum, and changes in the spleen. Secondly, those resulting from sepsis occurring during the long period of fever, and affecting the tissues and organs at large.

The lesions of the intestines are better described under four stages, infiltration, necrosis, ulceration, and healing. The first effect of the poison, typhotoxin, bacilli, or whatever it may be, is to cause hyperemia of the lymph follicles; the capillaries become engorged, cell infiltration proceeds till the glands extend from an eighth to a quarter of an inch from their base, the solitary glands varying from the size of a small bird-shot to that of a small pea. The follicles most involved are those in the lower third of the ileum and the upper part of the cecum, although the follicles of the entire tract may be involved. The infiltration reaches its height by the eighth or tenth day, when it terminates by resolution

or death. In the milder cases, by resolution, the follicles undergo fatty or granular degeneration, and are carried away by the absorbents, during which process there may be slight hemorrhages. More frequently, however, the infiltration is so excessive that resolution can not take place, the capillaries become engorged and choked by infiltration, and necrosis and sloughing follow.

A gland may have several necrotic spots with mucous membrane intervening, or an entire patch may be involved. The necrosis is variable, depending upon the severity, sometimes involving only the mucosa or sub-mucosa, again extending to the muscular and serous coats. This stage occupies eight or ten days, and is followed by the stage of ulceration.

The ulcers are shallow or deep according to the amount of necrosis or sloughing. The ulcers of the solitary glands are round, while those of Peyer's patches are irregular and ragged. Where the ulcers extend to the deeper portion of the bowel, hemorrhages result. Perforation may follow, although a rare condition.

This stage is followed by healing or cicatrization; granular material forms in the bottom of the ulcer; the mucous membrane of the edges projects; the glands with their epithelium reform, and the bowel is restored to its normal condition.

The mesenteric glands undergo similar changes—viz., hyperemia, necrosis, and ulceration—those opposite the lower third of the ileum being more often involved. They vary in size from that of a pea to a walnut. The spleen in nearly all cases is early involved. Congestion early takes place, followed by softening.

It is difficult many times to separate the secondary from the primary lesion; in fact, in some cases we get the tissue changes first. The system is so profoundly impressed by the poison that there is very early a degeneration of tissue. The liver becomes hyperemic, swollen, and soft, which may be followed by abscess formation.

Cloudy swelling, with granular degeneration, takes place in the kidneys. There may be ulceration of the larynx, while the congestion of the bronchial mucous membrane is shown by an irritable cough.

Congestion of the lungs is a very common and serious complication. The

heart shares in the general infection, although pericarditis and endocarditis are rare, myocarditis is not uncommon, the cardiac muscles become weakened, and the much dreaded heart-failure is to be early combated.

Symptoms.—*Incubation*—This stage is of several days' duration, from seven to twenty-one or more. The symptoms are those of depression; the patient feels languid, and complains of feeling tired, although there be no exertion. His rest is disturbed at night, and he rises unrefreshed, as weary as when he retired; the appetite is impaired, the tongue is generally coated, and the bowels are slightly constipated; he complains all the time of being tired and of having more or less headache. Bleeding from the nose may occur for several days. These symptoms increase from day to day until the period of invasion is ushered in.

Many times it is difficult to draw the line between the period of incubation and that of invasion, so gradually does the one run into the other. While the chill may be pronounced, at other times slight chilly sensations are the only evidence of its appearance. Epistaxis is common and affords slight relief to the headache so often experienced; the temperature has been slightly above normal for several days previous to the chill, but now reaches 101 or 102, and the patient is now fully entered upon his long siege of fever, which is to be characterized by daily remissions.

The pulse varies, is full and frequent, although soft, or quick and sharp, if there is much nervous irritation. There is evidence of depression even in the early stage; the face is slightly flushed, the eyes heavy and expressionless, the tongue is moist and dirty, the appetite is gone. The skin, at first, becomes moist and somewhat clammy, with an unpleasant odor. The bowels at this time are usually constipated, although if active cathartics have been used diarrhea early ensues; the urine is but slightly lessened in quantity, and as the disease progresses, it becomes slightly increased, and is pale and frothy, resembling new made beer.

The temperature gradually increases, during the first week being about one degree higher in the evening than in the morning. From the seventh to the tenth day the characteristic rash, rose-colored, appears on the abdomen and chest, and although this is regarded as one of the chief diagnostic symptoms, it may be absent altogether. The diarrheal, frothy, "pea-soup" discharges may begin as early as the sixth or seventh day, or it may be delayed until the third week, although usually the

second week finds the stools frequent and offensive.

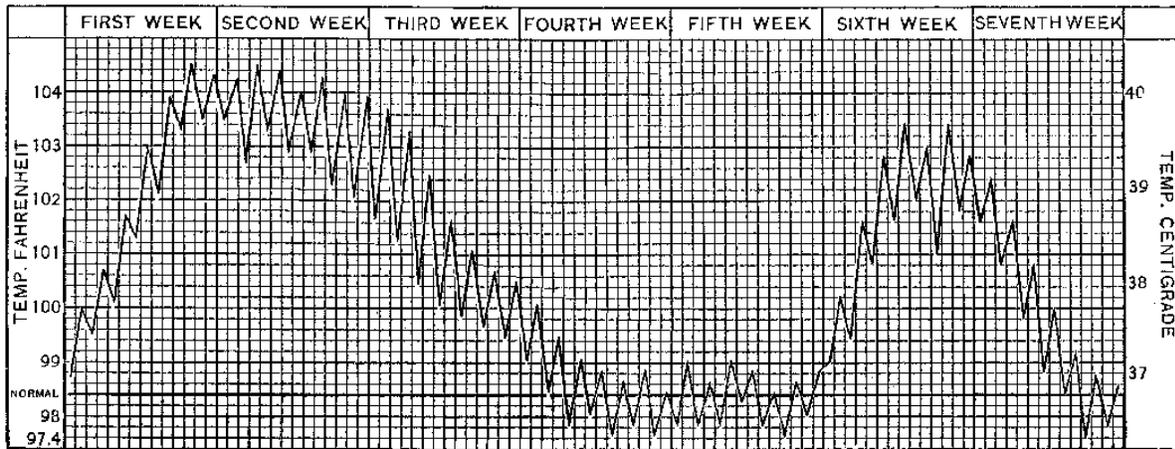
If there be much nervous irritation, the delirium may be active during the early stages, occurring mostly at night and disappearing with the approach of day; most frequently the delirium is of a passive character, and typhomania is a characteristic symptom.

The abdomen has been drummy from the invasion, with gurgling in the right iliac region, and by the second week tympanites is a marked feature. At this time there may be a temporary paralysis of the bladder, and the patient passes his water involuntarily; or, on the other hand, there may be retention, when the catheter affords the only relief.

From the tenth to the twentieth day the evidence of sepsis grows more pronounced; the tongue becomes dry, brown, and heavily coated, or sleek and glossy, while sordes appear on teeth and lips. The loss of tissue is rapid and emaciation marked. The pulse has now become dicrotic; the disturbance of the nervous system is complete, and we witness subsultus tendinum and carphology. If ulceration is severe, hemorrhages occur, followed by a drop in temperature and great prostration. The extremities are inclined to be cold, the heart feels the strain, and the depression is great. The position is dorsal.

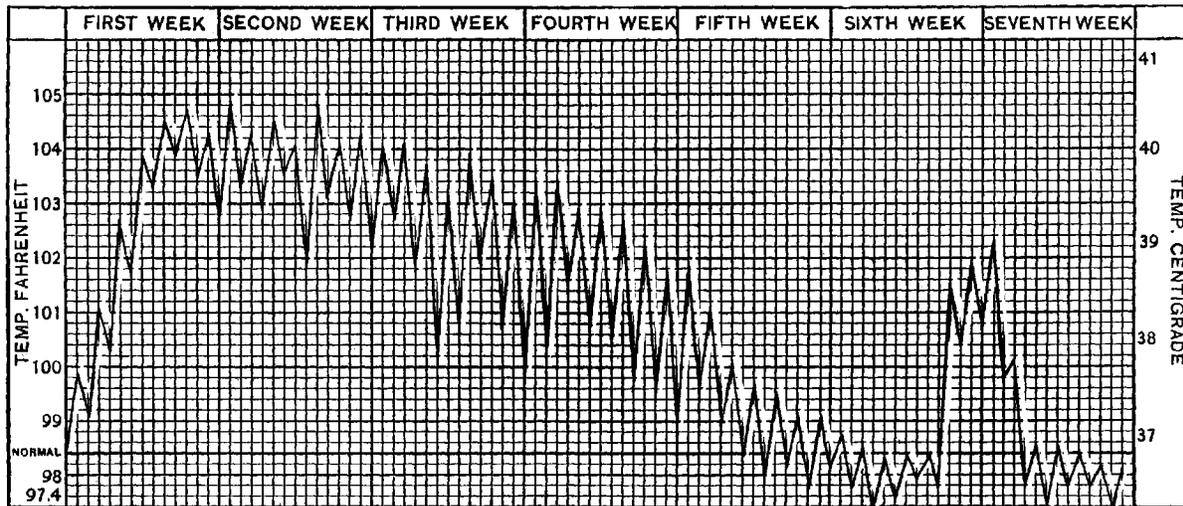
In the more favorable cases, the disease has spent its force by the eighteenth to the twentieth day, the temperature declines, the stools are less frequent, the tongue becomes moist and clean, appetite ferocious, and the patient enters the convalescent stage. This may be delayed, however, to the twenty-eighth, thirty-fifth, or even forty-second day.

Temperature.—There is a gradual rise in temperature during the first week, and if the forming stage is of long duration, the patient goes to bed with a temperature of 100°. Each day, for four or five days, we notice a slight increase from one degree to a degree and a half, the evening temperature being higher than the morning. These daily remissions are pathognomonic of typhoid fever. From the fifth to the seventh day the temperature reaches 104° or 105°. During the second week it is quite uniform—103° or 103.5° in the morning; 104° or 104.5° in the evening. The temperature, gradually rising from the noon hour, reaches its maximum between six and eight, remaining there until midnight, when there is a gradual decline till six or eight in the morning, when it reaches its minimum, remaining thus till nearly noon, when there is a repetition of the previous day.



Typical typhoid curve. "Anders."

Relapse.



Ambiguous period.

Curve in severe typhoid. "Anders."

Recurrence.

During the third week there is a slight decline, and by the twenty-first day, in the mild cases, the temperature is normal in the morning, although the rise in the evening temperature continues for several days. In severe cases the remissions are very slight, from the fifteenth to the twenty-fifth day the fever being very uniform, with an occasional increase of the morning temperature over the evening temperature. During the decline the remissions are more marked, there being a fall of from two to three degrees from morning till night, and where the emaciation and prostration have been extreme it is not uncommon to find a subnormal temperature in the morning for several days of the convalescent period. The severity of the disease and its duration is determined, as a rule, by the temperature range; when this is low the

fever is mild, the disease increasing in severity as the temperature rises. We meet some cases where the temperature never rises above 102° or 103°.

A disease which shows as much systemic infection as typhoid, would naturally show more or less wrong of every organ and tissue of the body, and while this is true, there are some parts more frequently affected than others, notably the respiratory, nervous, and gastrointestinal systems.

Bronchitis.—The toxin may early infect the bronchial mucous membrane, giving rise to bronchitis. The breathing is more hurried, and there is a sense of constriction of the chest, attended by a frequent hacking cough. Expectoration is at first scanty, and the mucus is raised with difficulty; but gradually the secretion becomes more free, often resulting in bronchial catarrh. The sibilant rhonchus, together with the symptoms already noted, enables us to recognize this lesion.

Pneumonia.—Congestion and inflammation of the lungs are not infrequent, and may occur during the second or third week, rarely in the first. The breathing is short and rapid, the oppression of the chest is marked, and the cough is harassing, greatly depressing the patient. The expectorated material is usually not so viscid and tenacious as in simple pneumonia, nor the sputum so rusty, being more of the prune-juice color.

The dark, dusky hue of the lips and tongue, the flushed face, oppressed circulation, dullness on percussion, and crepitant rhonchi, are symptoms that can not be mistaken. This is one of the most serious complications, causing great prostration, and rendering the prognosis problematical. The congestion is most frequently due to the dorsal position, and not from taking cold nor from germ infection.

Gastro-Intestinal.—In some cases we notice, at the beginning of the fever, marked wrongs of the stomach. The tongue is heavily coated with a dirty, pasty coating; there is loss of appetite, nausea, and weight in the region of the stomach. There is hyper-secretion of mucus, and food and medicine are not appropriated. The fever is of low grade, the pulse weak, and temperature not over 102° or 103°. Although the prostration is great, emaciation is not so marked. The extremities are inclined to become cold. In such cases convalescence is delayed to the fifth or sixth week.

In other cases there is great irritation of the stomach, and the enteric lesion is greatly aggravated. Diarrhea is a prominent feature, the stools being frequent and offensive. Tympanites is extreme and hemorrhage may be expected.

Cerebral Complications.—In some cases the nerve centers are the first to feel the effect of the poison, and the disease is ushered in with intense headache or neuralgia, and if the physician is not careful, he will overlook the real lesion. All the symptoms are increased in intensity; the skin, especially of the head and face, is intensely hot and pungent. The countenance is flushed; there is throbbing of the carotids; the pulse is rapid, full, and strong; the breathing is frequent and suspirous; the eyes are injected and suffused, or dry and burning. There is great irritability and restlessness, giddiness, intolerance to light and sound, with greatly increased sensibility.

Within forty-eight to seventy-two hours delirium of a wild and active character occurs, which is soon replaced by coma vigil, subsultus, and lastly by profound coma. At other times the cerebral affection is intense; profound stupor speedily makes its appearance, accompanied by a slow, oppressed, and intermittent pulse; or the patient is dull from the first, the pupils are dilated, the patient answers slowly, protrudes his tongue with difficulty, and is careless of the result. The pulse is feeble, skin cool, temperature not very high, delirium low and muttering, which is soon replaced by coma.

Laryngitis and Pharyngitis.—Occasionally we meet with these complications; the constriction of the throat, difficult deglutition, and change of voice enables one to recognize the lesion.

Heart.—We meet with cases where the circulatory apparatus feels the force of the poison, and, although rare, an endocarditis or pericarditis results. A myocarditis occurs more frequently.

Afebrile Typhoid Fever.—This form is exceedingly rare. Some eight or ten years ago I treated one of our students with this form, the temperature being sub-normal the greater part of his three weeks sickness.

Typhoid in Children.—The disease as seen in children needs no especial description, except to say that the onset is frequently more

sudden. There is a short forming stage, and the fever runs a shorter course, the patient often being convalescent the fourteenth day.

Diagnosis.—The diagnosis is usually not difficult, although in rare cases it may be uncertain for several days. Osler states that, in four or five cases in his series, the diagnosis was not made until autopsy.

The history of the forming stage: one, two, or three weeks of listlessness, languor, headache, loss of appetite, general depression, progressively increasing until the patient takes his bed, are the most characteristic symptoms of this fever, and the regular step-ladder rise in temperature with daily remissions, the peculiar dullness of intellect, the marked prostration and feeble pulse, are sufficient to render a most probable diagnosis. If to this we add tenderness and gurgling in the right iliac region, enlargement of the spleen, diarrhea, the presence of the rash and the cerebral disturbance, the diagnosis is complete.

The case difficult to recognize, is where the usual symptoms are masked by an early complication. A recent case serves as an illustration. The invasion was characterized by an intense headache and great irritation of the nervous system; his face was flushed, pulse full and hard, eyes bright and contracted, and his constant cry was for relief from the pain in his head. The symptoms were more of meningitis than typhoid.

Sometimes the respiratory complication is the first to attract the physicians attention, and if we are not careful we will give a mistaken diagnosis. In all such cases the physician must not be in too great haste to name the disease. If we examine our patient carefully, note the tenderness on pressure of the abdomen, the daily remissions in the fever, the evidence of sepsis as shown by the tongue, light will soon be forthcoming even in obscure cases.

I have but little faith or patience with the modern search for the bacillus typhosus as a means of diagnosis, nor with the serum test as proposed by Widal, which is as follows: To a drop of blood taken from the patient by pricking the finger with a needle, add a few drops of bouillon culture of the bacilli. In a short time, from a few seconds to five hours, the bacilli lose their peculiar movements and collect into heaps, and gradually into lumps, which, if examined in hanging drops, are visible to the naked eye. The blood serum of healthy persons, or persons suffering from any other disease, does not have this effect upon the typhoid culture.

Vaughan, in an article on ptomaines, toxins, and leucomains, says of the Widal test: "There are reasons for believing that too much reliance has been placed on the Widal test, and that normal blood serum will often have a similar effect upon the typhoid bacillus, and that the difference in behavior between the typhoid and cholera germs toward the blood serum of typhoid patients is not so marked as has been generally believed." We thus see that we must depend upon the clinical examination of our patient, rather than upon the microscopic or chemical reaction.

Prognosis.—This is a disease that varies greatly at different times and in different seasons. Some years it assumes a mild character and but few die, while again it assumes a most malignant form. The mortality is usually larger in hospitals than in private practice. If modern Eclectic treatment be carried out, the mortality should not be over three to five per cent. If there be severe hemorrhages, pneumonia, or peritonitis, the prognosis should be guarded.

Treatment.—In the treatment of typhoid fever, Eclectics have been remarkably successful, the mortality having been reduced to five per cent or less, and, with the modern care in nursing, the mortality will be still further reduced.

Prophylactic.—While we believe that the direct or specific medication employed by our school shows the best results, we also firmly believe in using every known means to prevent the further spread of the disease, and at the same time minify the toxin that is destroying the vitality of our patient. Since the infection is conveyed most frequently through polluted water, our first care should be in this direction. If an epidemic is prevailing, the attention of the health department will be drawn to the water supply. This will not, however, release the attending physician from all responsibility. He must insist that all water be boiled before using. The milk should also be treated in the same way, as we have seen that this is a fruitful means for carrying the poison.

"Cleanliness is next to godliness" was a favorite saying of Dr. Scudder, and he would add, "In some diseases, better." This is certainly important in typhoid fever. Dirt is a fruitful soil in which the poison thrives and multiplies, and hence we must see that the patient be kept perfectly clean. The bed linen should be changed daily, as well as the night dress. After each stool the soiled parts should be sponged with an antiseptic solution. Platt's chlorides or a solution of carbolic acid 1 to 50 is very

efficient.

The secretions, both urine and stool, should remain in a chloride-of-lime solution one hour before being emptied. The solution can be made by adding six ounces of pure chloride of lime to one gallon of water. The porcelain bed-pan should be thoroughly scalded after each using, and a cup of the lime solution placed in it to remain until it is again used. To each stool enough of the solution is added to completely cover it. After standing one hour, it should be emptied, if in the country, in a trench, dug for the purpose, being careful that it does not drain in any direction of the water supply. If vomiting occurs, the ejected material should be treated in the same way, as should the expectorations, unless cloths are used, when they should be burned. The soiled linen, after lying in some strong antiseptic fluid, should be thoroughly boiled before using.

These precautions may seem unnecessary to many, but as a school we have not paid as much attention to these matters as the times demand. This is an age in which antiseptics are demanded, and to fail in our attentions along this line is to court defeat. When possible—and I realize that many times it is not—the patient should be placed in a large room, where good ventilation can be secured, and where the sun can be admitted at some time during the day. An open fireplace is desirable. The temperature of the room should be maintained at sixty-five or sixty-eight degrees.

Much depends upon a good nurse, not necessarily a trained one, but one of good judgment, who will carry out instructions. The attendant should be gentle, but positive. Our patient must be put to bed early, and kept there. Much may be lost by allowing the patient to walk about during the early days. He is in for a long siege, and can not afford the unnecessary loss of a single ounce of his strength; hence a bed-pan should be used. He may object to it at first, insisting that he can not use it; but if the nurse be firm, he is soon convinced of his error. If impossible, which is rarely the case, he should be carefully assisted to the commode, which should be placed by the bed.

He is to be sponged daily with soda-water if the tongue be white and pasty, or acidulated water if it be red and dry. This is for cleanliness, not as a temperature reducer, which will be noticed later. The diet should be fluid, preferably milk, and should be given about every three hours, unless there be great prostration, when it may be given every hour. If the patient objects to sweet milk, it can be peptonized by adding essence

of pepsin, or make a sherry whey by adding one-fourth of a cup of sherry-wine to three-fourths of a cup of hot milk, stir till it curds, strain, and add a little sugar. This is a favorite whey, and I find it acceptable to many; others prefer buttermilk, while again malted milk, which may be prepared in many ways, will answer better. Broths do better in the advanced stages of the disease; if used early they are apt to aggravate the diarrhea.

Sick people soon tire of one food, and it is a good plan to change the broth from time to time; say beef broth one day, lamb broth another; then change to clam or oyster broth, or chicken broth, when we may return to the beef broth. Give plenty of cold boiled water. If he does not ask for it, give it as a medicine ; it will help nature wash out the poison by way of the kidneys. Do not allow any solid food until the temperature becomes normal and all tenderness disappears from the abdomen.

The position of the patient must be changed occasionally to prevent bed-sores.

In the giving of drugs in this disease, as in every other, it is well to bear in mind the object of our medication. We are to remember that our patient is to contend for weeks with a febrile condition that will tax to the utmost his vitality; that the fluids of the body and of every tissue and organ will be impressed by the poison; that every agent that is given must tend to conserve his vitality, and that every remedy that depresses it must be discarded. We are to guide our fever patient safely through the troubled sea of fever, render him as comfortable as possible, and so modify the morbid processes that may arise, that the voyager may safely reach the desired haven, health.

While we recognize that this is a true zymotic disease, with the intestines bearing the brunt of the attack, we do not treat it entirely by antiseptics. We most heartily concur in the teaching of Dr. Scudder in regard to the use of sedatives in this disease. An experience of twenty-five years convinces us of their beneficial action. We are aware of the fact that the fever is the result of a toxin in the blood, and that theoretically the treatment should be to give agents to neutralize or antidote this poison; at the same time we are satisfied that the fever may be modified, the irritation of the nervous system better controlled, and the secretions promoted by their judicious administration. We may not succeed in materially lowering the temperature, but we most favorably influence the heart's action and fortify it, so that it may

withstand the strain that it is always called upon to bear. Sedatives may be given to improve the circulation.

Aconite.—This is the sedative where the pulse is small and frequent, an evidence that the heart's action is weak and is beating rapidly to make up for loss of power. Aconite in the small dose does not depress, but adds tone to the heart. In proportion as the circulation is controlled, the secretions from the skin and kidneys are increased. Echinacea possesses strong antispetic qualities, and may be combined with it—thus:

Specific Aconite.	5 drops
Specific Echinacea.	1/2 to 1 drachm
Aqua Dest	4 ounces. Mix

Sig. Teaspoonful every one or two hours.

Veratrum.—Although there is usually debility with this fever, we occasionally find the strong, full pulse, showing excessive heart's action, and here veratrum takes the place of aconite. With excess of the heart's power, there is generally great irritation of the nervous system, which gives us the flushed face and bright eyes calling for gelsemium. Here the prescription will read:

Specific Veratrum	10 to 30 drops.
Specific Gelsemium	10 to 15 drops.
Aqua Dest	4 ounces. Mix

Sig. Teaspoonful every two or three hours.

Rhus.—This is an agent to relieve irritation, either of the nerve centers or an irritable stomach. These conditions are present with the small, sharp pulse, and if the tongue be pointed with elevated papilla the indications are still more pronounced:

Rhus Tox	8 drops.
Aconite	5 drops.
Aqua Dest	4 ounces. Mix

Sig. Teaspoonful every hour.

Lobelia.—This is an excellent drug where there is an oppressed pulse, as if there were some obstruction to the free flow of blood. In addition there is a sense of oppression in the chest, difficult breathing and unpleasant sensations in the region of the heart. These are symptoms often found with respiratory complications. Here specific lobelia, 10 drops, is added

to the aconite solution above named.

Jaborandi.—Where the skin is dry and the temperature running high, Dr. Webster recommends *Jaborandi*:

Specific <i>Jaborandi</i>	1 drachm.
Aqua Dest	4 ounces. Mix
Sig. Teaspoonful every one, two, or three hours.	

Bryonia.—Where there is bronchial irritation, with harassing cough, with sharp chest pains, and where the pleura is involved. *bryonia* is especially valuable. With these conditions the pulse is usually vibratile:

Specific Aconite or Veratrum.	
Specific <i>Bryonia</i> .	5 to 8 drops.
Aqua Dest	4 ounces. Mix
Sig. Teaspoonful every hour.	

Antipyretics.—For the high temperature, the temptation is to resort to some of the many antipyretics, chief among which are the coal-tar products, and quinine. These should never be used. The patient is being constantly depressed by the disease, and if to his depression we add remedies that are recognized by all medical men as heart depressants, our patient must necessarily suffer.

Baths.—To assist the action of the sedatives, baths are the safest adjuncts in reducing the temperature. The early Eclectics used the wet-sheet pack with great success, and we would do well to revive this practice. The Brand treatment, the submerging of the patient in cold water every time the temperature reaches 103, is not practical in private practice, but there are none so poor where the wet-sheet pack could not be used. Frequent sponging may take the place of the pack, and will be found very useful. Tepid water is the best.

Antiseptics.—Very early, antiseptics may be indicated. The dusky hue of the mucous membrane tells of the progress of the poison, and suggests *echinacea* and *baptisia*. Where the tongue is broad, full, slightly coated, and with a dusky hue, face and tissues full, give:

Specific <i>Echinacea</i>	1 drachm.
Aqua Dest	4 ounces. Mix
Sig. Teaspoonful every hour.	

Baptisia.—Where the face is dusky and presents a frozen appearance, the tongue is dusky and the stools frequent, baptisia may take the place of echinacea, or, what would be better, combine them.

Sodium Sulphite.—Where the tongue is moist, dirty, and pasty, the face full, eyes dull, extremities inclined to be cold, emaciation not very rapid, a saturated solution of sulphite of soda will be found invaluable. Tablespoonful every two hours.

Potassium Chlorate.—This is the remedy for bad odors, offensive skin and breath, fetid stools; in fact, general cadaveric odor:

Potassium Chlorate	1 drachm
Aqua Dest	4 ounces. Mix
Sig. Teaspoonful every two hours.	

Hydrochloric Acid.—This is by far the most frequently indicated antiseptic used in typhoid fever. By the end of the second week, and sometimes earlier, the tongue becomes dry and brown, or, dry, sleek, and glossy, with sordes on teeth and lips. The tongue is protruded with difficulty, the emaciation is rapid, here:

Hydrochloric Acid.	15 to 20 drops
Simple Syrup and Aqua Dest	2 ounces each. Mix
Sig. Teaspoonful every one, two, or three hours.	

Cider.—With these same symptoms, sharp, sparkling cider is not only very refreshing, but also curative. Buttermilk is another agent that is grateful in these conditions.

Sulphurous Acid.—The moist, dusky, red tongue, resembling spoilt beef, calls for sulphurous acid.

Sulphurous Acid.	2 drachms.
Aqua Dest	2 ounces. Mix
Sig. Teaspoonful every two or three hours.	

Nervous System.—We find that one of two conditions may be present. Where the patient is restless and irritable, gelsemium and rhus tox. will be called for; here the flushed face, bright eyes, hot head, and

restlessness, calls for gelsemium. If the patient suddenly starts in his sleep, has a sharp stroke to the pulse, rhus has the preference.

Belladonna.—If there is more or less coma, the pupils will be dilated, the pulse will be small and the extremities inclined to be cold,—we will add ten drops of specific belladonna to a half a glass of water. Teaspoonful every hour.

Quinine.—We do not use quinine as an antipyretic, but where there is lack of innervation, with moist skin and moist tongue, quinine is an excellent agent:

Quinine	2 grains
Phosphate of Hydrastia	1/4 grain. M
Sig. A capsule every three or four hours.	

Insomnia.—The patient who fails to secure sleep is doing badly, as the dry, brilliant eye, pinched features, and contracted nose will testify.

Passiflora. *Passiflora* in full doses will often secure the desired rest:

Passiflora and	
Aqua Dest	1 ounce each M.
Sig. Teaspoonful every one, two, or three hours.	

Diaphoretic Powder.—The old diaphoretic powder of the fathers, consisting of camphor, opium, and ipecac, is one of the most reliable remedies which can be used. The indications calling for it are, moist skin and tongue. From five to eight grains should be given every four or five hours. The second dose rarely has to be given.

Sulphonal and Trional.—These agents may be given in ten-grain doses, administered in very hot water. It is best dissolved in boiling water, then stir till cool enough to drink. The sulphonal should be given two hours before sleep is desired, as it is very slow in its action. Trional is much quicker, and should be given thirty minutes before bedtime. Before using any of these drugs, the nurse will have tried sponging the face in cologne-water, rubbing the spine, using the hot foot-bath, changing the pillows, etc., which will, very many times, secure the desired result, sleep and rest.

Gastric Complications.—Wrongs of the stomach should have been

considered, perhaps, before lesions of the circulation: for many times treatment has to be directed to correcting this before any other medication can be carried out.

Irritation.—The irritable stomach will be easily recognized. The elongated tongue, reddened at tip and edges, tenderness over the epigastric region, the constant nausea with persistent retching, will be overcome by the use of specific ipecac and rhus tox.— five to ten drops of each to a half a glass of mint water. Tea-spoonful every thirty or sixty minutes; or sub-nit, bismuth, drachms 1 to water four ounces.

A cold pack over the stomach will assist materially in overcoming this condition. An infusion made from the bark of the young twigs of the peach-tree, and given in small doses, may also be very useful.

Atony.—At other times there is marked atony of the stomach with hypersecretion of mucus. Here the tongue is broad and pallid, with a heavy coating from base to tip. The patient is dull, and the tissues full.

Sodium Sulphite.—Until these conditions are changed, neither medicine nor food can be appropriated. With these symptoms, place sulphite of sodium, drachms 2, in a half a glass of water, and give a teaspoonful every two or three hours.

Diarrhea.—If mild, nothing will be required, but if profuse, bismuth subnitrate or bismuth subgallate will be useful, three to five grains every three or four hours; or specific epilobium, ipecac, or dioscorea may be given, ten to twenty drops in a half a glass of water. If the tongue be pasty, sulpho-carbolate of zinc will be found of great benefit.

Hemorrhage.—There will be few cases of hemorrhage if the doctor has carefully met the conditions from the beginning; however, we will sometimes have it even under the best of care. Gallic acid, five grains every three or four hours, will usually promptly arrest it. The decoction of erigeron cane is advised by Webster. There is usually great prostration following a hemorrhage, and stimulants will be called for, strychnia grs. 1/60 being one of the best.

Tympanites.—If the distention of the abdomen be great, the small dose of turpentine will be found useful. The tongue in these cases is dry and clean. An emulsion containing one drop of the drug at a dose, every two hours, will not disturb the stomach or kidneys, and will give good

results. Specific xanthoxylum, 20 drops, to water four ounces, teaspoonful every hour. is good treatment. The common tincture of Prickly-ash berries, an ounce to a pint of warm water, and used as an enema, will also prove of marked benefit in stubborn cases.

Constipation.—I am not yet a convert to cathartics in typhoid fever, and I am persuaded that a little constipation is better than the irritating effect of a cathartic. I would allow the bowels to remain quiet twenty-four or forty-eight hours before resorting to means for an evacuation, when an enema of warm water and glycerine may be used. If unsuccessful, tablespoonful doses of pure olive-oil or broken doses of epsom salts may be given.

Bladder.—The condition of the bladder must be carefully looked after, for the patient may have retention and the nurse overlook it for several hours. If urine has not been voided for twenty-four hours, small doses of santonine may be used. Strychnia, 1/60 gr. every three or four hours is also an excellent agent. If there be much distention of the bladder, the catheter, of course, must be used.

Convalescence.—Great care must be exercised during convalescence; as the fever subsides and the tongue cleans, the patient develops a voracious appetite, and, if the nurse be not firm, will take more than can be digested. The nurse should give nourishment frequently and in small quantities, rather than the usual meals, three per day. As the strength is regained, the patient may be assisted about the room, but should not undertake to walk far till the stools become normal and the heart's action has regained its tone.

TYPHUS FEVER.

Synonyms.—Famine Fever; Ship Fever; Jail Fever; Hospital Fever; and Putrid Fever.

Definition.—An acute, infectious fever, endemic and also epidemic, where great masses of people are congregated without regard to proper sanitation. It is characterized by a sudden invasion, high grade of fever, a peculiar rash, great nervous derangement, and terminates in from twelve to sixteen days by crisis.

History.—According to Murchison, to study the history of typhus fever

would require an historic study of Europe for three hundred and fifty years, during which time severe epidemics have proven more destructive than war. Until the latter half of the present century but little attention was given to sanitation, in the army, on shipboard, in jails, prisons, or even in hospitals; hence the great loss of life; but the great improvement of modern sanitary regulations is rendering the disease less dreaded and far less fatal. Typhus fever is still epidemic in Ireland, England, Poland, Russia, Hungary, and Italy.

In 1807 the fever appeared in the New England States, and visited each in rapid succession. In 1812 it appeared in Philadelphia, and again in 1836, in 1865, and in 1883. New York was visited in 1881, 1882, and 1893 by epidemics of this fever. In all of these epidemics the disease sustained its reputation as the deadly typhus. Since 1893 but few cases have been reported, and, with improved sanitation and the rigid quarantine regulations adopted by this country, typhus fever will soon have only an historic interest for the American physician.

Etiology.—The predisposing causes are, filth, poverty, and overcrowding, without due regard to cleanliness, especially in regard to the removal and destruction of human excreta.

Intemperance, one of the most fruitful causes of poverty, weakens and saps the vitality to such an extent that its victims readily succumb to typhus. Poor food naturally makes poor blood, and poor blood is a soil where toxins flourish and multiply.

Exciting Cause.—The specific cause has not yet been isolated, although undoubtedly similar in character to that of other infectious diseases, and when once it finds entrance into the system of one susceptible to the poison or germ, it has the power of multiplying and reproducing the original toxin. Although highly contagious, the infection has but a short range and only those in close contact with the patient are apt to contract the disease; hence nurses and physicians are in special danger. “In the Crimean war—1854-56—during the height of the epidemic, in a single period of fifty-seven days, typhus fever attacked six hundred and three nurses in a total of eight hundred and forty in the service; and in the Russo-Turkish war, 60 per cent of the physicians were attacked.” Those who handle the soiled linen are peculiarly liable to the infection, as the linen retains the poison for a long period.

Pathology.—There are no characteristic lesions of the viscera. The blood is dark and diffluent, the result of the intense fever and rapid work of the poison. The liver is somewhat enlarged and softened, as are the kidneys and spleen, and each becomes dark-red in color. There is generally a bronchial catarrh, and many times hypostatic congestion of the lungs.

Extravasation into the pericardium gives it an ecchymotic appearance, which is also seen in the gastro-intestinal mucosa. The intestinal lesion is not characteristic as in typhoid fever, and while there may be hyperplasia of the lymph follicles, there is never ulceration as in the former. Peyer's plaques are also intact, although congested.

There is often granular engorgement, but the process stops short of suppuration. The muscular tissues are of a dark-red color, and the heart often shows granular degeneration, and is of the same dark-red color. There may be cerebral congestion, with effusion into the subarachnoid space and the ventricles. The coagulability of the blood is greatly diminished. The skin shows a characteristic rash, and ecchymotic spots are found on the more dependent parts after death.

Symptoms.—The period of incubation, the time from exposure to invasion, varies from three to twelve days, according to the intensity of the infectious material and the susceptibility of the patient. Although the onset is usually sudden, we may have during the last three or four days prior to the invasion the usual prodromal symptoms that accompany most fevers; viz., headache, languor, loss of appetite, aching of back and limbs, insomnia, and partial arrest of the secretions. These increase progressively until the chilly sensations or a rigor proclaim the invasion.

Invasion.—The chilly sensations continue for several hours or a sharp, short chill may announce the unwelcome guest. The patient complains of severe pain in his head, and the muscles seem sore as if bruised. There is now great prostration, and the patient is compelled to take to his bed. The temperature rises very rapidly, and by the end of twenty-four or forty-eight hours the temperature may register 104° or 105°. The pulse is rapid, full, and bounding, with throbbing of the carotids, although after the first forty-eight hours the pulse loses its strong impulse and becomes small and feeble, showing the influence of the toxin on the heart.

The face is characteristic. There is a dusky flush, with injected and contracted pupils. The skin is dry and pungent; the tongue is at first but slightly coated, but soon acquires a thick, dry, and brown coating. There is often nausea and vomiting during the first forty-eight hours. The pain in the head becomes intense, and the symptoms of meningitis are often present. The mind is early impressed, and delirium may occur as early as the second day, varying greatly in character, from the mild to the most intense. Usually, however, the patient becomes dull, and is impressed with difficulty, and stupor is an early feature.

Eruption.—From the third to the fifth day the eruption makes its appearance, at first on the abdomen, gradually encroaching upon the other parts of the body, although singularly sparing the face in most cases. The rash is characteristic, first appearing as bright red macules, disappearing on pressure, and soon changing to a dark, dingy red, becoming hemorrhagic in character, and petechia follows, the rash remaining after death.

There is no abatement of the fever with the appearance of the rash. By the end of the first week the fever is intense and uniform. Temperature 104°, 105°, or 106°. The tongue is dry and almost immobile; sordes appear on teeth and lips; the skin is hot, dry, and constricted; the urine is scanty and contains albumen. With the appearance of the eruption there is often retention of the urine. The patient lies upon his back, and tends to slip towards the foot of the bed. Although there is stupor, the eye may be open and the patient muttering; or the delirium may be very active. From the seventh to the fourteenth day the symptoms are quite uniform, showing great depression and much deprivation of the blood. There is increased suppression of muscular power, and an increase of involuntary action, as tremors, subsultus tendinum, and slight convulsive action.

The symptoms of the crisis have been thus described: “At the end of the thirteenth day a more serious exacerbation than any former one takes place; the heat is more glowing, the arteries pulsate more strongly, the brain is more affected, and the stupor passes into sopor. In twelve hours afterward, and on the fourteenth day, the parched skin shows a tendency to perspiration. In some cases slight epistaxis occurs, with relief to the head; the nostrils become moist; the tongue, at the point and edge, moist, clean, and red, and perspiration more copious and general.

“A free expectoration often takes place, especially if the chest has been affected. When the perspiration is salutary, it is uniform, not clammy, has a peculiar odor, and occurs during sleep. The stools are now copious, loose, and offensive; the urine plentiful, muddy, and slightly colored, and deposits a copious sediment. With these changes, or within a few hours afterward, the patient seems as if awakened from a dream, or from a state of intoxication. and, with the return of complete consciousness, all the severe symptoms abate.” Convalescence is usually quite rapid and uneventful.

Complications.—The most frequent, and quite common complication, is bronchitis, which occurs from the third to the seventh day. There is a sense of constriction of the chest, hurried respiration, dry, hard, and harassing cough, with an aggravation of all the symptoms. There may be hypostatic congestion of the lungs, rendering the respiration more labored; the duskiness of face increases, showing imperfect aeration of the blood. Thus more work is thrown on the heart, which greatly endangers the patient's recovery.

Temperature.—As will be seen by studying the chart, the range of temperature in typhus fever is higher than in any other fever, frequently running for ten days at 105 or more. In the milder cases the high range does not occur, and after the seventh day there is a more rapid decline, convalescence commencing the eighth or tenth day.

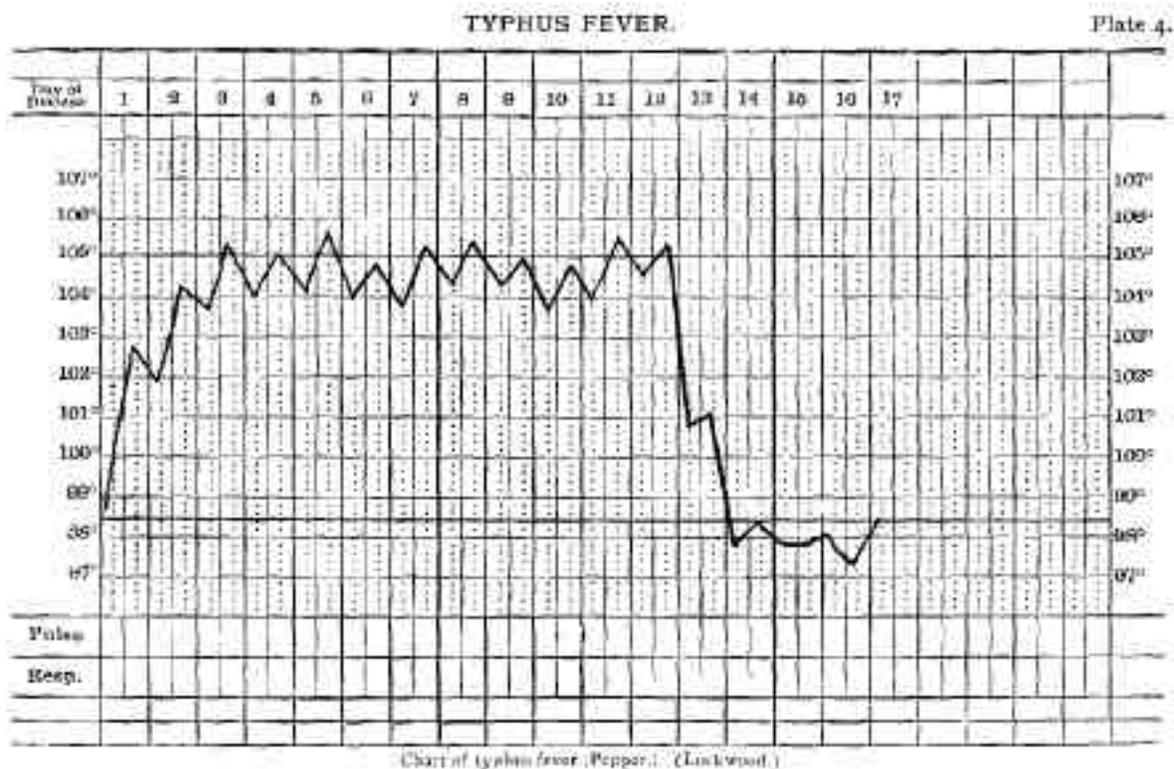
Diagnosis.—The diagnosis is readily made. The known presence of an epidemic, the sudden invasion beginning with a rigor, the high grade of fever, the more intense disturbance of the nervous system, the dusky flush of the face, the characteristic petechial eruption occurring the third day, render the diagnosis comparatively easy. We diagnose it from typhoid by the long forming stage of the latter, the less intense febrile reaction, and also less disturbance of the nervous system, the absence of the intestinal lesion, the difference in character of the eruption, and, also the time of its appearance.

In sporadic cases, if not careful, we may mistake it for spinal-meningitis, although in the latter the head symptoms are more pronounced, with retraction of the head, marked tenderness on pressure over the cervical region, and an absence, on the third day, of the petechial rash.

Prognosis.—The prognosis depends upon several conditions,—the severity of the epidemic prevailing; the character of the complications;

the vitality of the patient, the mortality being great where this is reduced; the age of the patient, but few children dying, while, after middle life, the mortality increases; the intensity of the lesion of the nervous system, and the severity of the blood lesion.

Race is also to be considered, the colored race succumb more rapidly than the white race. The mortality is given at from ten to thirty-five per cent, but with the sanitation now in vogue, and the use of remedies with which we have been successful in overcoming sthenic fevers, and the septic conditions, the mortality should not be large.



Treatment.—The prophylactic treatment should consist of disinfection, immediate isolation, and a persistent effort at cleanliness. There should be plenty of pure, fresh air in the sickroom.

In the treatment of this disease there are three conditions to overcome,—sepsis, high temperature, and wrongs of the nervous system; the two latter, no doubt, being- due to the first, sepsis.

The room, where possible, should be large, well ventilated, and the temperature, if in winter, not allowed over 68 degrees.

Veratrum.—Where there is a full, bounding pulse and throbbing of the carotids, veratrum, drachms .5 to drachms 1, to water 4 ounces, will be the indicated remedy. In connection with this, the wet-sheet pack may be used, if temperature be very high, 104° or 105°. Where the poison is intense, the extremities are cold, the patient is dull and drowsy, and the pulse feeble and oppressed, blankets wrung out of hot mustard-water, and placed about the patient, with a stimulating emetic of capsicum and lobelia, will give good results.

Belladonna will be called for where there is dullness and coma.

Gelsemium will be the remedy where there is great irritation and active delirium.

Hyoscyamus will also be used where the patient is restless and unable to sleep.

Echinacea.—This remedy should give a good account of itself in typhus fever. The furred tongue, the dusky hue, calls for the agent. Echinacea, drachms 1 to water 4 ounces, teaspoonful every hour. It should be continued with the proper sedative.

Baptisia.—The full tissues with purplish hue, as if the patient had been frozen, calls for baptisia.

Sodium Sulphite.—Where the tongue is broad, moist, and heavily coated with a dirty, pasty coating, a saturated solution of sodium sulphite, in tablespoonful doses, will not disappoint.

Potassium Chlorate is the remedy for bad odors, and where the tongue is moist, dirty, and the breath foul, potassium chlorate will be the remedy.

Hydrochloric Acid.—Where the tongue is dry, brown, or red, sordes on teeth and lips, nothing can take the place of hydrochloric acid, C. P., 20 drops, simple syrup and water 2 ounces each. Teaspoonful every two hours. This is one of the most severe forms of fever; but, with good nursing, the proper antiseptics, the proper wet-sheet packs, and the use of belladonna, gelsemium, and hyoscyamus for the nervous lesions, many will recover.

RELAPSING FEVER.

Synonyms.—Typhus Recurrens; Bilious Typhoid; Famine Fever; Hunger Pest; Spirillum Fever.

Definition.—An acute, infectious, and contagious fever, characterized by a series of exacerbations and remissions, each lasting from five to seven days, and prevailing epidemically.

History.—There is but little doubt that this fever prevailed previous to 1739. Some indeed believe that it existed during the time of Hippocrates, and cite, as evidence, his description of an epidemic which prevailed during his time. The first authentic account, however, dates from the epidemic which prevailed in Ireland, Scotland, and England in 1839, since which time it has gradually extended to other parts of the world, few countries escaping, notably Spain, Switzerland, Italy, and in France only a few sporadic cases.

It made its appearance in the United States in 1844 at Philadelphia, being brought by Irish immigrants. In 1847 it appeared in New York and Buffalo. In 1869-70 it again appeared in Philadelphia, and in the same way; viz., through Irish immigrants. In 1872-73 it made its last visit to our shores. New York being the place of its visitation.

Etiology.—The predisposing causes are similar to those of typhus fever: viz., filth, poverty, and overcrowding. This combination of conditions is prolific in furnishing a soil which readily generates toxins of an intense character, and occurs among a class whose vitality is lowered by insufficient and defective food.

Age and Sex.—Age has but slight bearing upon the etiology, although the greater number of victims are between the age of fifteen and thirty. More males are affected than females.

Race.—Race also plays but a very little part, save that some are more uncleanly than others, the negro being slightly more susceptible than other races. Neither season nor climate figures in the spread of the disease.

Famine.—During the time when scarcity of food prevails, the impoverished are peculiarly susceptible, and no doubt this bears upon its etiology.

Exciting Cause.—In 1873, Obermeier discovered in the blood of patients suffering from this fever a characteristic spirillum, which has been termed the “Spirillum Obermeier.” Since then the same micro-organism has been found by many observers, and this specific germ is now generally recognized as the causal factor in producing the disease. It is found in large numbers during an exacerbation, but disappears during the period of intermission, small granular bodies being seen at this time, supposed to be the spores of the spirillum.

Pathology.—There are no characteristic changes in the solids of the body. The voluntary muscles are inclined to undergo granular degeneration, and where there is icteric discoloration during the disease the tissues are stained after death. The liver, kidneys, and spleen are somewhat enlarged, especially the latter organ, and hemorrhagic infarcts are not uncommon. The kidneys and spleen present a mottled, appearance, with extravasation of blood beneath the surface. The heart, in severe and prolonged cases, becomes soft, and granular changes take place. Pleurisy and pneumonia are often present, although not a constant feature. The body retains its heat a long time after death, and the blood coagulates slowly, if at all.

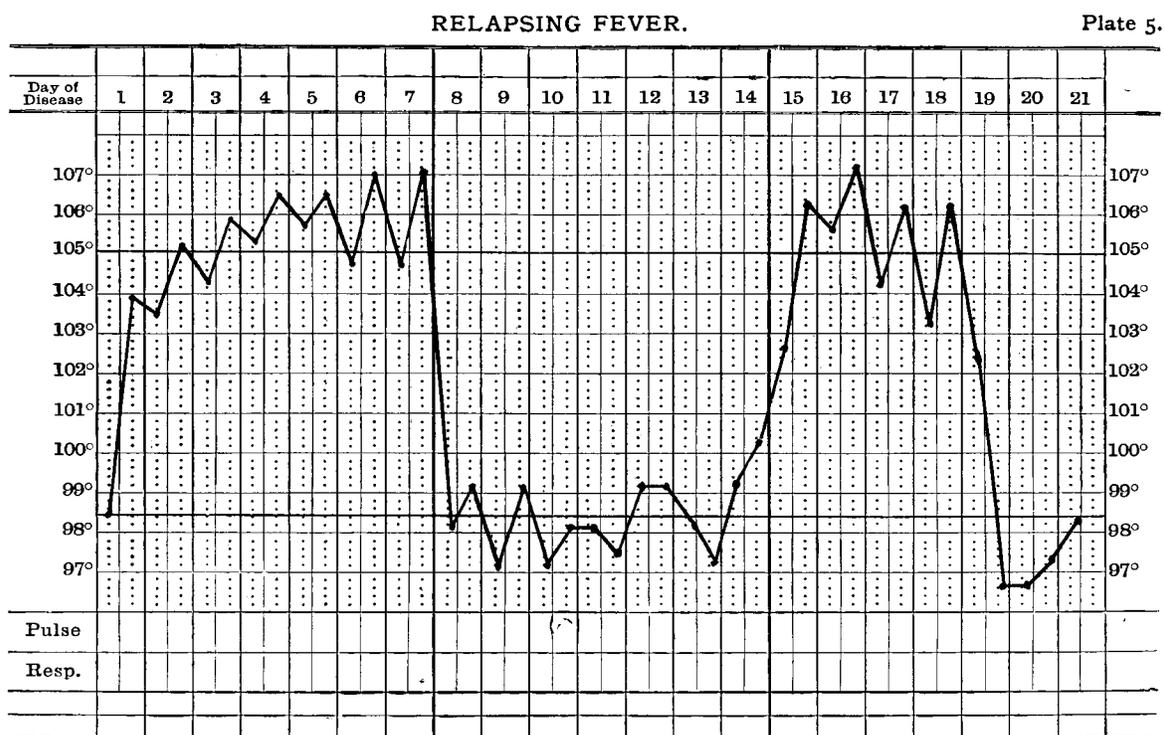
Symptoms.—The period of incubation is from five to seven days, although it may be much shorter where the system is impoverished and the infection is intense. The onset is usually sudden, although there may be the usual prodromal symptoms for twenty-four or forty-eight hours preceding the invasion, which is usually announced in the early part of the day by a severe rigor, although there may be only chilly sensations.

This is rapidly followed by reaction, extreme in character, the temperature often rising to 104°, 105°, or 106° at the end of the first twenty-four hours. The pulse is very rapid, from one hundred and twenty to one hundred and fifty per minute. The prostration is great, and the patient is compelled to take to his bed. The face is flushed, the eyes contracted, the skin hot, dry, and pungent, although frequently profuse sweating occurs. There is nausea and sometimes severe vomiting. The pain in the head is intense, with more or less vertigo. Myalgia is a marked feature, and the patient complains of pain in back and limbs; in fact, of aching all over.

By the second or third day a characteristic icteric discoloration makes its

appearance, although this is not constant. Although the fever is intense, there is rarely delirium, the patient retaining his mental faculties throughout the disease. Owing to his sufferings he is restless and secures but little sleep.

From the third to the sixth day the fever is intense. There is tension and pain in both hypochondriac regions, due to swelling of the liver and spleen. The tongue is at first moist, but becomes dry and brown. The constipation may give way to diarrhea. Preceding the crisis, there may be an aggravation of all the symptoms, when suddenly the temperature begins to fall, the skin becomes moist, the urine is more copious, and by the end of ten or twelve hours the patient is free from pain and the temperature is normal. Convalescence is rapid, and often by the end of the second day he considers himself well.



Typical case of relapsing fever (Pepper.) (Lockwood.)

The period of comparative health lasts from five to seven days, when a chill ushers in another exacerbation: the headache, myalgia, high temperature, and all the other symptoms of the exacerbation are repeated. It is usually, however, of shorter duration, the crisis occurring the fourth, fifth, or sixth day, to be followed by convalescence, although there may be a second, third, or even fourth exacerbation. Where there are two or more, each becomes shorter in duration.

The most frequent complications are lobar and bronchial pneumonia, more rarely acute nephritis.

Diagnosis.—The course of the disease is so characteristic that, where an epidemic has been established, the diagnosis is comparatively easy. The rapid rise in temperature, the intense headache and myalgia, great excitation of the nervous system without delirium, would suggest relapsing fever. We would recognize it from typhus fever by the absence of delirium, the characteristic rash, and by the early crisis ; from typhoid fever, by the long forming stage of the latter, the dull intellect, and the intestinal lesion: from cerebro-spinal fever, by a higher and more irregular temperature range, no tenderness along the cervical region, and but slight drawing of the head backwards.

Prognosis.—The prognosis is usually favorable, the mortality being from three to six per cent. The result depends largely upon the complications and the age of the patient. Where pneumonia and acute nephritis occur, the prognosis must be guarded, as it must also be when it occurs in elderly people.

Treatment.—Although, as a school, we have not had the opportunity of testing Eclectic remedies, owing to the few epidemics which have prevailed, the general management would be similar to that for typhus fever. We would think of isolation, perfect cleanliness, and plenty of fresh air. The use of baths, probably sponging with hot water, to determine the heat to the surface, and constant fanning of the face of the patient by an assistant. This rapidly cools the surface and lowers the temperature.

Echinacea, baptisia, the sulphites, chlorates, and mineral acids as might be indicated by the tongue, for sepsis. Macrotys, gelsemium, rhamnus Californica, and the old diaphoretic powder would be suggested for the myalgia, while stimulants would be used where the temperature became sub-normal or the heart became weak. For the congestion of the liver and spleen chionanthus and polymnia would be the agents of probable value. Should respiratory complications arise, such as pneumonia, pleurisy, or bronchitis, the treatment so successfully employed by our school for these diseases would be used; in fact, whatever complication should arise, the intelligent physician would meet the condition's by appropriate remedies.

The diet will consist of broths and milk in some form till the temperature becomes normal.

MALARIAL FEVER.

Synonyms.—Ague; Chills and Fever; Intermittent Fever; Swamp Fever; Marsh Fever; Paludal Fever.

Definition.—A specific, infectious, although non-contagious fever, caused by the hematozoa of Laveran, and consisting of two distinct parts: First, a succession of exacerbations and intermissions, or a series of short fevers separated by short intervals of health; second, a continued fever made up of exacerbations and remissions, there being but one cold stage. The disease is characterized by congestion of the spleen and portal circulation.

History.—Although Rome, secure on her seven hills, had conquered and ruled the world, there was one insidious foe whom she could not overcome. Intrenched in the Pontine Marshes there lurked an enemy that overcame her bravest sons and fairest daughters, and this same formidable foe has been found endemically and occasionally epidemically, from time immemorial, in nearly every clime save the extremes of latitude. During the last fifty years it has been progressively decreasing, and sections where once the disease prevailed in force are now almost immune.

It is more prevalent in the tropics, and diminishes as we recede from them. In Europe, Russia and Italy are the chief points of infection, while Germany, France, and England are rarely visited by the disease. It is also severe in Africa and India. In the United States it prevails largely in the South, while the East, North, and West are but slightly affected. Even in the South, however, there is a marked decrease in the number of cases during the last twenty years.

Etiology.—*Soil.*—The condition of the soil has been recognized as a causal factor for a great many years by a majority of the profession. A humid soil, producing a luxurious vegetation, was long regarded as a habitat for malaria ; and marsh miasm, arising from the decomposition of vegetable matter, was long credited as the principal factor in giving rise to this class of fevers.

That low, marshy, and swampy lands are the great breeding places of

malaria has also been recognized from time immemorial. The Pontine Marshes about Rome, a veritable hotbed for the disease, is one of many examples. Fresh-water marshes, situated near the sea, when slightly influenced by salt water, are especially favorable for the generation and multiplication of the parasite or poison.

The specific cause, then, may be said to reside in the soil made rich by the decomposition of vegetable matter, or upon its surface. The exposing of virgin soil, either in the overturning for agricultural purposes, or in digging trenches, or in excavations, has exposed the germs, and epidemics have followed where before the disease was unknown. In contrast to this, malaria has been found to exist in dry, sandy soil, although, in all probability, the poison had been carried by prevailing winds, rather than that such soils are the natural habitat of the disease germs.

Heat.—A temperature of sixty-five degrees is necessary for the development of the hematozoa, and consequently we find the disease prevailing to a far greater extent in the tropics than in the temperate zone. In fact, as we recede from the tropics, there is a progressive decrease in malaria.

Moisture.—A certain amount of moisture seems necessary for the development of the poison, although the large number of cases following a hot, dry summer, seemingly contradicts this statement.

In the tropics the disease prevails to a far greater extent during the rainy season, and the disappearance of malaria by draining marshy sections confirms this view.

Winds.—That the poison may be transferred some distance by strong winds has been clearly proven by sailors contracting the disease while anchored three to five miles off malarial shores; on the other hand, these same winds, by rapidly drying the soil, may combat its influence.

Trees.—The Eucalyptus-tree at one time was supposed to possess some virtue in combating the toxin, and the marked decrease in large areas where these trees were planted, notably in the Roman Campagna, were cited as proof; but the more rational view is that by drawing large quantities of water from the soil, it was thus rendered sterile to the germ, and that any rapid-growing trees would give like results.

Altitude.—That gravity influenced the poison was very early recognized by people settling in malarial sections, for it was soon learned that by building their houses on high lands they rendered themselves comparatively free from the disease, and that those residing in the second stories of buildings were also largely exempt, while those on the ground floor suffered. The poison is found near the ground, save when carried to higher altitudes by high winds.

Season.—Heat being an important factor in the development of the poison or germ, we find the disease prevailing more extensively in the fall, following the hot weather of July and August, the maximum number of cases occurring in September. While this is true of the temperate and sub-tropical zones, in the tropics as many cases occur in the spring as in the fall.

The Malarial Germ or Parasite.—In 1879, Klebs and Tomassi Crudeli discovered that certain soils, when the conditions of moisture and heat were favorable, resulted in the development of malaria, and they succeeded in isolating a specific germ, which they termed the bacillus malaria, and claimed that it was the specific agent causing all forms of malaria. Other observers, however, after most careful and painstaking study, failed to confirm the claims of these two workers, and it remained for a French army surgeon, Lavarán, in the following year, 1880, to discover in the blood of malarial patients the specific parasite that is now recognized by the medical world as the causal agent in all forms of malaria.

For three years his discoveries and publications caused but little interest in the medical world, but Richard, in 1882, and Marchiafava, Golgi, and Celli in 1883, Italian observers, published their investigations, ratifying the observations of Lavarán. Since then Conzilman, Osier, James, Dock, and others of the United States; Van Dyke Carter, of India, as well as French, German, English, and Russian observers, all unite in their declaration that Lavarán's observations were correct, and that the parasite described by him is the specific cause of malaria.

Parasites.—These micro-organisms belong to the hematozoa, a sub-class of the protozoa. Three varieties have been carefully studied, each of which gives rise to a certain kind of malaria. These three are the Tertian, Quartan, and Estivo-Autumnal, other types being simply a development of two or more of these groups at different intervals. These parasites enter the blood corpuscles as minute hyaline bodies, possessing

ameboid movement. Having gained entrance into a corpuscle, the further development is at the expense of its contents, converting the hemoglobin into pigment granules, which collect near the center of the parasite. On reaching maturity, segmentation or sporulation takes place, and the membrane or wall of the corpuscles gives way, liberating a fresh generation of hematozoa. They consist of very minute, spherical hyaline bodies, and those escaping the phagocytes enter other corpuscles, and there the process is repeated over and over again.

While the tertian and quartan parasites are thus developed, Golgi's investigations go to prove that the evolution of the estivo-autumnal germs takes place in the spleen, liver, and bone marrow. The evolution of each of these parasites is somewhat different.

Tertian.—The life cycle of this variety is forty-eight hours, sporulation taking place, accompanied by a paroxysm, every third day. The parasite is first seen in the corpuscle as a minute hyaline, ameboid body. It develops at the expense of the red corpuscle, converting the hemoglobin into pigment granules, which range themselves in the center of the parasite. During this process, the blood corpuscles become pale and somewhat increased in size. When completely developed, segmentation or sporulation occurs, and from fifteen to twenty new bodies are formed. At this stage the paroxysm of the fever occurs.

Quartan.—The life cycle of this parasite, or its period of development, is seventy-two hours, the paroxysms occurring every fourth day. When first seen in the blood corpuscles, it is a simple hyaline body resembling the tertian type, although of less size (about one-half the size of the red corpuscle), slower in its development, and occupying more time for its complete evolution.

The pigment granules, dark-brown in color, are coarser than those of the tertian; as they develop, the corpuscle shrinks about the parasite and assumes a brassy color. Having reached its maturity, sporulation or segmentation takes place, and from six to twelve germs are liberated with the rupture of the corpuscular membrane. About this time the paroxysm of the fever takes place.

Estivo-Autumnal.—This is the most irregular of the malarial parasites. At first it resembles those of the tertian and quartan; viz., small, spherical, hyaline, ameboid bodies that require from twenty-four to forty-eight hours for their full development. They have a peculiar and

distinct faculty of producing crescent-shaped bodies from the round parasites; these are not seen till after the fever has progressed for several days. The young parasites are seen in the peripheral circulation in their early stages, their further development and segmentation taking place in the spleen, liver, and bone-marrow.

If blood from the spleen be examined, they will be seen in different stages of their evolution. This parasite is much smaller than either of the other forms already considered, has fewer pigment granules, and in sporulation throws off fewer offspring. The blood corpuscle shrinks about the parasite, becoming brassy in color. The irregularity of their development accounts for the different phases of autumnal fever.

Each variety of parasites may develop flagella, which may become separated and float off among the corpuscles. Their exact nature has not yet been determined. From these three forms the different forms of malarial fever are developed,—the quotidian form, from two groups of the tertian, developed on successive days; and this combination of two or more varieties, or two or more groups of the same variety, explains the popular types occasionally seen.

Method of Infection.—There are three theories of the manner in which the parasites enter the system: 1. The Water theory; 2. The Air theory; 3. The Inoculation theory.

Water Theory.—A great many examples are cited by Lavarán, Sternberg, and other observers, to prove that infection may take place through drinking water. Three principal experiments will suffice in support of this theory. First, in special malarial sections, where the inhabitants were using water from stagnant pools and suffering from malaria, the disease was made to disappear by furnishing a pure water-supply. Second, malaria introduced into healthy places by using drinking water brought from malarial sections. Third, examples were given where travelers who were passing through malarial countries, preserved their health by using only boiled water, while those of the party who did not take this precaution were attacked in large numbers. While many of the experiments to prove the water theory are plausible, they are not above criticism from a scientific standpoint.

Air Theory.—The air theory has fewer apparently conclusive evidences whereby the disease has been contracted from this source than the water theory, and while sailors have contracted malaria while lying at

anchor off shore, while the prevailing winds were directly from the malarial districts, yet it is a well-known fact that the sea-breeze which blows in Rome during the summer months does not bring danger, although it passes over all the numerous foci of malaria in the western half of the Campagna and over all the swamps on the coast. Toinassi Crudeli has proved that the malarial germs rise but a short distance from the ground, and hence are not apt to be carried very far by the prevailing winds.

Inoculation Theory.—This theory, that the germs are inoculated into man through the mosquito, is the only one which has, to date, been demonstrated experimentally.

Bignami, who belongs to the Italian school, after much research, came to the conclusion that malaria acted like a disease inoculated through the sting of a mosquito. To prove the truth of his theory experimentally, he caused perfectly healthy men living in a positively non-malarial section to be bitten by mosquitoes transported from a place where malaria prevailed. These experiments were made with great scientific care, and gave positive results. Through the courtesy of William Wood and Co., publishers of the "Twentieth Century Practice of Medicine," I quote Bignami's description of his experiments:

"Experiment No. I.—Sola slept in the room (in which the infected mosquitoes had been liberated) from September 26th to the end of October, 1898. During the latter part of October the patient complained of malaise and headache. On the afternoon of October 31st he had a slight elevation of temperature to 37.2°C. (99°F.) On November 1st, at about three P. M., he was taken with a severe chill, which lasted until five o'clock, the temperature rising rapidly to above 39°C. (102.2°F.) Between nine and ten o'clock a feeling of cold was again experienced. The fever continued all night, falling in the early morning (November 2d) to 38.2°C. (100.8°F.), and rising again that evening to 39.3°C. (102.7°F.) The patient was restless, and complained of very severe headache, but there were no grave symptoms. In the night, about eleven o'clock, he had another chill of short duration. During this night the temperature remained above 39°C. (102.2°F.), and on the morning of November 3d rose above 40.4°C. (104.7°F.), the patient being very restless and complaining of much suffering. The fever broke in the afternoon with a gentle perspiration.

"At a quarter after five in the afternoon a hypodermic injection of 1 gm.

(gr. 15) of quinine was given, and repeated in the night. The fever fell, and at eight A. M., on November 4th, the temperature was 36.7°C. (98°F.) The administration of quinine was continued during the following days; the patient continued to have slight elevations of temperature which did not reach 38°C. (100.4°F.), except once on November 6th. From November 7th onward, the patient was entirely without fever, and rapidly regained his appetite and strength.

“An examination of the blood, made with the greatest care on November 2d, gave negative results, no malarial parasites being found. On the morning of November 3d a few young annular parasites, motile and discoid, without pigment and presenting the characteristic appearance of parasites of estival fever, were found at Maccaresse were liberated in this room. The subject of the experiment continued to sleep regularly in the room up to December 2d; he entered it at dusk and left it in the morning, passing the day in the general ward. He asserts that he was bitten by the mosquitoes every night, and there were always found in the room numbers of *A. clavinger* full of blood. Some of the insects died during this time, but on November 29th there were still found about fifty in good condition.

“The first two days of December the patient was indisposed and had a slight elevation of temperature. On December 3d he had a febrile attack, which began with a chill, the temperature rising to a maximum of 39.7°C. (103.5°F.) Similar attacks, each preceded by a chill, were observed on the following days up to December 7th, when 2 gm. (gr. xxx) of quinine were administered. On December 8th and 9th slight elevations of temperature were observed, but after that none. The patient continued to take quinine for a time, and rapidly recovered. The following are the temperature observations in degrees Centigrade from December 3d to 7th:

“December 3d—4 P. M., 39.8°; 6, 39.7°; 8, 39.7°; 10, 37.5°; 12, 37.7°.

“December 4th.—Apyrexia up to 6 A. M.; 8, 37.6°; 10, 38°; 12, 38.9°; 2 P. M., 40.2°; 4, 39.5°; 6, 37.5°; 8, 37.6°; 10, 37.7°; 12, 37.8°.

“December 5th.—Apyrexia up to 10 A. M.; 12, 39.5°; 2 P. M., 39.9°; 4, 40.5°; 6, 39.1°; 8, 38.5°; 10, 37.5°.

“December 6th.—Apyrexia from the last entry up to 8 A. M.; 10, 39.3°; 12, 40.5°; 2 P. M., 37.8°; 4, 38.7°; 6, 38°; 8, 37.1°.

“December 7th.—Apyrexia from last entry up to 10 A. M.; 12, 38.7°; 2 P. M., 38.1°; 4, 38.3°; 6, 37.5°; 8, 37.3°.

“The course of the fever was that of a double tertian. From the first febrile paroxysm, tertian parasites were found in the blood, which followed regularly the development in two generations corresponding to the daily attacks of the fever. A fact worthy of consideration is, that from December 6th—that is to say, four days, or, at the most, five, after the beginning of the disease—the patient had in his blood adult parasitic forms capable of further development in the body *Anopheles*. And, in fact, many individuals of *A. claviger*, which had been bitten about eleven o'clock on the morning of this day, were found later to have the middle intestine infested with tertian parasites.”

“Experiment No. 4.—A patient suffering from a relapsing estivo-autumnal infection, in whose blood were many crescents and round and flagellated bodies, slept from December 10th to 18th in a room in which had been set free about fifty individuals of *A. claviger* brought from Maccaresse. The temperature of the room was maintained at from 18° to 22°C. (64.4° to 71.6°F.) Most of the mosquitoes stung the patient and became infected with crescent bodies, and subsequent examination showed in the middle intestine the characteristic forms in process of development. But it was also observed that the mosquitoes remaining in the room at the given temperature during the last days of December did not have in the intestine mature sporozoa with sporozoites, but only growing forms. Evidently at a temperature of from 18° to 22°C. the life cycle of the parasite is completed very slowly. But these same mosquitoes, confined for a few days in an incubator at a temperature of 30°C. (86°F.), were found to contain forms of a later development. There were noted, indeed, in the intestine, typical capsules filled with sporozoites, and also broken and empty capsules, and in the salivary glands were numerous sporozoites.

“When this fact was noted, three mosquitoes of this group were kept in the incubator at 30°C. for two days, and on January 2d they were made to sting a new subject, A. B——, who lent himself knowingly and willingly to the experiment. It is needless to say that this man had never had malarial fever. On January 5th, two of the same mosquitoes were made to sting the same person again, who then had been stung in all five times by three specimens of *A. claviger*.

“After this part of the experiment, the three mosquitoes were dissected and examined under the microscope, with the following result:

“A. claviger. No. 1.—In the intestine were found very many capsules, with sporozoites, and some capsules which had been ruptured and completely emptied of their contents. In the salivary glands were found two infected tubules; in one were seen the cells swollen, of ovoid form, and filled with granules of uniform size. When pressure was made on the preparation, there issued a very large number of sporozoites of typical form, uniform in appearance, and all of equal length; in the other tubule were also seen cells containing filiform sporozoites of characteristic appearance.

“A. claviger, No. 2.—In the intestine were found very numerous capsules, some still whole and filled with sporozoites; others ruptured and shrunken, containing a granular residuum of a pale yellow color.’ In some of these ruptured capsules were seen also brown bodies of variable size and shape, some elongated, others short and deformed. In the salivary glands all the tubules were infected except one or two. In them were seen cells containing typical sporozoites, cells filled with granules similar to those described in the case of A. claviger No. i, and cells filled with round hyaline bodies of variable size. In addition there were also found typical filiform sporozoites along the excretory duct of the gland.

“A. claviger No. 3.—The intestine was filled with mature sporozoa. Many capsules were broken and shrunken, and contained a pale yellow detritus; others contained a large central body of granular aspect, surrounded by a hyaline halo, and without any recognizable structure. These were possibly mature sporozoa in process of degeneration. The salivary glands were not found infected. From the results of this examination we may conclude that of the three specimens of A. claviger employed, only two had inoculated the patient with malaria.

“On the evening of January 10th the patient had a sense of heat and headache, but the temperature was normal. On January 11th, 12th, and 13th there was no fever, and the patient felt well. On January 14th—that is, after from nine to twelve days of incubation—there was no fever until eight o'clock in the morning, but then the temperature began to rise rapidly and reached 39.5°C. (103.1°F.), at noon. From this time the fever remained continuous up to January 18th. On January 14th, the temperature fluctuated from 39.5° at noon to 37.5° at 4 P. M.

At midnight it was 38.9°; at 2 A. M. on the 15th, 39.5°; at 10 A. M. 37.5°. and at noon 40.4°. On the 16th it varied from 37.2° at 6 A. M. to 40.4° at 4 P. M. The extremes on the 17th were 38.2° at 4 A. M. and 40.4° at 4 P. M. The temperature fell to normal at 6 A. M. on the 18th.

“On January 16th a hypodermic injection of hydrochlorate of quinine 2 gm. (gr. xxx) was administered, and this was repeated on the following day. The patient was entirely without fever on January 18th, but he continued to take quinine, and, except for very slight elevations of temperature on the evening's of January 19th and 22d, he had no further trouble. Recovery was perfect and rapid.

“On examination of the blood on the morning of January 15th, there were found scanty estivo-autumnal parasites, with very fine pigment granules at the periphery. On January 16th there were found also plasmodia without pigment and with granules in normal red-blood corpuscles and in brassy bodies. The parasites disappeared after the exhibition of quinine on January 17th. Thus the infection was rapidly cut short, and no crescent bodies were seen.

“We have in this case a typical example of estivo-autumnal infection beginning with a continued fever, as is usual- in this group of malarial affections. The course of the disease was in every respect identical with that in the first case of malarial fever, experimentally induced by the stings of mosquitoes (the Sola case), described by Bignami.”

Thus the life cycle of the malarial parasite in mosquitoes has been proven to be similar to the life cycle of the parasite in man, and that mosquitoes may take the parasite from man and inoculate man with it again. The mosquito responsible for this kind of work is the *Anopheles clavinger*, which may be distinguished from the harmless variety by taking the vertical position while at rest, while the others, the *Anopheles culex*, are parallel to the surface while at rest.

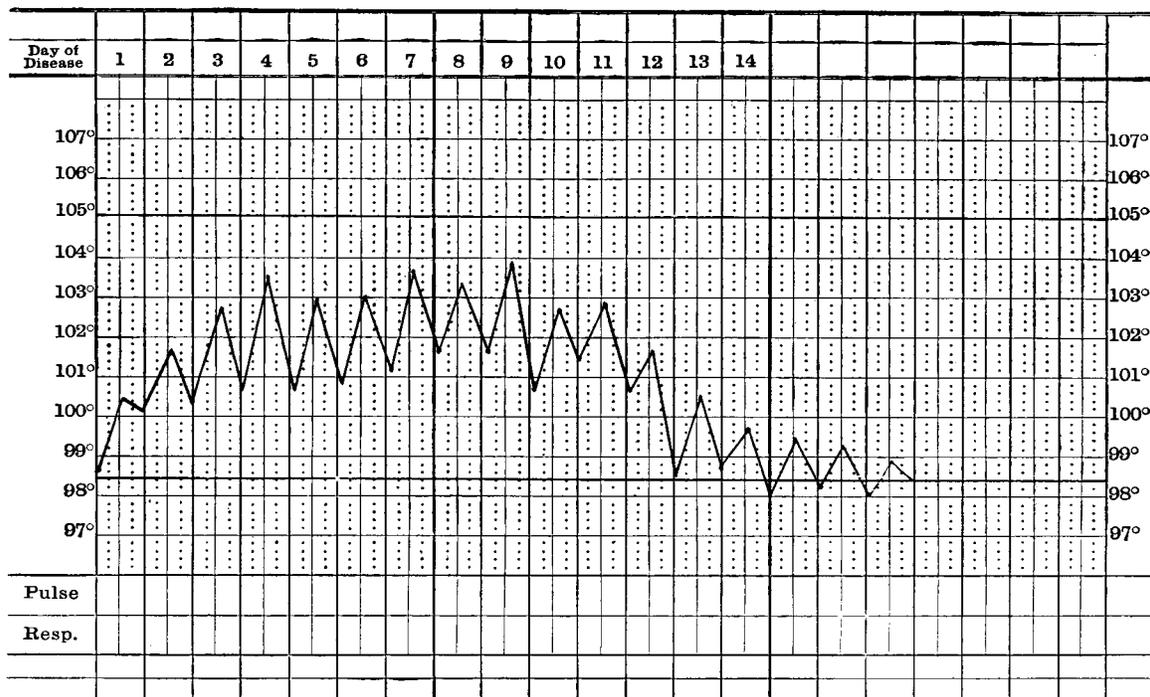
Pathology.—The morbid changes that are found in malaria are due to the disintegration of the red-blood corpuscles. The destruction of the corpuscles—and they are found in all stages of dissolution—may be due to the action of the parasite, or a toxin resulting from the bacilli or from metabolic changes of which we are still ignorant.

The anemia that attends malaria is thus explained in the rapid destruction of the red-blood disks. The increase of pigment, melanin, in

the spleen, liver, kidneys, blood-marrow, and, in fact, in all the viscera, is due to the conversion of the hemoglobin into pigment granules.

MALARIAL FEVER.

Plate 6.



Temperature chart of remittent fever (Lockwood.)

The spleen is enlarged, of a dark slate-color, and more or less friable. In the more severe or chronic forms it becomes enormously enlarged, and is known as ague cake. The liver partakes of the same changes, although the enlargement is not so great. It is of a dark color, and contains pigment granules. The kidneys are somewhat enlarged, are of a dark-red color, and have the characteristic pigment. Pigment granules are also sometimes found in the white corpuscles. Parasites are found in the phagocytes, and occasionally pigment granules. The leuko-cytes are not increased.

Division.—Etiologically, malaria is divided into Tertian, Quartan, and Estivo-Autumnal; clinically, into Intermittent and Remittent.

The chief characteristic of an intermittent fever is the distinct and periodic or rhythmic recurrence of its exacerbations and intermissions. Each paroxysm embraces the cold, hot, sweating stage, and the intermission, and is termed an interval or revolution.

The type of fever has reference to the length of a revolution. Of these

TYPES.	MON.	TUES.	WED.	THUR.	FRID.	SAT.	SUN.	MON.	TUES.	WED.
Quotidian chill as occurring A. M.	9	9	9	9	9	9	9	9	9	9
Tertian " "	9		9		9		9		9	
Quartan " "	9			9			9			9
Double A. M.	9	9	9	9	9	9	9	9	9	9
Quotidian P. M.	3	3	3	3	3	3	3	3	3	3
Double, A. M.	9		9		9		9		9	
Tertian, P. M.		3		3		3		3		3
Quintan, A. M.	9				9				9	
Sextan, A. M.	9					9				
Septan, A. M.	9						9			
Octan, A. M.	9							9		
Duplicated A. M. or Doubled Tertian, P. M.	9		9		9		9		9	
	3		3		3		3		3	
Triple Tertian, A. M. P. M.	$\frac{9}{3}$	12	$\frac{9}{3}$	12	$\frac{9}{3}$	12	$\frac{9}{3}$	12	$\frac{9}{3}$	12
Anticipating,	9	8	7	6	5	4	3	2	1	
Deferring,	9	10	11	12	1	2	3	4	5	
Erratic,	9	12	8	3	11	4	1	6	5	

there are three principal and two minor. Where the fever makes a revolution in twenty-four hours, it is termed a quotidian type, the fever occurring every day. When it requires forty-eight hours for a revolution, it is termed a tertian type, the fever occurring every third day. Where seventy-two hours are required for a revolution, it is termed a quartan, the fever occurring every fourth day. There may be two revolutions in twenty-four hours, two paroxysms occurring the same day; this is termed a double quotidian; or there may be a recurrence each day, but at different hours, yet each alternate day the paroxysm occurs at the same hour, the fever observing a perfect rhythm; this is termed a double tertian. Other types have been mentioned of long duration, such as quintan, sextan, septan, and octan, although these

must be extremely rare, and but few have had the privilege of noticing them.

There has also been recorded another singular type, where two paroxysms occur one day and none the next, called a duplicated or doubled tertian, or two paroxysms one day and one the next. A fever occurring at an earlier hour each day is called anticipating, while one

that occurs at a later hour each day is termed deferring, and one that observes no regular time is termed an erratic type. By reference to the diagram the types may be readily recognized.

Intermittent.—This class may be subdivided, clinically, into simple, inflammatory, gastric, masked, pernicious, and chronic intermittent. The period of incubation depends upon the type of the fever—the tertian about ten days, the quartan ten to fifteen days, the time required for the development of a sufficient number of bacilli or toxin to so forcibly impress the blood as to bring on the paroxysm.

Symptoms.—*Incubation.*—Although the invasion may be sudden, prodromal symptoms often precede the chill for a few days. They are malaise, languor, listlessness, headache, and a general tired feeling, impaired appetite, and more or less torpor of the excretory organs. The skin is sallow or tawny, and sometimes dry. Each day finds the patient feeling more uncomfortable, till it terminates in a chill.

Cold Stage.—The cold stage varies as to length and character. It may begin with a prolonged rigor, the patient shaking vigorously, his teeth will chatter, and he will be unable to control the convulsive movements; or the invasion may be more gradual; the patient will yawn and stretch, there are chilly sensations that drive him to the fire. There is pain in the head and a general aching of the body. The tongue is dry, with a white coating, and the patient experiences great thirst; the lips are blue, as are also the fingers; the skin is dry and contracted, giving it a roughened appearance, commonly called goose-flesh—*Cutis anserina*. There is frequently nausea, and sometimes vomiting. The pulse is small but frequent, and the respiration is short and quick. Although the patient feels cold to the touch, if the thermometer be used we will find a temperature ranging from 101° to 103°. This cold stage may last from a few minutes to two or three hours.

Hot Stage.—As the cold stage draws to a close, hot flashes alternate with the chilly sensations, which rapidly increase till all sensations of coldness disappear and the hot stage or period of reaction has full sway. The respiration is full and rapid, the pulse quick and bounding, the face flushed, with throbbing of the carotids; increased pain in the head with restlessness; the tongue is dry and parched, and thirst is constant; the skin is dry and constricted. urine is scanty and high colored, and there is constipation. The temperature may reach 106° or 107°. This stage, like the cold one, may vary as to length of time, from one or two hours to

eight or ten hours.

Sweating Stage.—After two or more hours of fever, the temperature begins to fall, the pain in the head ceases, and the sweating stage, or period of excretion, has replaced the former stage. The skin becomes moist, with sometimes profuse perspiration; the secretion from the kidneys is established, is less highly colored, and deposits a sediment. All the unpleasant symptoms disappear, and the patient pronounces himself well.

Intermission.—The stage of excretion is followed by a period of health, of longer or shorter duration, according to the type of the fever. This is followed, in turn, by the cold, hot, and sweating stages, and the fever is made up of these exacerbations and intermissions.

Diagnosis.—The diagnosis is readily made after the fever has made one revolution. The distinct intermission, the temperature becoming normal between the exacerbations, the sallow complexion, the fullness and tenderness of spleen, remove all doubt as to the diagnosis.

Prognosis.—The prognosis is always favorable.

Treatment.—We hear so much of the hematozoa as a cause of malaria, that a large part of the profession takes for granted that an agent which will destroy these micro-organisms will be a specific for the disease. Quinine has been found equal to the test, and the germs disappear upon its administration; hence it is regarded as a specific for intermittents. Yet I am sure that every physician of experience has met cases where this Samson has failed to cure his patient. While quinine is our best anti-periodic and will break the fever, one must know how much to use and when to use it.

The cold stage is usually of short duration and rarely calls for treatment; where long continued, we resort to stimulants externally. The patient may be enveloped in hot blankets, and hot-water bottles applied to the back, sides, and extremities. Internally, ten, twenty, or thirty drops of chloroform administered in syrup may be given every twenty minutes, till reaction is established.

Sedatives.—We now commence our sedatives, aconite and veratrum. In this fever we generally have excess of heart-powder, which is shown by the full, bounding pulse and throbbing of the carotids. With this

condition there is great excitation of the nervous system, and we combine gelsemium.

Veratrum	20-30 drops
Gelsemium	15 drops
Water	4 ounces. M.

Sig. A teaspoonful every one or two hours.

These agents shorten and modify the fever, and early establish the secretions, the skin soon becoming moist under the use of veratrum.

Aconite.—If the pulse be small and frequent, aconite replaces the veratrum.

Rhus.—Where there is irritability of the cerebro-spinal centers, as will be shown by the small, hard pulse, restless condition, elevated papilla on tongue, irritability of stomach, we prescribe,—

Aconite	5 drops.
Rhus	8 drops.
Water	4 ounces. M.

Sig. A teaspoonful every hour.

Belladonna.—Where there is marked capillary congestion, which will be shown by the small pulse, the dull expression of face, with dilated pupils, we combine belladonna with our sedative:

Aconite	5 drops.
Belladonna	10 drops.
Water	4 ounces. M.

Sig. A teaspoonful every hour.

These agents not only shorten the fever, but prepare the system for the administration of the antiperiodic during the intermission. Where the temperature is very high, the wet-sheet pack may be used in addition to the sedative.

Quinine.—Success in the use of quinine depends upon the condition of the stomach to absorb it, the amount to be given, and the time of its administration. The tongue must be moist and comparatively clean, or the agent will fail. The amount will be fifteen grains, administered in broken doses, or, if there be time but for a single dose before the

expected chill, administer ten grains. I think that the efficiency of quinia is increased by the addition of phosphate of hydrastine. This was a favorite prescription of my father's, and patients came for miles to procure the old yellow powders :

Quinia	15 grains.
Hydrastine Phosphate	6 grains. M.

Divide into three powders, and give one every two or three hours during the intermission, so that the last will come one hour before the expected chill. This may be increased or diminished as the case may require. It may be administered in capsules or solution. I would advise against the use of pills, unless the physician prepares them himself, and knows that they are freshly made. Many pills that are on the market are old and insoluble, and are often passed from the bowels unchanged.

A solution of quinia with syrup of yerba santa makes a quite palatable combination, and where the patient can not swallow a capsule, this is a desirable form. Many like the action of prussiate of iron with quinia as follows:

Quinia	15 grains.
Prussiate Iron	10 grains. M.

Divide into three powders, and give as above.

With a return of a new exacerbation, the sedatives are to be repeated, and with the return of the intermission, we again resort to quinia. Usually, in simple intermittent, the paroxysm is arrested at the end of the second or third revolution. To prevent a return, it is well to continue the quinia, in small doses, for two or three days after the fever is arrested, and every seventh day for three or four weeks.

If there be torpor of the liver and bowels, Podophyllin and leptandrin may be administered; or where there is portal congestion with swelling of spleen, chionanthus and polymnia will prove of great benefit. An inunction of quinia and lard will prove highly beneficial:

Lard	2 ounces.
Quinia	1 drachm. M.

Rub over the abdomen, in the groins and in the axilla, every three or four hours.

Strychnia.—There are some patients who can not take quinia: a very good substitute is strychnia, given hypodermically, 1/30 of a grain one hour before the chill.

Fowler's solution of arsenic is also a good agent where the skin is doughy, tongue small, with a mucoid coating and inclined to a bluish cast:

Fowler's Solution	20 drops.
Water	4 ounces. M.

Sig. A teaspoonful every hour during the intermission.

GASTRIC INTERMITTENT.

This classification is peculiarly appropriate to those cases where there is great gastro-intestinal disturbance, although medical writers do not generally accord it a distinct place. There are two conditions that are met sufficiently often to merit a consideration.

Irritative Form.—The gastro-intestinal irritation is shown by the contracted and pointed tongue, reddened at tip and edges, slightly coated in center and by a bad taste in the mouth, with nausea and frequent vomiting. There is tenderness in the epigastric region; there is also great irritation of the nervous system, face flushed, eyes bright and contracted, intense headache, and sometimes delirium. The skin is hot, dry, and constricted, the urine is scanty and high colored; there is constipation, sometimes followed by diarrhea. The chill is usually short and the febrile reaction quite high; the intermission is not so perfect as in the simple form.

Atonic Form.—The second condition is where there is atony and torpor. The chill is prolonged, although reaction is not so high; the tongue is broad, pale, and flabby and more or less coated with a dirty-yellowish, pasty, mucoid coating. There is a sense of weight and oppression in the epigastrium. The appetite is impaired; there is more or less nausea, but rarely vomiting. The skin is yellow, doughy, and inelastic, and inclined to be cool. The bowels are constipated, the stools being clay colored; the urine is but slightly decreased in quantity, but pale, frothy, and of low specific gravity. The patient is dull and listless, with a dull headache; the extremities are inclined to be cold. Either one of these forms is easily recognized.

The treatment will consist in correcting the condition of the stomach and bowels, bringing the fever back to the simple form, when antiperiodics will be used as already indicated. To overcome the irritation, use counter-irritants over the stomach, either a sinapism or the cold pack. Internally, give the small dose of ipecac or subnitrate of bismuth in mint water.

Ipecac.	5 drops.
Water	4 ounces. M.

Sig. Teaspoonful every twenty or thirty minutes.

Or,

Subnitrate of Bismuth	1 drachm.
Water	4 ounces. M.

Or,

Aconite	5 drops.
Rhus Tox	10 drops.
Water	4 ounces. M.

Sig. Teaspoonful every hour.

Where there is great torpor and atony, this must be corrected or our antiperiodics will not be absorbed.

Sodium Sulphite.—For the moist, pasty, dirty tongue give sulphite of soda, in twenty-grain doses, every three hours. If the tongue is broad and flabby, but clean,—

Nux Vomica	5 drops.
Water	4 ounces. M.

Sig. Teaspoonful every hour.

Podophyllin and Leptandrin.—For the torpor of the liver,—

Podophyllin. and	
Leptandrin	1 drachm each.
Water	4 ounces. M.

Sig. A teaspoonful every two hours.

If the tissues are full and there is puffiness under the eyes, with thick tongue and doughy skin,—

Potassium Acetate 1/2 ounce.
Water 4 ounces. M.

Sig. A teaspoonful every three or four hours, the patient drinking freely of water with each dose.

Belladonna.—Where the tongue is clean, but thick, with dull pains in the head, pupils dilated, pulse small,—

Belladonna 10 drops.
Water 4 ounces. M.

Sig. A teaspoonful every four hours. Then use quinia.

MASKED INTERMITTENT.

In malarial sections there are certain well-defined diseased conditions that occur with marked regularity; in fact, the period is as well marked as in any of the intermittents, but with this difference,—there is no fever. Almost every disease may have a distinct periodic complication, and need special treatment, but the neuralgias are the ones commonly embraced under the head of masked intermittents.

The nerves most frequently involved are the supraorbital and infraorbital branches of the trigeminus. The headache is intense and persistent. Occipital pain is also quite common, while intercostal and sciatic neuralgias are of frequent occurrence. Earache may occur at a certain hour each day.

In all of these forms the pain usually begins in the morning, increases in intensity during the day till just before the close of an attack. Croup often shows a tendency to occur periodically, and my first recollection of this disease, as taught me by my father, was the giving of quinia during the afternoon following an attack. We occasionally meet with a case of diarrhea or dysentery, occurring only in the morning. In any or all of these malaria should be suspected, and antiperiodics administered in conjunction with the indicated remedy.

PERNICIOUS INTERMITTENT.

Synonyms.—Congestive Intermittent; Congestive Chills; Malignant Intermittent.

Definition.—An intense intermittent, where the paludal poison is so

intense as to rapidly break down the blood, resulting in a local or general congestion which early threatens life.

Etiology.—The etiology is the same as that of the other intermittents.

Pathology.—An examination of the blood shows an abundant destruction of the red corpuscles and the presence of black pigment derived from the coloring matter of the broken-down corpuscles. The red corpuscles are sometimes crenated; but as this is often seen in other fevers, it is not characteristic.

The increase in the pigment is the most characteristic lesion of the blood, and is deposited in the tissues and organs of the body; notably the spleen, liver, kidneys, brain, and spinal cord. The lesion of the spleen is characteristic, which consists of hypertrophy and softening, the contents consisting of dark-colored pulp, or-black, bloody fluid. There may be thickening of the capsule of the spleen. Infarcts may occur, followed by abscess or gangrene.

The liver is hypertrophied and softened with extravasation of blood; sometimes there is fatty degeneration. The lesions of the kidneys are also similar; viz., congestion followed by degeneration. The lungs, especially the lower lobes, are engorged, and in the severer forms hemorrhagic infarctions are found.

Symptoms.—The symptoms depend upon the type, there being the algid, comatose, hemorrhagic, gastro-enteric, and icteric.

Algid.—This is commonly called congestive chills. It may be preceded by one or more paroxysms of a simple intermittent, or the first chill shows evidences of great congestion. There is marked prostration from the beginning, and the patient, if he attempts to walk, staggers as though under the influence of intoxicants. The early rigors are followed by extreme coldness of the surface; the pulse becomes small and feeble, breathing more or less labored. The eyes are dull and lusterless; the mind becomes early confused, and the patient answers slowly and with difficulty.

The coldness of the surface gradually increases, and the skin, at first contracted, becomes relaxed, and great drops of cold sweat stand upon the face and body, like transparent beads. The face is now blue, the eyes sunken, and the patient is oblivious to his surroundings. The pulse

grows more feeble, respiration becomes labored and slow. The patient slips toward the foot of the bed, and death soon terminates the struggle. The temperature during this severe cold stage, strange to say, is very high. One case which I examined registered 108° about one hour before death.

Where not so severe, the cold stage is followed by reaction, which comes up slowly. The heat of the body is gradually restored, the pulse gains in strength, the mind becomes clear, and reaction is fully established. In exceptional cases reaction is very high, with full, bounding pulse and active delirium, which soon gives way to coma.

Comatose.—This, like the preceding form, may be preceded by one or more paroxysms of simple intermittent, to be followed by a reaction, in which the patient early passes into a comatose condition, resembling apoplexy. The face is but slightly flushed and dusky; the pupils are dilated; breathing is labored, and sometimes stertorous; the coma becomes more profound, and may continue for hours, when the skin becomes relaxed, and the patient breaks out with a profuse perspiration; consciousness is regained, and the paroxysm is over; but after a short intermission there may be another exacerbation equal in severity, or more intense, ending fatally.

Hemorrhagic.—In this form the chill is severe and prolonged, and, with reaction, hemorrhage occurs. The urine is scanty and bloody, while the hemorrhage may take place from the uterus, rectum, mouth, or nose. Ecchymotic spots may appear all over the body. The sallowness of the skin assumes a deeper hue, the icteric color being very marked. There is not so much coma in this form; in fact, the patient usually retains consciousness throughout.

Gastro-Enteric and Icteric.—These forms are more a complication of the other three than separate varieties or types. When these complications occur they render the case more grave.

Diagnosis.—The severity of the different types, as recognized by the grave symptoms, the intense congestion and marked depression, the deathlike coldness and the marked coma, render the diagnosis comparatively easy.

Prognosis.—The prognosis must be guarded; if seen early, and active measures be used, many cases may be saved.

Treatment.—This is the most severe form of malarial fever, and the only variety that is apt to prove fatal, and requires not only prompt, but very active and somewhat heroic measures.

Our first object is to bring about reaction and overcome the great congestion. Stimulants externally and by mouth, and hypodermically, will be the order of treatment. Our patient is deathly cold, arid, to determine heat to the surface, we will order blankets to be wrung out of hot mustard or capsicum water, and envelop the patient in them, at the same time directing hot-water bottles, stove-lids, or, if in the country, hot corn, placed about the body to keep up the heat. While the attendant is getting hot water, utilize the time by rubbing the patient briskly with dry mustard; improve every moment, for your patient's life is at stake.

If the tongue be heavily coated, as in all probability it will, administer an emetic of ipecac or lobelia, to which has been added mustard or capsicum. This may be followed by the old compound cajuput mixture every ten or twenty minutes or an infusion of capsicum.

The stomach is very torpid, however, and remedies are but slowly absorbed, so we give strychnia, one-twentieth grain, hypodermically, or a five per cent solution of camphor and ether. As the system begins to respond to the action of the stimulants, we will administer subcutaneously ten, twenty, or thirty grains of the bisulphate of quinia, and repeat in an hour or two till reaction is fully established. It is always better in these extreme cases to give quinia hypodermically, owing to the slow action of the absorbents.

During the intermission, quinia in somewhat larger doses than in simple intermittent will be given. The nasty, dirty, pasty coating on the tongue, in nearly all cases, shows not only acidity, but sepsis. It calls for sulphite of soda; of a saturated solution we will give a tablespoonful every two or three hours. If there be capillary congestion, which will be shown by dull and dilated pupils, belladonna will be called for, and with this we may combine successfully nux vomica:

Specific Belladonna	10 drops.
Specific Nux Vomica	5 drops.
Water	4 ounces. M.

Sig. A teaspoonful every hour.

From the favorable reports of subcutaneous injections of saline solutions in the stage of collapse in cholera, and from what we have seen of its benefit in surgical collapse, I would suggest its use in the cold stage of this fever.

In the comatose form, the medication should be active. Jaborandi or pilocarpin should be given to establish diaphoresis, reduce the temperature, and overcome congestion; as in the other form, quinia in twenty or thirty grain doses will be used hypodermically.

For congestion of the liver and the spleen, which occurs in all pernicious intermittents, we think of chionanthus and polymnia uvedalia. One drachm of the former and two drachms of the latter to four ounces of water, teaspoonful every one or two hours. Where febrile reaction is intense and delirium active, give,—

Veratrum and	
Gelsemium	1 drachm each.
Water	4 ounces. M.
Sig. A teaspoonful every one, two, or three hours.	

Where there is gastric irritation and persistent vomiting, it is well to wash out the stomach by having the patient drink freely of warm water, to which a little ipecac or lobelia has been added.

Wrongs of the Liver and Spleen.—Enlargement of the spleen and congestion of the portal circulation are among the chief characteristics of this disease, and remedies looking to a correction of these wrongs will early be called for. Fortunately these remedies may be combined or alternated with any of the above treatment.

Polymnia Uvedalia.—Where the spleen is enlarged with engorgement of the liver and mesenteric glands, and there is but little or no pain, and the tissues are doughy, uvedalia internally and locally will be the specific. One or two drachms to water four ounces, teaspoonful every three hours. For the external use, either a hot infusion or the ointment may be used, care being taken to rub it in with brisk friction.

Chionanthus.—Where the engorgement of the liver is followed by jaundice, and there is tenderness in right hypochondriac region, chionanthus in five or ten drop doses will effect a cure.

Ceonothus.—This is an agent that acts nicely where there is puffiness of the face, doughy skin, and pain in spleen and liver; two to five drops of ceonothus in water every two or three hours will prove beneficial.

Carduus Marianus.—Those who have read Burnet's little book on "Diseases of the Liver" will prescribe carduus for the big spleen; if the patient is despondent, bordering on melancholy, the indication for its use will be still more pronounced.

Grindelia Squarrosa.—Dr. Webster speaks very highly of this remedy with enlargement of spleen with dyspeptic symptoms of long standing, while Professor Bundy declares that for these enlarged spleens there is a "Balm in Gilead," and that this is found in grindelia squarrosa.

Chelidonium.—Where there is enlargement of the liver, and the skin is of a bronze color, the tongue thick and full and of the same yellowish-green tinge, two drops of chelidonium every three hours will give good results. These remedies are somewhat similar in their action, and two or three may be combined, or two may be given one day and two others the following day, in this way getting the benefit of the entire group.

Excretions from the Skin.—There is a relation between excretion and ague, and remedies that increase the function of the skin, kidneys, and bowels, will prove curative to the disease. There are cases where the ague is perpetuated by the wrong of the skin; if harsh and dry, the proper bath is to be commended. If doughy, or leathery and inelastic, quinine inunction is invaluable.

Quinia	1 drachm.
Lard	1 ounce.
Oil of Cinnamon	10 to 20 drops. M.

To be rubbed into groin, axilla, and over abdomen every three or four hours, using considerable friction.

Kidneys.—Where the tissues are full, puffiness under the eyes, broad, thick, full tongue, scanty secretion of the kidneys, acetate of potassium is our best agent. Place half an ounce in four ounces of water, and give teaspoonful every three or four hours, the patient drinking freely of water after each dose.

Cuprum.—Where the skin is of a greenish hue, and the tongue of the same color, the blood is of poor quality and a blood-maker is needed, cuprum will prove curative. One of my first cases of chronic ague, nearly twenty years ago, yielded to the small dose of tincture of copper after all other agents had failed.

Arsenic.—Where the tongue is small, pale, and slimy, and of a bluish cast, and where the pulse is small and feeble, the skin lifeless and inelastic, the small dose of Fowler's solution will be found effective. There may be some structural complications that will need to be corrected before a cure can be effected. An old metritis, giving rise to dysmenorrhea, or menorrhagia, or to an amenorrhea, will continue indefinitely the periodic disease, as will wrongs of the rectum or urethra, and in all these persistent malarias a careful examination must be made, that the offending part may be corrected. The convalescent period must be carefully watched, and any symptoms of a recurrence be met by the judicious use of quinia.

CHRONIC MALARIAL FEVER.

Synonyms.—Malarial Cachexia; Chronic Ague.

Definition.—A persistent fever of an irregular type, partaking of the nature of both the intermittent and remittent fevers, and characterized by anemia; the skin being either sallow, doughy, and inelastic, or dry and constricted; there is enlargement of the spleen, congestion of the portal circulation, and disordered condition of the digestive apparatus.

Pathology.—Anemia is quite marked, the malarial poison causing a wholesale destruction of the red corpuscles. The viscera, especially the spleen, liver, and kidneys, are dark red, owing to a deposit of the pigment of the blood following the breaking down of the corpuscles.

The spleen is enlarged, sometimes filling the left abdominal cavity. There is congestion of the liver, and the kidneys show extravasation of blood. There may be albuminuria and dropsical effusion. The skin presents a jaundiced appearance.

Symptoms.—The symptoms of chronic malaria are legion; the blood being deranged, nearly every organ and tissue is affected, hence the great variety of symptoms. There is generally disturbance of the circulation. This may result from the enlarged spleen pressing against

the diaphragm, and which, by crowding the heart, gives rise to frequent palpitations or irregularity in its beat.

In severe cases, where there is marked congestion of the liver, there will be repeated attacks of asthma, owing to pressure of the liver against the diaphragm, and this in turn against the lungs, thus impeding a free respiration. The tongue is nearly always coated, with a disagreeable taste in the mouth. There is derangement of the stomach, which gives rise to many symptoms of dyspepsia. There may be gastric irritation, of which nausea and retching, are prominent features; here, the tongue is, narrow and elongated, or there is atony, with fullness of tissue, the tongue being broad and full.

The liver being congested in nearly all cases, we have, as a result, an-icteric hue to the skin. The abdomen is enlarged, owing to hypertrophy of the liver and spleen; hence there is great dullness on percussion. There is a dull, aching pain in the loins, and not infrequently dropsy, as a result of impaired function of the kidneys. The skin is usually dry and harsh, although it may be relaxed, cool, and doughy. There is constipation, alternated with diarrhea. Dysentery is not an infrequent complication. With these various symptoms, there is associated the periodicity of malaria.

The nervous system feels the influence of the poison very early, and headache and general myalgia naturally follow.

The chill may occur with the marked regularity, of the simple intermittent, or it may be erratic, occurring when least expected. Again, there may be an absence of the cold stage, but occasional exacerbations of fever of an irregular type; or the disease may be characterized by periodic neuralgias, such as facial, bronchial, or sciatic. Again, the periodic character may be so slight that, if we are not careful in our examination, we will overlook entirely the true nature of the disease.

Diagnosis.—This is generally easy. The history is of great importance, the patient having resided in a malarial section and having suffered from frequent acute attacks. The cachectic appearance due to the marked anemia; the jaundiced, waxy, or doughy skin; the enlarged spleen, which is characteristic; the congestion of the liver, and the periodical manifestation which a careful study will reveal, point conclusively to the nature of the affection.

Prognosis.—The prognosis will depend to some extent upon the length of time, or the stage of the disease. If the engorgement of the liver and spleen has been followed by more or less degeneration of these organs, or if there is dropsy with Bright's disease, the case is unfavorable, and, while some relief may be promised, a cure is out of the question.

Treatment.—While quinia is a very important agent in malaria, there are few cases of a chronic nature which it will cure. The complication, whatever it may be, must be overcome before it will be of any use, and many cases will be relieved without the administration of a single dose of quinia. If periodicity is the most distinctive feature, the basal lesion, quinia will cure, but in the large majority of instances this is not the case.

The early Eclectics were peculiarly successful in the treatment of this disease, and I can not do better than to reproduce a large part of the treatment as given in "Scudder's Practice." I believe the practitioner will find it the only rational method, and an experience of twenty-five years confirms it.

"Remedies that Influence the Circulation.—I claim that any case of intermittent fever showing increased temperature, increased frequency of pulse, torpor of the organs of excretion, and irritation of the nervous system, should have the sedative before giving quinine, as a part of a good treatment. It is true that persons suffering from ague do not like to wait the slow actions of remedies: they want it broken at once; yet if they are told that the slower cure is the more rational one, they will take it in preference.

"A man showing the wrongs that would ordinarily call for sedatives, may have the ague broken by antiperiodics; but it returns again and again, and gives us a chronic case.

"*Aconite.*—If the patient has a small, frequent pulse—usually small and hard during febrile reaction, small and soft in the intermission, the tissues being somewhat contracted, color not very much changed—I would recommend the administration of aconite, say,—

Tincture Aconite	5-10 drops.
Water	4 ounces. M.
Sig. A teaspoonful every one or two hours.	

Veratrum.—*Veratrum* does not seem to have as large a field of usefulness as aconite, but still we have an occasional case where it is useful. The pulse is frequent and full, the tissues full, the patient full-blooded. Prescribe it in the usual dose:

Tincture <i>Veratrum</i>	20-30 drops.
Water	4 ounces. M.

Sig. A teaspoonful every one or two hours.

Lobelia.—*Lobelia* is used for its influence upon the circulation, as well as an emetic, and it is this first use we wish to study here. There is a sense of precordial oppression, with difficulty in respiration, and a full, oppressed pulse; we give the tincture of the seed in doses just short of nausea. In the olden time an extract of *lobelia* was combined with black pepper or piperine, as in the following:

Extract of <i>Lobelia</i>	10 grains.
Powdered Black Pepper	2 drachms. M.

Sig. Make three grain pills, and give one every hour.

Gelsemium.—Though the influence of *gelsemium* is primarily upon the cerebro-spinal centers, it also influences the circulation, and we may study it here. In the ordinary treatment of ague, many physicians use *gelsemium* associated with quinine where there is evidence of an excited nervous system. The flushed face, bright eyes, contracted pupils, increased heat of the scalp, restlessness, and irritability, are the common symptoms indicating it.

<i>Gelsemium</i>	20-60 drops.
Water	4 ounces. M.

Sig. A teaspoonful every three hours.

Belladonna.—*Belladonna* is the remedy for congestion of the nerve centers, as marked by drowsiness and tendency to coma during the paroxysm of fever. The face is dull, expressionless, the eyes dull, the pupils dilated, and indeed there is want of expression in all parts of the body. In the recent disease, we give *belladonna*, in such cases, as a preparation for quinine, and in a chronic case, where the symptoms were marked, we would expect it to cure. Usually there is the indication for aconite as well, and we would give the two together, as,—

Tincture <i>Belladonna</i>	10 drops.
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Tincture Aconite 5 drops.
Water 4 ounces. M.
Sig. A teaspoonful every one or two hours.

“There are other remedies that might be grouped with these, that we sometimes find useful, but the above must suffice for the present.

“Remedies Influencing the Digestive Apparatus and the Spinal and Sympathetic Nervous System.—I think the lesions of innervation associated with wrongs of the digestive apparatus are more important than the functional wrongs of the organs themselves. We never have a wrong of the stomach, bowels, liver, or spleen, that we have not an equal wrong of innervation from the solar plexus, and sometimes of the spinal cord.

“Emetics.—In the olden time the emetic was a prominent means for the cure of chronic ague, either as preparing the way for antiperiodics or serving instead. Even yet, with our abundant means, we find cases in which the emetic is the shortest way to a cure. The case is well marked, and needs not be mistaken. There is a marked oppression of the nervous system, and oppressed pulse and perspiration, sensations of weight or fullness in the epigastrium, disgust for food, and a tongue broad and heavily coated at the base. In such a case a thorough emetic gives prompt relief.

“Cathartics.—I deprecate the common use of cathartic medicines, and feel confident that many failures, even in the treatment of ague, are due to their injudicious use. Still, if there is evidence of material in the bowels which serves either as a cause of depression or of irritation, it should be removed. Simple constipation is not sufficient to justify their use. The simpler the means, and the milder the action, the better it is for the patient in the ordinary case.

“Podophyllin.—There is a condition of the nervous system, and of the circulation, calling for this remedy, as well as a condition of the digestive apparatus. In the recent disease there is a case in which Podophyllin prepares the way for a cure by quinine. There is oppression of mind, of muscular action, of respiration, of the circulation. The tongue is broad, coated from base to tip, the face is full and expressionless, and there is especially fullness of the veins with evident impairment of venous circulation. Even the old-fashioned emeto-cathartic with podophyllin serves a good purpose here.

“In a chronic case of ague presenting these symptoms, I should give Podophyllin in doses sufficient to obtain its full action.

“In some cases we do not want the decided action of podophyllin. The ague has been arrested for the time, and we are looking to a radical cure. There is an atonic condition of the stomach, of the intestinal canal, of the organs associated with it, and oppressed innervation from the sympathetic; the patient is dizzy, suffers from dull headache at times, and does not feel like work. In such cases I prescribe Podophyllin with hydrastia in small doses, as the following:

Podophyllin	2 grains.
Phosphate of Hydrastia	10 grains. M.
Sig. Make forty pills; one or two may be given each day midway between meals.	

Nux Vomica.—We use nux vomica in the recent disease, where there is nausea, colicky pain in the bowels, pain in the right hypochondrium pointing to the umbilicus, and a yellow sallowness of the skin.

“In some cases of persistent ague these symptoms are very marked, especially the abdominal pain, and an unpleasant color of the surface; then nux vomica may cure when the antiperiodic treatment has failed. In some cases I give it alone, in small doses, as,—

Tinct. Nux Vomica	5 drops.
Water	4 ounces. M.
Sig. A teaspoonful every one or two hours.	

“It may be alternated with any other remedy indicated; and even with aconite.

“*Alkaline Salts*.—There are cases in which the alkaline salts become important remedies, or even curatives. The broad, pallid tongue is the indication, and when present I would never think of treating a case without the use of a salt, usually of soda.

“*Sodium Sulphite*.—We meet with cases showing distinct indications for this antiseptic salt. The tongue is broad, pallid, and dirty, retrograde metamorphosis is defective, and the tissues look old and inactive. Sulphite of soda will frequently cure these cases, giving it in doses of

from ten to twenty grains every three or four hours.

“*Acids*.—While acids may not be curative alone, they will aid other remedies, or prepare the way for other remedies. The deep-red tongue is the indication, and muriatic or lactic acid is the remedy.

“*Uvedalia*.—Among the wrongs arising from continued ague, none are so common and characteristic as enlargement of the spleen-ague cake. With this disease of the spleen, the ague will continue to recur despite all antiperiodic treatment. In some cases we will find the liver enlarged, evident engorgement of the mesenteric glands, and sometimes general disease of the lymphatics.

“For these cases uvedalia is undoubtedly the specific. We use the ointment of uvedalia as a local remedy, applied over the enlarged spleen or liver, or even over the entire abdomen. It is well to use heat with the application, covering the part with flannel, and passing a warm iron over it. The application should be thorough and repeated every day. Internally, we give it in doses of from one to twenty drops, three or four times a day.

“*Chionanthus*.—We have the still more rare case of chronic ague associated with jaundice, and examination does not show incurable structural disease of the liver. The more common case is one of irritation marked by uneasiness in the right hypochondrium, and tenderness on pressure. In one such case a radical cure resulted from the employment of the tincture of chionanthus alone, in doses of ten drops every three hours.

“**Tonics**.—The advantage of a tonic treatment following the breaking of an ague has long been recognized, and good practitioners always examine the patient with reference to their need of this class of remedies. The bitter tonic improves the appetite, and gives better digestion and blood-making, and increases the power of the tissues to appropriate nutrient material, and in this way increases the resisting power of the body to the disease. Many of these also improve innervation through the sympathetic, and thus strengthen the vegetative functions of the body.

“**Restoratives**.—Restoratives are also of importance in many of these cases. There is the indication of a special want of some material in the body, and blood-making and nutrition will not go on well without it, or

some organ or tissue can not be made without it. Thus there may be the want of phosphorus, of iron, of sulphur, of silica, as well as of soda or an acid, or food. It may be that the administration of a teaspoonful of the compound syrup of the hypophosphites after each meal will be the one thing wanting to restore the resisting power of the body, or a tablespoonful of cod-liver oil may be the thing wanting to give right combustion and a normal temperature.

“The Excretions.—Physicians have also recognized the relation between excretion and the ague: when excretion was deficient or otherwise changed, the ague would continue.

“Our school of physicians has given more attention to the skin, and have placed remedies to increase its activity among the foremost. There are cases, certainly, in which the ague is perpetuated by a wrong of the skin. With a harsh and dry skin, it is almost impossible to effect a cure, as it is also with a soft and relaxed, doughy or inelastic skin.

“In addition to the usual baths for the different conditions of the surface, let me again call attention to the use of fatty inunction and quinine inunction. Frequently this seems to answer the purpose in both cases. Where the skin is harsh and dry, and where it is doughy and inelastic, it is one of our most efficient means of cure, and I usually order a quinine inunction in the proportion of drachms .5 to drachms 1 to the ounce of lard, and have the body thoroughly rubbed with it once or twice daily. Thorough rubbing is the expression, although a large quantity of the ointment need not be used, and if the skin is inclined to be greasy, it may be rubbed clean with soft flannel.

“Potassium Acetate.—Golding Bird placed great stress on obtaining free excretion from the kidneys in these protracted agues; he claimed that cures could be effected by the use of acetate of potash, when all antiperiodics had failed. I know by experience that some of these old agues can be cured by the saline diuretics, and possibly can only be cured by them. Take a case where the tissues are inelastic and sodden, and the renewal of tissue is slow, I should give a solution of potassium acetate in preference to all other means. From one to three drachms is divided into doses very largely diluted with water, and given daily, and continued for one or two weeks.

“Specific Remedies.—Physicians recognize other antiperiodics than quinine, but they must concede their inferiority in the ordinary ague.

The other alkaloids of the Peruvian bark are now being used to a considerable extent, although, in the main, the only difference between these and quinine is less cost. Other than these I do not know of any remedies that can be classed with quinine as antiperiodics.

“*Cuprum*.—We occasionally have a case where copper is the remedy par excellence. My first experience with the remedy was so successful that I have ever since been an admirer of its curative power. The patient had been shaking with a regularity which is so characteristic of some of these chronic cases. Quinia had been given in large doses and in small doses, but all to no effect. I found the patient with a sallow, doughy skin, the color of the yellow-green cast that one occasionally sees in chronic ague. The tongue was broad and of the same peculiar yellowish-green order. I prescribed tincture cuprum 20 drops, water 4 ounces, teaspoonful every three hours, and in less than ten days the patient considered himself well, although I had the remedy continued for several days longer, for fear of a relapse.

“*Carduus marianus*, *ceanothus*, and *grindelia squarrosa* are remedies that influence the spleen and liver. (See ‘Pernicious Intermittent’ for their indications, etc.)

“*Arsenic*.—Arsenic is in very common use as a remedy for ague, and sometimes exerts a remarkable influence in effecting a cure. But, as ordinarily used, it sometimes exerts a remarkable influence in the opposite direction, which is quite unpleasant for the patient. Some of the patent ‘ague cures’ contain arsenic; as, for instance—(I will not name them, as the proprietors are very sensitive on the subject.) I have known a preparation of euonymus, quinine, and Fowler's solution of arsenic used successfully, but I can not recommend it.

“When I use arsenic it is in minute doses for its specific effect. Given a chronic case of ague, with soft, feeble pulse, lifeless inelastic skin, and tongue pale, small, and coated with slimy fur, I would think of the arsenic pellets. Take of the medium-sized Homeopathic pellets sufficient to fill an ounce bottle half full, drop on them five drops of Fowler's solution of arsenic, shake them well together, and, when dry, we have the small quantity. Ten of these may be given every three hours. It is well to say that the indications for the large-and small doses of arsenic in the treatment of chronic intermittents are just the opposites of one another.

Nitric Acid.—Among the positive remedies used in the cure of protracted ague we must not forget nitric acid. The indication is very distinct, a violent coloration of the tongue, and more slightly of any part where the circulation shows free. In the typical case the violet color is transparent, seeming like a glaze on the tongue; it is never a dull, solid color. In these cases I prescribe,—

Nitric Acid	20 drops.	
Aqua Dest	2 ounces.	
Simple Syrup	2 ounces	M.

Sig. A teaspoonful every three hours.

“Complications.—It may be remarked, in conclusion, that sometimes a complication of functional or structural disease will continue the ague, in the same way that the malarial poison will continue a local disease. Thus I have known an ague continued by amenorrhea, by dysmenorrhea, and by menorrhagia, as I have by disease of kidneys, bladder, urethra, or other structure. It is safe in all cases to take it for granted that this is the fact, and in intractable ague associated with local or functional diseases, to adopt a treatment for their, cure.

“Lastly it may be said, whenever there is a special indication for any remedy, it will prove a remedy in ague, as it would in other diseases. It may be preparatory for the use of the anti-periodics, associated with them, or it may cure alone. This advice is therefore given, to examine each patient carefully with reference to symptoms calling for special remedies, and to use remedies thus indicated.”

REMITTENT FEVER.

Synonyms.—Bilious Fever; Estivo-Autumnal Fever; Gastric Fever.

Definition.—One of the divisions of malarial fever in which there is but one revolution of the disease, the hot stage being greatly prolonged and made up of exacerbations and remissions.

Etiology.—The estivo-autumnal parasites already described are the specific micro-organisms that give rise to this form of malaria. The same conditions that favor intermittent fever, predispose to remittent fever.

The severity of the disease depends largely upon climatic conditions, being mild in high and temperate regions, and increases in intensity as

we approach the tropics. It prevails more extensively in the fall months, although it is seen during the entire year.

Pathology.—The morbid changes depend largely upon the length of time the disease has existed, and also upon the frequency of reinfection. The pathology does not differ greatly in character from that of intermittent fever, the difference being only in degree.

There is pigmentation of the spleen, liver, and brain, and the blood contains broken-down blood disks or degenerated pigment. The spleen in recent cases is swollen and soft, while in protracted cases, or where there has been frequent infection, it is firm and permanently enlarged.

The liver is dark in color and undergoes similar changes.

The brain is of a dark, almost black, color. Other organs, together with the lymphatic glands and the skin, are deeply pigmented.

Symptoms.—The forming stage is quite variable, and some cases appear suddenly, without any prodromal symptoms; usually, however, there is a more gradual invasion, lasting from two to five or six days.

The first evidence of the disease is a sense of weariness on slight exertion, which, increasing, results in general malaise, loss of appetite, headache, with general aching of the body. The bowels are constipated, the skin dry, and the urine scanty and high-colored. The tongue is coated, there is a bitter taste in the mouth accompanied by nausea, and, as the chill ushers in the disease, vomiting of bilious matter follows.

Occasionally, for twenty-four or forty-eight hours, an intermittent fever precedes the disease.

Cold Stage.—The chill is usually shorter in duration than that of intermittent fever, although, while it lasts, it is quite severe. The nausea which precedes this stage, frequently terminates in vomiting during the chill or as soon as reaction occurs. In the exceptional case, the cold stage can not be recognized from that of the intermittent type.

Hot Stage.—Although the temperature may have been two or three degrees above the normal during the cold stage, with the termination of the chill there is a rapid rise of temperature, often reaching 105° or 106° within ten or twelve hours after the chill. The pulse is full, strong, and

bounding; the respiration hurried and uneven; the skin dry, harsh, and constricted; the eyes red and suffused; the face flushed and turgid, and the patient is extremely restless. The tongue is coated with a dirty, yellowish fur; there is tenderness over the epigastrium, and vomiting of bilious material aggravates the patient's suffering. The patient complains of pain in the head, back, and limbs, it being sometimes extremely severe.

The secretions are markedly arrested, the bowels being constipated and the urine scanty, high-colored, and frequently colored with bile. There is restlessness, and, in nervous patients, delirium may ensue, or should there be marked congestion it will be shown by dullness and stupor.

These symptoms continue from ten to twenty hours, when the temperature begins to decline; the pulse is less rapid, loses its full, bounding character, the skin becomes relaxed, and a slight perspiration is noticed about the head, face, and neck; the pain in head and back subsides, the vomiting ceases, and the patient becomes quite comfortable, and frequently drops into a quiet sleep.

This constitutes the period of remission, and usually occurs each day, generally in the morning, although there may be two remissions daily, or they may occur every third or fourth day, resembling a tertian or quartan intermittent.

The time embraced in a remission varies: in one it may be very slight and of short duration, while in another patient it may be quite prolonged, and might even be considered an intermission did not the thermometer show an elevation of temperature.

Following the remission, the temperature again rises with all its accompanying symptoms, and the fever is made up of exacerbations and remissions.

Bilious fever can not be said to run a uniform course. In some, the fever is quite mild, the remission pronounced, and but little, if any, gastric disturbance. In others, as the disease progresses, it loses its remittent character, and merges into a continued fever with typhoid symptoms.

Again, we occasionally meet with cases where there is great congestion of the spleen and liver, and when the remission occurs, there is but little reactive power, the skin becoming relaxed, the patient is bathed with a

cold, clammy perspiration, the pulse is small and feeble, the extremities are cold, the breathing shallow and labored, coma appears, and the patient dies during the remission.

Complications.—“Remittent fever is frequently rendered difficult to treat by the existence of some local affection. Irritation of the stomach and duodenum is probably the most frequent complication; the symptoms are, continued nausea and vomiting, tenderness on pressure over the epigastrium, with a feeling, frequently, of insufferable oppression in that region.

“Determination to the brain is also met with in the severer forms of the disease, indicated by symptoms of cerebral excitement, followed by stupor, low delirium, and coma.

“Disease of the liver is also of frequent occurrence in warm climates, most frequently manifested by symptoms of irritation and increased secretion of acrid bile, which produces irritation of the bowels; but sometimes by congestion, the secretion being arrested.

“Various pulmonary affections are met with in this disease, especially bronchitis and pneumonia, of a congestive form.”

Diagnosis.—The diagnosis is usually not difficult after one or two remissions. Where the remissions are slight, it might be mistaken for typhoid, although an absence of the eruption, and the much less prostration, should enable one to distinguish the one from the other. When complications occur early in the disease, the symptoms may be so masked as to make a correct diagnosis somewhat difficult.

Prognosis.—The prognosis should always be favorable if the patient be seen early in the disease, or unless grave complications arise.

Treatment.—In simple remittent fever, the object of our treatment will be to lessen the fever, establish the secretions, and lengthen the remission, that we may get the full effect of our antiperiodic, quinine. This is usually accomplished early in the disease, and the patient is convalescent in from four to six days.

To accomplish this end, we select aconite or veratrum, according to the condition of the circulation; aconite for the small pulse, veratrum for the full and bounding pulse, and combine with the sedative gelsemium,

where the patient is restless and nervous. This modifies the fever and favors the reception of the quinine during the remission. If there is irritability of the stomach, this can be corrected by small closes of aconite and ipecac, rhus tox., or bismuth and mint water.

As the fever begins to subside, and the tongue and skin become moist, we begin the administration of quinia:

Sulphate of Quinia	15 grains.
Phosphate of Hydrastine	10 grains. M.

Sig. Divide into three powders, and give one every two or three hours during the remission.

The sedative may be continued during the remission, but at longer intervals. With the reappearance of the fever the sedative treatment is given as before, and the antiperiodic the following remission. It is noticed that each exacerbation becomes lighter and the remission more marked, the disease early terminating in health. The more severe cases will need additional study and treatment.

Remittent fever is rendered severe by certain complications, but, if recognized early, can be corrected by a selection of the proper remedies. The complications most frequently found are those of the gastrointestinal tract, the blood, the respiratory tract, and the nervous system.

Wrongs of the Stomach.—Irritability of the stomach is seen in nearly every severe case of bilious fever, and is recognized by the elongated tongue, which is also pointed and reddened at tip and edges, and by tenderness over the epigastrium. There is nausea, with retching, and neither food, drink, nor medicine is retained with comfort, if at all. Our remedies are not readily absorbed, and if quinia is given, it only adds to the general irritability of the stomach and nervous system.

With this condition we administer,—

Aconite	5 drops.
Ipecac	10 drops.
Water	4 ounces. M.

Sig. Teaspoonful every thirty or forty minutes until relief is obtained.

Where the patient is very nervous, and is startled at the slightest

Water 4 ounces. M.
Sig. A teaspoonful every hour.

This will be followed by good results. As these various complications are overcome, the disease assumes its remittent form and quinine is again administered. Should there be complications of the respiratory tract, such as pneumonia, bronchitis, and kindred lesions, the treatment should be such as given under their respective heads. The same may be said of any other complication that may arise. We meet the condition by appropriate remedies. During convalescence a proper selection of food will be important, and a tonic, nux vomica and hydrastine, will improve the power of the stomach for digestion.

Pernicious Remittent Fever.—This type so closely resembles the pernicious intermittent fevers, that a separate description is unnecessary.

YELLOW FEVER.

Synonyms.—Typhus Ichteroides; Febris Flava; Black Vomit; Yellow Jack.

Definition.—An acute, infectious, though non-contagious, disease of the tropics or sub-tropics, and characterized by a sudden invasion, a high grade of fever lasting from two to seven days, marked tenderness over the epigastrium, vomiting of black, broken-down blood, albuminous urine, and yellow discoloration of the skin.

History.—The disease, in all probability, has existed for many centuries, although the first authentic report is that of the epidemic which appeared in the Barbadoes, West Indies, in 1647. It made its appearance in this country at Boston in 1693. Since then numerous epidemics have occurred, entailing the loss of thousands of lives and a financial loss of many millions of dollars.

Guiteras has classified the infected areas as follows: 1. The focal zone, in which the disease is never absent—Havana, Santiago, Vera Cruz, and other Spanish-American ports. 2. Perifocal zones, or regions of periodic epidemics, including the ports of the tropical Atlantic in America and Africa. 3. The zone of accidental epidemics, between the parallels of 45° north and 35° south latitude.

Epidemic in Havana: that city has been the focus for a century and a half, from which many portions of the civilized world have been repeatedly infected.

Etiology.—While season, age, race, and unhygienic conditions predispose to the disease, the exciting cause has not yet been positively determined, though the bacillus *icteroides* of Sanarrelli and the bacillus X of Surgeon-General Sternberg have been found in a number of cases, and believed by many to be the specific cause.

Prophylaxis.—One of the most far-reaching and beneficent discoveries in the history of the medical world was recorded when the medical commission appointed by the Surgeon-General of the United States army completed their work in Havana, proving beyond doubt that the transmission of yellow fever is through the bite of a species of mosquito, the *Stegomyia fasciata*.

The late Dr. Walter Reed, a major in the United States army, was chairman of the commission, the other members being Assistant Surgeons James Carroll, Jesse W. Lazear, and Aristides Agramonte. As early as 1881, Dr. Carlos Finlay, of Havana, a graduate of Jefferson Medical College, of Philadelphia, had declared his belief that a certain species of mosquito in Havana was the transmitter of yellow fever from person to person. Acting upon this belief, Drs. Lazear and Carroll allowed themselves to be bitten by infected mosquitos. In the case of Dr. Carroll, he became infected and narrowly escaped death. Dr. Lazear, though not infected by the first test, was later accidentally bitten, became infected with yellow fever, and lost his life.

The commission soon determined, by actual experiment, that if a female mosquito of the species *Stegomyia fasciata* were permitted to bite a yellow fever patient during the first three days of the disease, and then a period of from twelve to twenty days elapse and a non-immune be bitten by this infected mosquito, he almost invariably developed yellow fever.

The commission also proved, by experiment, that the disease is never transmitted by fomites. A number of immunes slept for twenty consecutive nights in a room in which articles were hung that were soiled by black vomit and bloody fecal discharges from fatal cases of yellow fever. These immunes also packed and unpacked the soiled

clothing each day; and a still more severe test was the sleeping in clothing and under sheets that had covered fatal cases of yellow fever, yet not a single case of fever was contracted, though, when exposed to infected mosquitoes later, several contracted the disease.

One of the most practical proofs of their findings is the disappearance of the disease in Havana as soon as the yellow fever patients were protected by mosquito netting, thereby preventing mosquitoes from carrying the infection to others; this, together with the crusade that was inaugurated against the destruction of the larvae of the mosquito, and the removal, as far as possible, of all pools, stagnant ponds, and filthy gutters,—breeding-places of the mosquitoes.

The report of the commission was as follows:

1. The mosquito—*Stegomyia fasciata*—serves as the intermediate host for the parasite of yellow fever.
2. Yellow- fever is transmitted to the non-immune individual by means of the bite of the mosquito that has previously fed on the blood of those sick with this disease.
3. An interval of about twelve days or more after contamination appears to be necessary before the mosquito is capable of conveying the infection.
4. The bite of the mosquito at an earlier period after contamination does not appear to confer any immunity against a subsequent attack.
5. An attack of yellow fever, produced by the bite of the mosquito, confers immunity against a subsequent attack of the non-experimental form of this disease.
6. Yellow fever is not conveyed by fomites, and hence disinfection of clothing, bedding, or merchandise, supposedly contaminated by contact with those sick with this disease, is unnecessary.
7. A house may be said to be infected with yellow fever, only when there are present, within its walls contaminated mosquitoes capable of conveying the parasite of this disease.
8. The spread of yellow fever can be most effectually controlled by measures directed to the destruction of mosquitoes, and the protection of the sick against the bites of

these insects.

Pathology.—The skin and mucous membrane show a varying degree of jaundice, from the light yellow to a dark brownish or orange color, the color deepening over the course of the blood vessels. The liver partakes of the same yellowish color, and at first is hyperemic, though, after death, it is usually anemic. There may be extravasation of blood, giving it a mottled appearance. The parenchymatus changes show fatty or granular degeneration. The gastro-intestinal mucous membrane shows catarrhal lesions with softening of the membrane, at first hyperemic, followed by extravasation of blood.

The stomach contains more or less of broken-down blood, the so-called black vomit. The kidneys undergo diffuse nephritis, with fatty or granular degeneration. The spleen, though dark, soft, and friable, is but little changed in size. The heart is pale, flabby, and shows the same necrotic changes which take place in the other viscera.

The blood is dark and broken down, the disintegration of the red-blood disks is responsible for the hemoglobin found in the blood serum. The meninges and brain are hyperemic, and show the characteristic degenerations.

Symptoms. — *Incubation.* — This varies from twenty-four hours to two weeks with the usual prodromal symptoms; viz., languor, listlessness, loss of appetite, partial arrest of secretions, with pain in head and back.

Invasion.—The invasion is abrupt; the chill, though not long, is well defined, and followed by febrile reaction, the temperature rapidly reaching 103°, 104°, or 105° ; the skin becomes hot, dry, and harsh; the urinary secretion is arrested, and the bowels are obstinately constipated. The patient suffers severely with pain in the back, limbs, and head, and is extremely restless and uneasy. Much irritation of the stomach exists from the first, with pain and sense of oppression in the epigastrium; in a majority of cases vomiting speedily comes on, and continues through this stage, the retching and ejection from the stomach being painful and difficult.

The eyes are generally suffused, reddened, and very sensitive to light, presenting the appearance that would follow exposure to wood-smoke; this has been looked upon as almost a pathognomonic symptom by some.

The pulse, varies greatly in different cases; in many it is hard, quick, and irregular; in others small, corded, and oppressed; and, again, not different from what it would be in a simple remittent. The tongue hardly ever presents the same appearance; sometimes clean, again broad, flabby, and covered with a thin white coat; or reddened at tip and edges, pointed and coated in the center; and again presenting a thick, yellowish, or yellowish-brown coat. As before remarked, this stage varies in duration, and there is just as much variation in its intensity.

Stage of Remission.—The febrile action gradually abates; the vomiting ceases, or is less constant; the pains are much ameliorated; the skin becomes softened, and frequently covered with perspiration- The patient feels comparatively well, though exceedingly debilitated, and has hopes of speedy recovery; and yet, even now, may be noticed that yellowish discoloration, manifesting itself in the conjunctiva and the skin of the forehead and breast, the precursor of that third stage from which it is so difficult to recover.

This remission, sometimes so complete, can hardly be noticed at others, but the first rapidly passes into the third stage; or collapse. It is always of short duration, not more than from two to ten hours.

Third Stage.—In this stage the pulse becomes very feeble, and the prostration is excessive; the yellow appearance of the skin, which gives the disease its name, becomes plainly visible, and continues to deepen as the disease advances. The irritability of the stomach is excessive; nothing can be retained, but the vomiting now is easy. The material ejected from the stomach is peculiar, being very dark colored, and hence known by the name of black vomit. This dark-colored material has been determined to be broken-down blood.

Diarrhea frequently ensues, the discharges from the bowels resembling those ejected from the stomach. The respiration is hurried and difficult, with frequent sighing, and the patient complains of an intolerable oppression and distress at the precordia.

The powers of life rapidly fail; slow delirium or coma comes on, and death soon eases the patient from his intense suffering. During this stage there is very little, if any, urine secreted, and it is highly albuminous. In some cases febrile reaction occurs during this stage, and in favorable cases terminates by lysis, or assumes a typhoid type, which

rapidly proves fatal.

Diagnosis.—According to the statements of all authorities, it is extremely difficult, if not impossible, to distinguish yellow fever from the severer forms of remittent fever, in the first stage. Yet the prevalence of the disease as an epidemic in that locality is considered sufficient cause to adopt a treatment suitable for its arrest, in every case presenting the symptoms named.

The subsidence of the fever, after the exacerbation has continued more than twenty-four hours, is a prominent symptom of the disease; the commencing yellow discoloration of the skin, great prostration, and finally vomiting of dark-colored material, renders the diagnosis beyond cavil.

Prognosis.—We are always to bear in mind that yellow fever is one of the gravest of diseases; yet the prognosis varies, depending upon the character of the epidemic and the stage in which treatment is begun. In some epidemics the toxemia is intense and the mortality reaches an alarming per cent, while at other times all the cases seem more or less mild, the mortality dropping as low as five per cent.

Treatment.—*Prophylaxis.*—Quarantine must be rigidly enforced in individual cases as well as in the infected districts. The excreta should be thoroughly disinfected and buried: all clothing and bedding of a fever patient should be either disinfected or burned. When possible, those not immune should leave the infected area at the earliest moment, seeking a cooler place in a higher altitude. During an epidemic excesses of all kinds should be studiously avoided.

The medicinal treatment for yellow fever has largely been a failure, and physicians with little or no experience have been about as successful as those who have passed through the various epidemics; hence it is not presumptuous for one who has never seen a single case to outline a course of treatment.

Remembering that the blood is very early influenced by the toxin, causing its disintegration, we would suggest the remedies which would antidote or check this destruction,—antiseptics, such as baptisia and echinacea, in full doses, would most likely influence this process. The first-named remedy has been used extensively by our Southern physicians for this purpose.

Realizing that just in proportion as we control the fever will we retard the necrotic processes, the wet-sheet pack or spirit vapor bath would be among our best auxiliary measures to produce sedation. Internally, aconite or veratrum in the small dose would assist the above measures. Where there is great nervous irritability, with flushed face, bright eyes, and contracted pupils, gelsemium would likely prove of benefit. For gastric irritation, ipecac and rhus tox. would most likely be useful agents; for depression, camphor has been used successfully; for the stage of collapse, the treatment would be similar to the same stage in cholera; viz., hypodermic injections of strychnia and large injections, sub-cutaneously, of warm saline solution.

In the earlier stages, the bowels should be emptied by large enemas of warm water. For the intense thirst, acidulated waters would do no harm, and might afford some relief. During convalescence great care should be taken not to give anything but the blandest kind of diet, such as sherry whey, koumiss, malted milk, clam and chicken broths, etc.

CHOLERA.

Synonyms.—Cholera Algida; Cholera Asiatica; Cholera Maligna.

Definition.—Cholera is an acute, specific, infectious disease, occurring endemically and epidemically, and characterized by severe vomiting and copious watery stools, violent cramping of the muscles, and collapse.

Cholerine is a term which has come into use in recent years, and is applied to mild cases of cholera and the fatal cases of diarrhea attending an epidemic of cholera.

History.—On the right bank of the Ganges, one thousand feet above the sea-level, at the foot of the Himalaya Mountains, beautifully situated, lies the little town of Hurdwar. Here every year more than one hundred thousand people come to bathe in the sacred waters of the Ganges, while every twelfth year, a sacred year, two million devotees make the pilgrimage.

During the yearly visits thousands of sheep and cattle are slaughtered for ceremonial rites, and the waste portions rot in the burning sun to become centers for the propagation of infectious diseases. This little city

of five thousand people is the home and great focus from which cholera radiates throughout India. Mecca and Medina, other holy cities, are also the places of vast pilgrimages, and one can readily understand why cholera is endemic in India, where sanitation is unknown.

For centuries cholera has occurred in epidemic form in India, Persia, Egypt, and those provinces of Russia bordering the Black Sea. As the Eastern countries were opened to intercourse with European nations, avenues of communication were offered for the transmission of this dread disease, and in 1832 cholera made its first appearance in Europe, one hundred thousand dying in France alone. During this year it was brought by emigrant ships to Quebec, where it rapidly spread along the lines of travel up the great lakes, until it reached the Upper Mississippi.

During this same year it entered the United States by the way of New York, where over three thousand died. It traveled along the great thoroughfares, leaving death in its wake. In 1849 another epidemic occurred, this time entering by way of New Orleans, and, as before, visiting the larger cities, carrying off its victims by the thousands. In 1854 it again appeared in New York, though the loss of life was not so great as in 1849. In 1866 and 1867 it also visited America, but was more mild, and there were less fatalities than in any previous epidemic. In 1873 it made its last appearance in the United States, but owing to greatly improved sanitation it did not prevail over a wide field.

Cholera is of more interest to the American from a historical standpoint than from a practical one; for, in all probability, the United States has seen its last epidemic, for the quarantine system becomes more rigorous each year. so that the fatal disease will hardly be able to find entrance into our country.

Etiology.—Predisposing causes are such as lower the vitality and resisting power of the body; viz., overwork and-lack of proper nourishment, enfeebled condition of the system from previous diseases, dissipation and poor food, especially food where decomposition has already begun, as in tainted meat and vegetables.

Season also influences the spread of the disease. In hot, moist weather the conditions are all favorable for the rapid development of the infectious poison; hence it reaches its maximum intensity at this time, while with the appearance of cold weather it entirely disappears. Social position is also a factor in predisposing to cholera; for this is essentially a

filth disease, and consequently occurs more frequently among the poorer and more ignorant classes. During an epidemic the disease rages most fatally in the slums, where filth abounds, and is not so severe in the cleaner sections of the city.

The exciting cause is now generally recognized as the comma bacillus of Koch, which is not found in any other disease. This is about one-half the length of the tubercle bacillus, thicker and slightly curved, resembling a comma, hence the name. Some of them are corkscrew-like in shape, resembling the letter s. In fact it is not a true bacillus, but should be classed as a spirocheta.

They can be readily cultivated in various media, but desiccation destroys their vitality, differing greatly from the tubercle bacillus. They are found in the intestine very early in the disease, in the dejecta, and, when the rice-water discharges appear, are to be found in enormous quantities. They are rarely found in the vomitus, but may be found in large quantities in the intestines, post mortem.

In those cases which die within twenty-four or forty-eight hours from the attack, the bacilli are not found in the walls of the intestine; but where the disease is more protracted they invade the glands and deeper tissues. During an epidemic they are found often in the stools of well persons, such being immune owing to their vigorous health and resisting power. Koch, failing to find the spirilla in any of the internal organs, concluded that the systematic infection was due to ptomaines or toxins generated from the spirilla, since dead cultures are always toxic.

The infection is usually introduced into the system through the medium of water, either directly by drinking, or from food which has been washed in infected water or has been diluted with the same. It does not enter by inhalation, since drying destroys their vitality. It may, however, be conveyed by meat or bread on which the germs live for from six to eight days. They may also be conveyed to the mouth by the hands of those who wash the linen of cholera patients.

The virulence of an epidemic, then, depends upon the degree of contamination of the water supply. The Hamburg epidemic of 1892 is a striking example of this fact. The water supply was taken unfiltered from the Elbe; the mortality in the epidemic that prevailed was forty-two and two-tenths per cent, while the filtered water supplied from the same stream to a neighboring city resulted in a very low death rate. The

safeguard of a city, then, lies largely in a pure water supply, and even this should be filtered.

Pathology.—The tissues after death are shrunken and drawn, and the extremities are inclined to be mottled; in some cases there is a post-mortem rise in temperature. Rigor mortis sets in very early. Spasmodic contractions sometimes occur for some moments after death; hence the eyes and jaws have been seen to move after life was extinct. Owing to this marked contraction, the limbs have been distorted and the partial fuming of the body is thus accounted for, and is not, as many have supposed, the result of being buried alive.

The tissues are dry, having been drained of their fluids before death; hence some time elapses before decomposition begins after death.

The chief visceral lesion is that of the intestinal canal. The mucous membrane is swollen, hyperemic, and softened. The solitary glands and Peyer's patches are congested and sometimes ulcerated. The peritoneum is either dry or covered with a viscid, sticky fluid. The intestine contains a more or less quantity of rice-water, fluid rich in the comma bacillus. The denuding of the peritoneum is now supposed to be due to post-mortem changes. The kidneys and liver show cloudy swelling, and occasionally degeneration; the spleen, however, is generally found to be reduced in size. The heart is flabby, dry, and anemic-looking, while the blood is very dark, but slightly coagulable and robbed of its salts and fluids.

Symptoms.—The disease may be divided into three stages: (1) A choleraic diarrhea; (2) Cold stage, or stage of asphyxia or collapse; (3) Stage of reaction. Dr. Scudder, having passed through the epidemic of 1866-67, graphically describes cholera in the following words:

“Incubation. — *Diarrheal Stage.* — The stage of incubation varies greatly in length, from but a few hours to days. It may be attended from the first with diarrhea, or it may precede this for some time. In the latter case, the patient will complain of a feeling of prostration, with relaxed skin, scanty urine, or urine of low specific gravity, a pallid tongue with a pasty white fur at its center; the pulse is invariably smaller, and increased in frequency; the appetite is poor, and the digestion imperfect, with occasionally a sensation of weight and uneasiness in the bowels. I have seen symptoms continue for from two to eight days before a choleraic diarrhea appeared, and I do not know that I have ever

witnessed these symptoms where cholera did not fully develop itself, unless appropriate treatment was adopted.

“During an epidemic of cholera, diarrheas are very prevalent; and though it must be admitted that any form of gastro-intestinal irritation or disease predisposes to an attack, yet these are not to be regarded as choleraic. To place the matter in a different light, any diarrhea may become choleraic, but only by those persons being influenced by the peculiar epidemic poison.

“It is of importance, then, that we be able to distinguish between an ordinary and a choleraic diarrhea; for the first will require but the ordinary treatment (though it should always be arrested), while the second requires rest in the recumbent position, and a very careful treatment by specific remedies. We need not mention the symptoms of the ordinary diarrhea; it will be sufficient to specify those peculiar to the diarrhea of cholera.

“With the first choleraic discharge, the patient will feel unnatural prostration that is characteristic. It is not fear, or a nervous sensation, but a real exhaustion and loss of strength. An examination of the pulse will show an enfeebled circulation; the pulse being markedly small, easily compressed, and increased in frequency. The tongue will present a pallid appearance, with a white or pasty-white coat in its center. These symptoms are, as I believe, pathognomonic, and may be relied upon, whatever may be the character of the discharges. And I have seen them well marked, when there was but the inclination to go to stool, and where death resulted from cholera asphyxia within twenty-four hours.

“The discharges at first were fecal, though usually thin; as they continue they gradually lose color (dirty water) until at last they present the characteristic rice-water appearance.

“The duration of this choleraic diarrhea varies in different cases; rarely of two or three days continuance, frequently not more than six to eight discharges in less than as many hours. It is observed that the prostration increases with each discharge, and the pulse is more affected; the amount discharged by the stool, as a general rule, determining the extent of the prostration, and the development of the second stage.

“Thirst is a marked feature of cholera, developing in the first stage, and

increasing as the disease progresses, until it becomes one of the most intolerable features of the disease. In the second stage, whatever the patient may take as a drink is immediately rejected.

“Cholera asphyxia is ushered in by increased frequency in the discharges, which have ceased to be feculent, and, in a majority of cases, are characteristic,—rice-water. Great prostration attends them, and the pulse becomes very small and feeble.

“As a general rule, nausea is developed with the choleraic diarrhea, and with the development of the second stage vomiting is frequent and persistent. The vomiting, as well as the diarrhea, persists until the stage of collapse, when it ceases of its own accord.

“The surface now presents a peculiar appearance; the first tissues are shrunken, and the skin covering the extremities is contracted and shriveled, and of a bluish, leaden color. The extremities are also cold, and as the disease progresses it extends upward to the trunk. There is a want of elasticity in the skin; when pinched up it does not readily assume its position. As the disease progresses, the loss of tonicity is indicated by a free but unnatural clammy perspiration, sometimes as sticky and of the consistence of glue water.

“A very marked feature of this stage of cholera is the spasmodic contraction of the muscles, known as cramps. These usually make their appearance in the second stage, and, increasing in severity as the disease progresses, continue to the period of collapse. Sometimes they do not cease until death is far advanced. They commence in the muscles of the legs and thighs, in which they are most severe. Sometimes they extend upward and involve the psoas and the muscles of the abdomen, and occasionally the muscles of the upper extremities and back. In one case I witnessed, these cramps assumed the form of true tetanic spasms, involving all the voluntary muscles.

“The last part of the second stage has been known as the stage of collapse. The pulse has now left the wrist. The extremities are cold to the trunk, and the skin presents the peculiar purplish. shriveled appearance heretofore named. The features are shrunken and pinched, the eyes set back in the head, the lips livid, the ears and nose itching", the forehead cold and clammy, respiration difficult and irregular, the cutaneous veins distended and dark, and the mind evidently clouded and not appreciating the condition. Even with such symptoms, life may

be prolonged for several hours, the patient finally dying from asphyxia.

“It will be noticed as characteristic of cholera, that no urine is passed in the second stage of the disease; indeed, none is secreted, and the bladder is usually found empty on post-mortem examination.

“*Stage of Reaction.*—The pulse comes back to the wrist, the surface becomes warm, the patient breathes with more ease, and is inclined to sleep. As we have noticed above, it may not go further than this. When it does, we will find the skin becoming dry and harsh; the pulse increased in frequency to 100° or even 120°; the mouth is dry, and the coating of the tongue assumes a shade of brown, with brownish sordes on the teeth. The urine is scanty and very highly colored, if passed at all. As a general rule, there is marked irritation of the nervous system, the patient being restless and irritable, and unable to sleep.

“These symptoms may give way in a few hours, secretion being established, and the patient convalescing without trouble. Or they may continue for several days, presenting the features of the nervous stage of a typhus fever. Or, increasing, the disease may run rapidly to a fatal termination.”

Complications.—*Cholera Typhoid.*—Following reaction, there may be relapse, the patient becoming delirious, the tongue dry and brown, sordes appear on the teeth and lips, and the patient passes into a comatose condition, which finally ends in death.

Kidneys.—Various kidney lesions have followed convalescence, and death from uremic poisoning is not an uncommon result of this complication.

Cholérine.—There are cases where the diarrhea is attended with severe griping pains, vomiting, liquid copious stools, in which there is some fecal matter, and finally a slight collapse, followed by reaction and return to health; this, in recent years, has been termed cholérine.

Diagnosis.—In the early stages, before the epidemic is fully established, there may be some confusion between this and cholera morbus, cholera nostras. Later the diagnosis is readily made, the symptoms being so marked as to be readily recognized. The rapid prostration, following the copious rice-water discharges, the vomiting and finally collapse, the patient becoming cold, blue, and almost

pulseless, can not readily be mistaken.

Prognosis.—Like all infectious diseases, epidemics vary in intensity in different seasons and in different places. However, cholera is always a grave disease, and our prognosis should therefore be guarded. The mortality is always great among the aged and young children, among the intemperate and those poorly nourished, and where treatment is not vigorous in the early stage of the disease. We may say that the mortality varies from twenty to eighty per cent.

Treatment.—*Prophylaxis.*—Since cholera thrives where filth abounds, strict hygienic measures should be adopted to prevent further spread of the disease. Cleanliness should be the message communicated to every ear. Cess-pools, vaults, drains, catch-basins, etc., should be thoroughly cleaned and as thoroughly disinfected.

A vigorous quarantine should be established, and the excreta from a cholera patient, as well as the clothing and room, should be thoroughly disinfected. Regular habits should be insisted upon; for intemperance, overwork, and all influences which tend to depress the nervous system, predispose to cholera. Overeating should be discouraged, though the ordinary diet need not be changed; fresh vegetables and fruits should be encouraged, but, above and beyond all, are cleanliness and a pure water supply.

Medical Treatment.—Never having passed through an epidemic of cholera, I submit the treatment as practiced by Eclectics as given in Dr. Scudder's last edition of his work on practice, and also add the treatment recommended by Cantani, of Naples. The latter treatment, as you will see, was anticipated by Dr. Scudder; but no opportunity offered for trial after his attention had been directed to this line of treatment. We may therefore lay some claim to this new method.

Dr. Scudder says: “The treatment for the forming stage of the disease, diarrhea not being developed, will vary in different cases. When the circulation is feeble, and the skin relaxed, I prefer aconite with ipecacuanha in the usual doses, alternated with tincture of nux vomica in the proportion of ten drops to four ounces of water, a teaspoonful every two or three hours.

“If the tongue is pallid, and coated with a pasty-white coat, the sulphite of sodium may be given in doses of ten grains every two hours, or, in

place of this, the bicarbonate of sodium, or common salt, may be used; but if the tongue is red, somewhat dusky, or there is a tinge of brown in the coating, the mineral acids will be preferable.

“A choleraic diarrhea requires to be promptly arrested. The patient should assume the recumbent position, and keep entirely quiet until the diarrhea is arrested, and the sense of prostration has passed away. This is imperative. The local application to the abdomen may be either a large sinapism or a cold pack, as the physician may prefer, or, in many, commence with the first, and then follow with the cold application.

“The remedies will vary in different cases, and with different practitioners. There is a very large list to select from, and we may employ the different classes of stimulants, astringents, narcotics, or special remedies.

“Among the first we have the essential oils, all of which have been employed, in the form of a compound tincture, in cholera. The compound tincture of cajeput is preferred by our school, and is probably as good as any combination that can be made. Whatever stimulant is selected, it is freely used, and continued until the diarrhea is arrested. In some cases it is combined with an astringent; in others, with a preparation of opium.

“Chloroform has been employed in this disease with advantage, in doses of from ten to forty drops. Chlorodyne has also been extensively used, and is probably as good a remedy as can be placed in the family. Camphor has been thought by some to be a specific; the tincture is given in doses of from ten to fifteen drops.

“The majority of the vegetable astringents have been employed to arrest the diarrhea of cholera. Some combine them with stimulants, others with narcotics; but the results have not been very flattering.

“Opium has been extensively employed for this purpose, and sometimes with excellent results. A pill of opium and camphor, half grain to one grain each, will probably be the best form of the remedy, and may be given as often as every hour. It has been recommended to add one grain of leptandrin to each dose, though I doubt the advantage of it. I have never used opium by mouth, in cholera, preferring its action by hypodermic injection of morphia.

“Of the many remedies I have employed for this diarrhea, nothing has given so much satisfaction as strychnia. I prescribe it in the following form:

Strychnia	.5 to 1 grain.
Sub-Nitrate of Bismuth	1 drachm. M.

Sig. Divide in fifteen powders, and give one every half-hour or hour, until the feeling of prostration is removed, and the diarrhea checked.

“When the stomach is very sensitive to medicine, or there is a tendency to nausea and vomiting, we will have to employ remedies by mouth with great care. Indeed, in these cases I would never run any risks of exciting vomiting, preferring that the diarrhea should continue until it could be arrested by other means. I have had excellent success in these cases by administering salt water in moderate quantities, and the use of opium with a stimulant as an enema. The form that I prefer for the last is—

Tincture of Opium	1/2 drachm.
Tincture of Xanthoxylum	1/2 ounce. M.

“In place of the salt water, when it is distasteful, especially when the mucous membranes were reddened, I here use the white liquid physic¹, in doses of a teaspoonful every fifteen to thirty minutes, until the patient is relieved. Afterwards, less frequently. The tincture of nuxvomica may also be employed in this case with advantage, using it in small doses, frequently repeated.

“In the treatment of *cholera asphyxia*, the first object is evidently the relief of gastric irritation; for so long as nausea and vomiting continue, no other remedies can be of any use, as they will be ejected. For this purpose I employ cold salt-water packs over the abdomen, though some use the large sinapism in preference. The patient should be kept in a recumbent position, and not be allowed to get up to stool, a bed-pan or cloths being employed. Dry heat should be applied to the extremities to as great an extent as possible, the patient being covered with blankets. In some of the milder cases, stimulants or aromatics may be used to arrest the nausea. Thus, as we have already seen, the compound tincture of cajeput will stop the vomiting in cholera morbus, and,

1	Sodium Sulphate	8 ounces
	Water	12 ounces
	Nitric and Muriatic Acids,	1 ounce each. M.

continued, will arrest the diarrhea. Some have depended upon the aromatic waters, but I do not think much of them.

“The remedies that I have employed to best advantage are the following: A teaspoonful of salt in a glass of water, and given in small quantities frequently, has served the best purpose. The white liquid physic has proven valuable in the class of cases heretofore named. The tincture of nux vomica, or a solution of strychnia, will also accomplish the object in many cases, and may be used alone or in combination with either of the other means.

“I do not attempt to give remedies for the arrest of the diarrhea so long as the vomiting continues, unless it is a stimulant which answers this purpose, or strychnia. I have found it better to use enemata for this purpose, the preparation of opium and xanthoxylum, heretofore named, being preferred.

“Soda in its various preparations stands first in the list of curative means, and we will generally employ common salt in preference to any other. Strychnia undoubtedly stands second in the list of remedies, being the most powerful stimulant and tonic we ever employ.

“Cramps of the muscles may be relieved by brisk rubbing, but this should always be done under cover. A local application of chloroform, or compound tincture of cajeput, to the affected part, will frequently give great relief. The simplest, as well as the most effectual plan, is to give the great toe a sudden twist with the hand.

“Let it be recollected that the patient must keep the recumbent position, must not get up to stool, and must be warmly covered in bed with the application of dry heat.

“Though the thirst is excessive, yet water can not be given with safety. Even after the vomiting is checked, we will find that but a small portion of fluid will cause it to recur. Small portions of salt water, frequently repeated, is the best means of supplying fluid to the blood.

“I feel confident that the loss of fluids might be replaced to some extent by subcutaneous injection, and for this purpose had prepared a four-ounce hypodermic syringe, had cholera reappeared in 1867. It was tried to some extent in 1866, with good results.. Absorption from the cellular tissue is very rapid, even in an advanced stage of cholera, and a weak

solution of salt water would be readily taken up. It might be used at several points, and as much as eight to twelve ounces introduced in the course of an hour.

“The stage of collapse will be treated by the administration of salt water in such quantities as can be borne by the stomach, by the assiduous use of dry heat, and such stimulants as may be deemed applicable, and by the hypodermic use of strychnia in large doses. Other than these three means, I know of none that is likely to prove of any use. Persons will, in rare cases, recover from this stage without medicine, as I have seen in two instances.

“Convalescence must be managed with great care. Quiet in bed is the only course of safety. The desire for drink must be supplied gradually and in small quantity, whilst the food should be of the most bland description, and taken sparingly. I have generally put the patient upon the use of aconite in small doses, with belladonna if there was any tendency to congestion. If the tongue becomes dry, and the mucous membranes be dusky red, as is frequently the case in the third stage, we give the dilute muriatic acid.

“Small doses of strychnia may be continued internally, or in its stead we may give the tincture of nux vomica. Quinine, when needed, is best used in the form of inunction, or applied in solution in brandy, with brisk friction.

“In some cases, small portions of brandy may be given with the drink, to keep up the strength and aid convalescence. We are governed here by the same rules that governed its administration in fever. If the pulse increases in volume, with a better circulation of blood, better secretion, and better innervation, let it be continued; but if the influence is the reverse, let it be stopped.”

Enteroclysis.—Professor Cantani, of Naples, used with great success, according to report, the following solution introduced high into the bowel:

Boiled Water	2 - 4 pints.
Tannin	1.5 - 2.5 drachms.
Laudanum	30-50 drops.
Powdered Gum Arabic	1 ounce.

This solution should be introduced through a Langdon rectal tube, introduced as high as possible, and at a temperature of 105°. These injections should be used with the first appearance of diarrhea. The bowel should be thoroughly irrigated several times in twenty-four hours.

Hypodermoclysis.—This is the introduction into the system of a saline solution to counteract the loss by the copious dejections, the solution:

Chloride of Sodium	2.5 ounces.
Sodium Carbonate	1.5 ounces.
Boiled Water	4 pints.

The region selected is the mammary or ileo-costal; a large canula furnished with a stopcock is attached to the hose of a fountain syringe, which is elevated sufficiently high for the force of gravity to force the fluid into the system. A fold of loose tissue is raised, and the needle introduced quite a distance, and the current turned on; in a few moments quite a large tumor is formed; with a turn of the stopcock the solution ceases flowing; gentle friction over the seat of the swelling will hasten absorption, when more can be introduced. A warm bath greatly facilitates the absorption of the solution. At the same time a hypodermic of strychnia should be given, and hot applications made to the feet and extremities, while brisk friction of the surface with dry mustard will favor the reaction. This part of the treatment is begun with the first symptom of asphyxia. From the response I have received in the cold stage of cholera morbus from the introduction of saline solution, I am satisfied that it will prove of benefit in cholera.

CEREBRO-SPINAL FEVER.

Synonyms.—Spotted Fever; Cerebro-Spinal Meningitis; Typhus Syncopalis; Malignant Purpuric Fever.

Definition.—An acute, infectious, although but slightly contagious disease, occurring sporadically, endemically, and epidemically, and characterized, anatomically, by hyperemia of the brain and spinal cord, and sometimes attended by a petechial eruption. Clinically, by excruciating pains in the head, back, and limbs, hyperesthesia often followed by anesthesia, contraction of the muscles of the nucha, and delirium of a varied character.

History.—Although it is possible that this disease prevailed before the present century, no authentic account was ever given till Vieusseux described an epidemic which occurred in Genoa, Italy, in the year 1805, and which he termed a malignant, although non-contagious, fever. In the first family attacked, two children died within twenty-four hours. In another, four died after an illness of less than a day; thirty-three dying during the epidemic, the victims living from twelve hours to five days.

The following year it crossed the Atlantic and appeared at Medfield, Massachusetts. From 1806 to 1816 the disease appeared in most of the New England States and in Canada. During this same period, 1805 to 1816, it visited France and Prussia.

From 1837 to 1849 France and Italy suffered more than any other countries, the armies bearing the brunt of the epidemic. The mortality was large. From 1854 to 1861 the Scandinavian peninsula was ravaged by the dread disease, more than forty-one hundred dying in Sweden during the seven years. From 1861 to 1868 Germany, Ireland, and the United States were the most afflicted.

While these are regarded as the four great epidemic periods, nearly every year since 1805 the disease has occurred at some point, the exception being from 1850 to 1854, when both hemispheres seemed spared. Since 1860 nearly every civilized country has been visited by this dread malady.

Although this disease was first regarded as occurring only epidemically—hence one of its names, epidemic cerebro-spinal meningitis—since 1860 it has assumed a new phase, becoming acclimatized, or, as Smith says, naturalized in the large cities, and from an epidemic disease it has gradually changed, becoming endemic in all our large cities. Such is true at least in New York, Philadelphia, Chicago, St. Louis, and Cincinnati. For several years, not a year has passed but cases have been reported in New York, Philadelphia, and Cincinnati. An examination of the reports, taken from the Health Department of our city, shows that during the past sixteen years there has not been a break, in its steady march, and, notwithstanding our boasted advance in medicine and sanitation, we begin the twentieth century with the deadly fever thoroughly intrenched and ever present.

Etiology.—As in many other diseases, the exciting cause has not yet

been determined, although the meningococcus intracellularis of Weichselbaum is believed to be a factor in the disease. The peculiar fact that this disease occurs in isolated sections where there has been no connection with other cases, is one of the strongest proofs, to my mind, that it is not microbic in its origin. We can not believe in the spontaneous generation of life, and hence we must look elsewhere for the cause. That there is a toxin which is intense in character, there can be no doubt; but we are inclined to believe that it is generated in the body in the metabolic changes which so rapidly take place on great exertion.

Exertion.—One of the most prominent predisposing causes is overexertion, either physical or mental, and where the tissue changes are rapid, and where there is a failure in the excretory organs to remove the poisons, it must affect the fluids of the body for harm. Soldiers after severe and prolonged marches are especially susceptible, and we are often told by the parents that great mental worry or work in school preceded the attack.

Age.—Children and young adults are more frequently attacked than those of maturer age, although none are exempt except the very aged.

Climate.—The disease prevails largely in the north temperate zone, and is unknown in the tropics.

Overcrowding and Filth.—Dirt, especially human dirt, is a rich soil for the generation of poisons of various kinds and intensity ; hence, in the poorer quarters, where but little attention is paid to cleanliness and ventilation, where filth accumulates and fairly reeks with the stench of its decomposition, we find the susceptibility very great.

Modes of Conveyance.—We do not understand the method by which the infectious material is carried from the sick to the well, as it is considered non-contagious, or, if contagious, to but a very slight extent, the best proof being that it very rarely attacks more than one member of a household. J. Louis Smith found single cases occurring in seventy families, dual cases in nine families, three cases in one family, and four cases in one other family; intercourse with the sick-room was not restricted in any of these cases, the children frequently assisting in the nursing.

Pathology.—In the cases which speedily prove fatal, there are but

little, if any, changes in the blood and tissues, the only marked or characteristic lesion being the hyperemia of the meninges of the brain and cord. Where the disease has continued for several days, however, we find the characteristic suppurative exudation. The character of this material depends upon the degree of the inflammation; at first it is seroplastic, but later it changes to a purulent fluid.

The sinuses of the dura mater contain blood clots. The ventricles are filled with a serous or sero-purulent fluid. The pia mater, says Dr. Netter, is the seat of the characteristic lesion. "The exudation upon its surface presents different aspects; sometimes it is a yellowish, false membrane, resembling a layer of butter spread over the surface of the brain." The exudation sometimes follows the course of the auditory and optic nerves, pus having been found in the internal ear and chamber of the eye.

The lesions of the cord are similar in character; first congestion, followed by suppurative changes already noted. The septic character is seen in the various viscera, and tissues generally. The white corpuscles are largely increased in numbers in the blood. Reider reports a case where there were twenty thousand, one hundred cells to the cubic millimeter. The lesion of the pleura, lungs and bronchi are such as would be found as complications in any malignant disease.

The liver, spleen, and kidneys are usually slightly engorged and somewhat softened. The muscular tissues may undergo granular degeneration. There occurs in quite a number of cases a petechial eruption; the purpuric spots may be quite profuse, or but one or two may be seen; these, however, are not constant.

Symptoms.—The symptoms of this fever have a wide range, although some are characteristic and constant.

Incubation.—The period of incubation is not determined; it may last for a few hours or for several days, although most frequently the invasion is sudden. Where we have a forming stage, the prodromal symptoms are similar to those of all fevers, but more intensified, the headache being more severe and vertigo almost constant, the patient staggering when he attempts to walk.

Invasion.—The invasion is usually sudden, the patient having but little warning. It is announced by a chill, accompanied by a pain in the head.

There is often nausea and vomiting, and in children a convulsion is not rare.

The excruciating pain in the head is characteristic and one of the constant features during the disease, and while it may be lulled by coma or delirium, it recurs with the first ray of returning consciousness. "My head, my head!" is the familiar cry. The pain in the back is almost as great, especially in the cervical and lumbal regions. There is also general hyperesthesia, and the patient cries if touched or moved. The patient generally lies passive or immobile on this account, the least motion adding to his sufferings. Occasionally, however, a patient is restless and tosses about. There is contraction of the muscles of the nucha, and the head is drawn back. There is great sensitiveness to light and sound.

The fever is usually asthenic in character, the temperature range being low, and the extremities cold. In exceptional cases the temperature may reach 104° or 105°, the pulse being very rapid, but weak; or slow and feeble; again wiry and rapid. The breathing is usually increased in frequency.

Delirium is one of the most constant symptoms, and but few patients pass through all stages without it; the character of it varies, however. In some it will be wild and intense, the patient requiring two or more assistants to keep him in bed; this may be followed by coma. Again the delirium may be passive and of a low muttering character. Coma may come on early, within twenty-four or forty-eight hours, when it is an unfavorable symptom. Where the disease is of long duration, the symptoms are legion, the typhoid being the most prominent. A case under my care lasting ten weeks, assumed a different phase every few days. A return to consciousness does not necessarily mean an improvement; for after one or more lucid days, he may again relapse into unconsciousness. In perhaps one-third of the cases a petechial eruption makes its appearance. At first it may be bright in color, but soon becomes of a dusky hue; it may be discrete or confluent. Vesicles upon the face—herpes facialis—is also quite common, although not constant.

The tongue, after a few days, becomes dry and shrunken, although it may be moist and dirty. After the first twenty-four or forty-eight hours the irritation of the stomach disappears, and the patient retains food and drink. There is usually constipation.

The special senses are greatly impaired, photophobia being often present, while loss of taste and hearing is quite common. The emaciation, where the disease runs a long course, is extreme.

One peculiar feature of this dread malady is, that, after having run a course of several weeks, all the symptoms give way, the force of the disease seems to have spent itself, the pulse and temperature become normal, the appetite is good, a sufficient amount of nourishment is taken, but the patient gradually fails, and finally dies of exhaustion, or, remaining in this weakened condition for days, the tide is finally turned in his favor and the patient slowly regains his health.

Paralysis may occur at any stage of the fever, although usually in the latter stage. This may be but temporary, as noticed in one of my cases, the paralysis, involving the entire right side, disappeared in a few weeks. I have met with one symptom which I have not seen described; viz., a cadaveric odor, like that sometimes noticed a few hours before dissolution, and, although unfavorable, it is not necessarily fatal.

Convalescence may be followed by impairment of the hearing. Although the brain bears the brunt of the attack, the mental faculties, on recovery, are usually unimpaired.

Complications.—Pleurisy, pericarditis, and pneumonia are the most dreaded complications, and lessen the hope of recovery. They are recognized by their characteristic symptoms.

Diagnosis.—The diagnosis is comparatively easy. The suddenness of the attack; the extreme pain in the head; the contraction of the muscles of the nucha; the tenderness on pressure along the cervical region causing the patient to flinch, even although unconscious; the great pain in the cervical and lumbar regions; the active delirium; the eruption, when present; the irregular fever,—make a group of symptoms which can not be mistaken for those of any other disease.

Prognosis.—This is one of the gravest of diseases, and the prognosis must always be guarded. The character of the epidemic, the condition of the patient when attacked, the nature of the complication, if any, would influence the prognosis. If seen early, the prognosis is favorable in many cases.

Treatment.—As in other infectious diseases, where possible, the patient should be isolated in a large, airy room, where good ventilation can be secured. The room should be darkened, and, as far as possible, everything which would tend to excitement avoided, and the patient kept perfectly quiet. The diet should consist of milk and broths, and be administered at regular intervals.

In the administration of remedies it is well to remember its twofold character,—the hyperemia of the brain and cord, and the intense sepsis. For the great irritation of the nerve centers, we will administer with our sedatives in full doses, gelsemium; if the pulse be small and quick,—

Aconite.—Where the pulse is small and frequent,—

Aconite	5 drops.
Gelsemium	10-30 drops.
Aqua Dest	4 ounces. M.
Sig. A teaspoonful every hour.	

If the pulse is full and strong and the delirium active,—
Veratrum.—Where the pulse is full and bounding,—

Veratrum	20 drops.
Gelsemium	1/2 drachm.
Aqua Dest	4 ounces. M.
Sig. A teaspoonful every hour.	

At the same time we would sponge the head with hot water, that being more soothing than the cold pack. The hot sponge bath may also be used along the spine with benefit. Dr. Webster speaks highly of jaborandi, which may be used in three or four-drop doses.

Jaborandi	1.5 drachms.
Aqua Dest	4 ounces. M.
Sig. A teaspoonful every hour.	

Rhus.—*Rhus tox.* is an agent which is of excellent use where the patient starts in his sleep, where the pulse is quick, sharp, and wiry. If, in addition to the irritation of the cerebro-spinal centers, there is nausea and vomiting, it is doubly indicated.

Belladonna.—If the patient is dull and drowsy, coma early making its

appearance, we would give,—

Belladonna	10 drops.
Water	4 ounces. M.

Sig. A teaspoonful every hour.

Sodium Sulphite.—Where the sepsis is shown by the broad, pallid, moist, dirty coating upon the tongue, sulphite of soda will be our remedy.

Chlorate of Potassium.—Where the odor is cadaveric, I have seen the tongue clear and the odor disappear within ten hours, on,—

Potassium Chlorate	1 drachm.
Phosphate of Hydrastine	10 grains.
Aqua Dest	4 ounces. M.

Sig. A teaspoonful every hour.

Echinacea.—This is one of our best remedies in this disease. It is called for with the first appearance of sepsis. It may be given alone or in combination with the sedative:

Echinacea	1 drachm.
Aqua Dest	4 ounces. M.

Sig. A teaspoonful every hour.

It may be given from the beginning to convalescence.

Hyoscyamus.—For the delirium, hyoscyamus is often useful; if of an active character, the remedy may be combined with stramonium, which makes it more effective. These remedies are similar in their effect, hyoscyamus being superior.

Passiflora.—From what we know of passiflora in quieting the nervous system in infants, especially where convulsions intervene, we would be inclined to try this agent. If given, it should be in quite large doses,—from a half to a teaspoonful of the tincture.

Convalescence.—Where the disease has run a long course, the vitality is very much reduced and the danger is from extreme exhaustion; hence the patient must be careful as to overexertion. The best tonic is good, nourishing food, which is easily digested.

VARIOLA.

Synonyms.—Small-pox; German, Blattern; French, La Petite Verole.

Definition.—A specific, infectious, and highly contagious febrile disease, which, after a definite period of incubation, lasting from seven to fourteen days, commences abruptly with chilly sensations, accompanied by headache, an intense pain in the back, especially in the sacral and lumbar regions, and characterized by a dermatitis, in which the eruption passes from papule to vesicle, and this in turn to pustule, finally desiccating, leaving small cicatrices, where the suppurative processes have extended to the deeper tissues of the skin.

With the appearance of the eruption, usually on the second or third day, there is a decline in the temperature, to be followed by a secondary fever during pustulation.

History.—The origin of small-pox is more or less a mystery, and three different countries are named as the original home of this loathsome and dreaded disease. Moore regards China as the original seat of the plague, and gives the earliest records as 1122 B. C. The disease is called Tien-hwa, meaning the "Heavenly Flower." It has been deified, and temples have been erected in honor of the goddess who bears the name of "Holy Mother of Small-pox." While there is great doubt as to the authenticity of these early records, it is well known that the disease has prevailed from a very remote period, inoculation having been practiced in China for more than a thousand years.

Hirsh regards India and Central Africa as the original habitats of the disease. The traditions of the Brahmin caste, from time immemorial, give India as the starting place. Here, as in China, temples are erected for the worship of a deity whose protection was invoked at the outbreak of an epidemic. The disease was unknown to the early Greeks and Romans, although some regarded the great plague of Athens, 430 to 425 B. C., as small-pox.

It appeared in Europe during the sixth century, devastating the shores of the Mediterranean. During the crusades it again invaded Europe. The fourteenth century found it in Ireland, and the following century in Germany.

Fifteen years after the discovery of America, small-pox visited the New World, and, in 1620, Mexico was the scene of one of the most dreadful epidemics in the history of this most loathsome plague. The United Colonies escaped until the seventeenth century, and Australia until the nineteenth century.

The mortality, previous to vaccination, was frightfully large, and when the disease entered a country for the first time it numbered its victims by the millions. Thus its first invasion of Mexico resulted in the death of three and a half millions of her people, while in Iceland one-fourth of her population succumbed at the first outbreak, and a quarter of a century later Greenland was almost depopulated.

This disease, which at one time was the scourge of the world, has largely been shorn of its terrors, thanks to Jenner, one of the greatest benefactors of his century, and also to the modern sanitary and hygienic measures adopted during every outbreak of any contagious disease. Ever since Jenner's discovery there have been, at various times, attempts to discredit its prophylactic power, owing either to its occasional failure or as the result of a death from vaccination or the transmission of other diseases.

That unpleasant and serious results have followed vaccination, none will deny; nevertheless, a prophylactic measure of such vast importance should not be discouraged because of faulty vaccine virus; rather should there be extra precautions that only pure, fresh virus be used. Could this be secured, and vaccination universally practiced, there can be but little doubt that Jenner's prophecy that small-pox would become extinct would be soon realized.

Etiology.—The contagion of small-pox is the most virulent of all the infectious diseases, and all persons who are unprotected by vaccination are almost certain to contract the disease when exposed, although there have been notable exceptions.

The true nature of the virus is unknown, and although certain microorganisms have been described which are found in the pock, there is no proof that they are responsible for producing the poison. All that is positively known is, that it is developed in the system and reproduced in the pustule.

The virus exists in the secretions, and excretions from the skin, kidneys,

and bowels. The crusts, or scabs, however, contain by far the most important factors in the dissemination of the poison, and the dust from this source impregnates the air, furniture, and clothing of the sick-room.

The virus possesses a tenacity exceeding that of all other contagious diseases, and may remain in a dormant stage for months or years, ready to break out afresh whenever the conditions are favorable for its propagation. Just how early the disease becomes contagious has not been definitely determined, although it is probably not until after the



FIGURE 8. CONFLUENT SMALLPOX: EARLY PUSTULAR STAGE—(Corlett)

eruption makes its appearance. The poison of a mild case of varioloid is sufficient to produce a malignant type of small-pox in the unprotected; hence the wisdom of universal protection by vaccination.

Age.—No age is exempt, although the mortality is greatest among young children. The fetus has been attacked, and cases have been recorded where the child came into the world with the rash already developed, and still others bore the scars as a proof of having undergone the disease in utero.

Sex.—Sex carries with it no predisposing power, save the more frequent exposure of the male.

Race.—The colored race seems more susceptible to the contagion than the white race, and especially is this true of the negro. The mortality is also greater, although this may be accounted for more on sanitary grounds than on that of race. The aborigines have always suffered greatly in an outbreak, and the history of epidemics among the

Indians of our own country reveals a mortality truly appalling.

Pathology.—The most marked pathological change occurs in the skin, due to the cellular infiltration during the inflammatory process. The eruption is the result of changes which take place in the rete mucosum, and consists of papilla, vesicle, pustule, and scab.

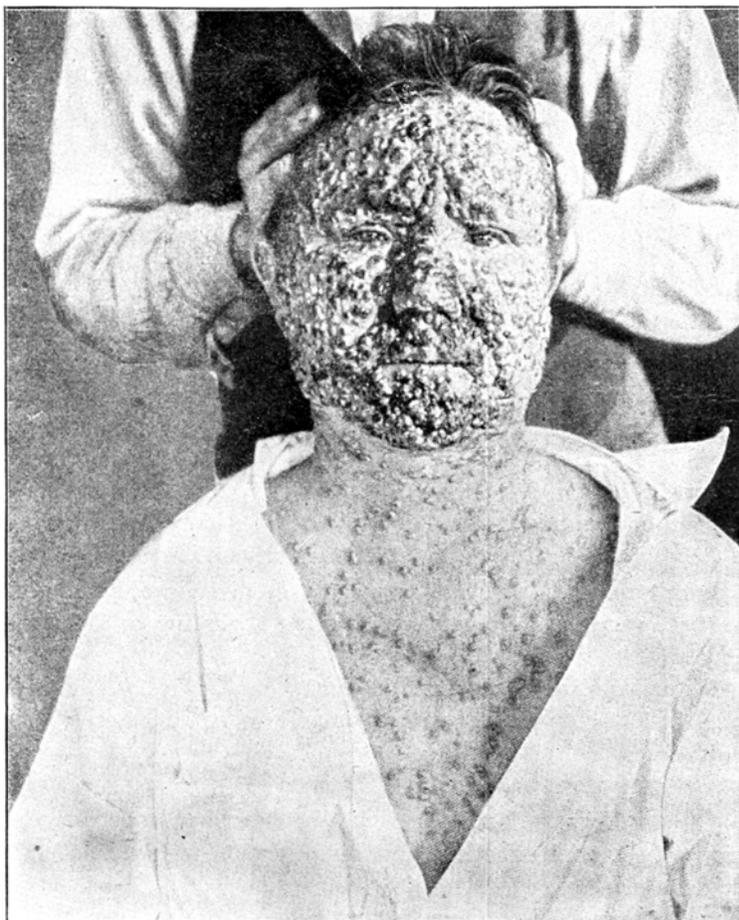


FIGURE 9. VARIOLA: CONFLUENT ON FACE, SEMICONFLUENT AND DISCRETE ON OTHER PARTS OF THE BODY. MUCOUS MEMBRANES OF MOUTH AND THROAT COVERED WITH WELL-FORMED PUSTULES—(Corlett.)

The hyperemia is first made apparent by small red spots which very soon assume the hard, shot-like characteristic papillæ, due to the increase of cells in the rete mucosum. As the inflammation progresses, molecular changes occur, the cells deliquescing, and a vesicle forming on the apex of the papilla. The vesicle consists of several small cups or pockets separated by fibrinous reticuli, and filled, at first, with a clear, whey-colored fluid composed of serum, leukocytes, and fibrin filaments.

while the circumference swells and becomes elevated ; hence the cup-shaped or umbilicated vesicle, characteristic of small-pox. The blood-vessels throughout the cutis are now dilated, and a stream of leukocytes engorges the vesicle, the contents change to a yellowish or purulent character, and the pustule is formed.

The fibrous reticuli being firm, the center of the vesicle becomes depressed,

The suppurative process softens and often breaks clown the fibrous septum, and the pustule becomes conical. If the suppurative process, extends to the cutis vera, cicatrization follows, and pitting necessarily results. The pustules may dry up, but usually rupture, exuding their

contents, which, drying, form the scabs or crusts. These consist of dried pus cells, and the detritus resulting from the previous destructive processes.

The mucous membrane of the nose, mouth, pharynx, esophagus, and rectum may be the seat of the eruption, and Peyer's glands may be swollen and infiltrated. Only when the mucous membrane is exposed to the external air, are fully developed pustules seen, while in the larynx bronchi and esophagus the tissue changes result in ulceration.

In the hemorrhagic form, extravasation takes place in the serous and mucous surfaces, while parenchymatous changes occur in the various viscera. Although there is no characteristic change in the lungs, hypostatic congestion and broncho-pneumonia are not uncommon.

Early we may have myocardial changes, and endocarditis and pericarditis have been associated with this disease. There may be diffuse hepatitis with swelling, although in the hemorrhagic form it is firm and hard. The spleen shows cloudy swelling, and there may be fatty degeneration. The kidneys may reveal a similar condition and nephritis may follow. The blood does not reveal any microscopic changes, although darkened in color.

Symptoms.—All writers agree as to the division of small-pox into three varieties, the symptoms varying according- to the form presented.

1. *Variola Vera; Discrete; Confluent.*

2. *Variola Hemorrhagica; Purpura Variolosa; Hemorrhagica Pustulosa.*

3. *Varioloid.*

Variola Vera.—The disease may be described consecutively under the stages, incubation, invasion, eruption, maturation, and desquamation.

Incubation.—This stage embraces a period of from ten to fifteen days, extending from the time of exposure to the infection to the ushering in of the disease by the chill. The average duration is twelve days, although it may be prolonged to three weeks.

Prodromal symptoms are generally wanting, the period of invasion coming on suddenly; but when they are present they consist of malaise,

and aching of the entire body. The tongue is furred, there is loss of appetite, more or less headache, with general soreness of the muscular tissues.

Invasion.—A chill, more or less pronounced, attended with nausea and sometimes vomiting, marks the stage of invasion in the adult, while a convulsion may be the symptom which first announces its presence in the child. The chill may consist of a hard rigor, or there may be chilly sensations alternated with flashes of heat, extending over a period of twenty-four hours. As reaction follows, the pain in the back, lumbar and sacral regions, becomes intense in character, while the face is flushed and the headache intolerable.

The temperature rises rapidly till it reaches 105° to 106°, or even higher, although in milder cases it will not go over 100° or 102°. The pulse is full and bounding, respiration short and hurried, while the bronchial cough, which so frequently accompanies the invasion, reveals the bronchial irritation. The tongue is coated with a moist, dirty, pasty coating, which is somewhat characteristic. The skin is often moist despite the high temperature. There may be soreness of the throat thus early in the disease, and auscultation reveals dry rales.

Examination of the left hypochondrium shows slight splenic enlargement. During this period there may be present an initial or accidental rash, erythematus in character, resembling scarlatina or measles, and making its appearance on the lower part of the abdomen and inner surface of the thighs and arms. If the physician is not on his guard, this may mislead him in his diagnosis.

The period of invasion lasts about three days, during which time the pain in head and back continues, the patient is very restless, and, in the severe form, delirium occurs.

Eruption.—By the third, or beginning of the fourth day, the eruption makes its appearance in the form of small red spots resembling flea-bites, first upon the forehead at the edge of the hair, then upon the face, neck, wrists, trunk, and lastly upon the extremities. The fever now begins to decline, and there is relief from the pain in the head and back. The small red spots soon become hard, and when the finger is passed over them it receives the sensation of feeling a shot beneath the skin. A burning sensation gives rise to a pruritis. These hard, shotty bodies are the papules, which by the sixth day show their apices to be filled with a

clear, whey-like fluid.

As the process of evolution continues, the vesicles replace the papules, and the center becomes depressed, giving them an umbilicated appearance. The vesicles are inclined to be grouped in threes and fives, although in the confluent form this peculiarity is not observed. As the eruption progresses, there is marked tumefaction at the base of the vesicle, and the parts become greatly swollen. The nose becomes distorted, the eyes are closed, and the patient is scarcely recognizable by his most intimate friends. The vesicle, after forty-eight hours, or on the eighth day of the eruption, changes its consistency, the contents become yellow, the center gives way, and the pustule is then fully developed.

Maturation.—The center now breaks down, and many of the pustules become conical in shape. The swelling that attends the development of the pustules in the nose and throat, renders both respiration and deglutition quite difficult, and the suffering of the patient is extreme. The pustules rupture, either spontaneously or as the result of injury—the itching being almost unbearable—and the contents exude as a gluey or syrupy substance. A disgusting, fetid odor now is emitted, and one is ready to class this as one of the most loathsome of all diseases.

During the maturation of the pustules, a secondary fever arises, and for forty-eight or seventy-two hours the temperature runs high, the pulse is rapid, the patient restless, and, in severe cases, delirium again appears, although usually the fever is much milder than in the early stage.

Desiccation.—Even before the eleventh day, many of the pustules break, and the sticky contents, drying, form the crusts or scabs, and the period of desiccation is begun. As this stage progresses, the swelling and pain subside, the redness disappears, the eyes open, the nostrils become clear, respiration is easy, and the patient experiences relief, after many days of suffering. The crusts soon separate and drop off, leaving a blue or purplish mottled appearance, and when the cutis vera has been invaded, a small pit or pock results. In the severer forms, the period of desiccation and separation extends over a period of several weeks, although it is usually complete by the twenty-first day.

Desquamation.—In addition to the separation of the crusts, there is often a branny desquamation, somewhat resembling that of scarlet fever, which continues for a week or ten days after the skin has become

free of crusts.

Discrete.—In the discrete form the eruption appears later, is not so profuse, and but few pustules, which are grouped, make their appearance. The fever does not run so high, the systemic disturbance is not so great, the secondary fever is mild and of short duration, and the period of desiccation is materially shortened.

Confluent.—This is just the opposite of the discrete. The eruption is seen earlier and is much more profuse, running together in the severe types. The fever is very active, and the systemic disturbance of a most serious nature. Maturation and desiccation are more prolonged, while the secondary fever is quite active. Suppuration is much greater, and the cutis vera is more often involved. Cicatrization and desquamation follow.

Hemorrhagic Small-pox.—This variety appears in two forms, *purpura variolosa*—the so-called black small-pox, in which the symptoms appear very early and death occurs in from forty-eight hours to six days before the pustules develop—and *variola hemorrhagica pustulosa*, in which the disease progresses as an ordinary small-pox till the development of the vesicle or pustule, when the hemorrhage takes place in these bodies. There may also be hemorrhage from the mucous membranes.

Purpura Variolosa.—The period of invasion is more intense in character than in the former varieties. By the second or third day a dingy hyperemic flush appears, and petechia is seen over a large portion of the body. “The skin may have a uniformly purplish hue, and the unfortunate victim may even look plum-colored.” (Osier.)

In the most severe forms, death may result before the eruption appears. As the disease progresses, hemorrhages may occur from the mucous surfaces. The face becomes swollen, and ecchymosis occurs in the conjunctiva, giving the patient a most terrible appearance. Moore, of Dublin, says: “A condition of acute hemophilia is in fact produced, so that the ill-fated sufferer bleeds from every pore and orifice of the body. There is chemosis, blood being effused into the connective tissue binding the conjunctiva to the eyeball, sometimes to the point of bursting, so that the patient may even weep tears of blood. Retinal hemorrhage may destroy the eyesight.”

There is epistaxis, terrible because uncontrollable. Blood oozes from the lips and gums. The patient spits or coughs up blood; he vomits blood; the motions from the bowels are tarry. Blood pours from the kidneys, and in the female from the genital organs. The tongue looks as if it were parboiled, and there is unquenchable thirst. Fortunately, one rarely sees such desperate cases as these.

Another peculiar phase of this form is the retention of the mental faculties. In most intense lesions, nature kindly dulls the mind, and coma or delirium veils the present. Here, however, the mind remains clear, and the unfortunate victim looks death in the face almost to the last hour.

Variolosa Pustulosa Hemorrhagica.—In this form the disease does not begin in such a tempestuous form, but progresses as a severe case of small-pox till the vesicle or pustule forms, when there is extravasation of blood into the vesicle. The earlier the hemorrhage, the greater the danger. Of these two forms Moore says: “They differ merely in degree; in both, the blood is profoundly altered and devitalized to such an extent that it is apparently rendered incapable of throwing out or developing the characteristic or pathognomonic rash of variola. . . . The blood is so devitalized and defibrinated as to establish an acute hemophilia, the patient becoming 'bleeders' from an infectious dissolution of the blood.”

Varioloid.—This is a mild form, which has been modified by vaccination. In some, this prophylactic measure is only partially protective, while in others, after a few years, it loses its protective value, and on exposure the individual contracts small-pox in a very much modified form. That it is genuine small-pox is proven by the contagion giving rise to the fully developed disease in a person who has not been vaccinated, and by affording perfect immunity from variola.

It differs from small-pox only in that the symptoms are milder and it runs a shorter course. The symptoms are those of a mild case of discrete small-pox. The eruption is scanty, in some cases only one or two pustules showing. There is but little fever, which subsides upon the appearance of the eruption. The period of maturation is generally but six or eight days, and the secondary fever, if any, is of short duration. The desiccation and removal of the crusts is also rapid, so that by the twelfth or fifteenth day the surface is well freed from them.

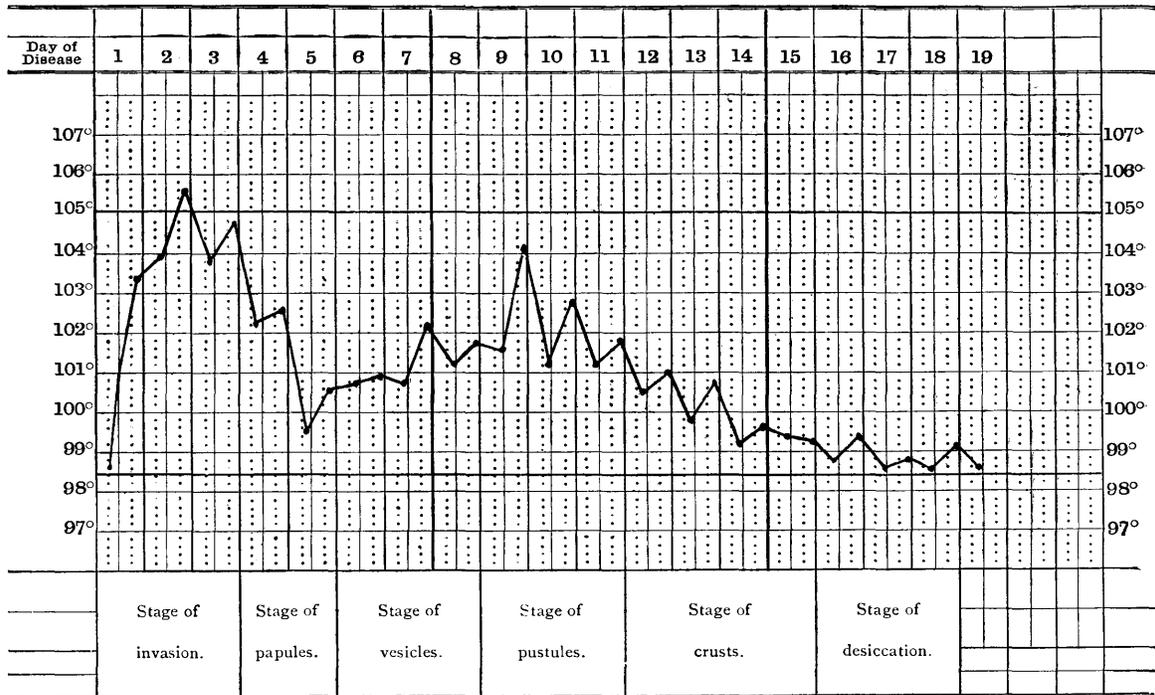


Chart of temperature curve of small-pox (Eichhorst.) (Lockwood.)

Complications.—The complications are generally inflammatory in character, the respiratory apparatus suffering most frequently.

Laryngitis, resulting in edema of the glottis, attended by dangerous symptoms of asphyxiation, is not uncommon.

Bronchitis.—This is one of the most frequent complications, and occurs early in the disease.

Pneumonia also frequently occurs, followed 'by an effusion into the pleural cavity.

Cardiac complications are more rare, although myocardial changes do sometimes take place. *Endocarditis* and *Pericarditis* are among the rare complications.

Nephritis occurs but seldom, although a temporary albuminuria is not uncommon. Boils and abscesses are among the common and painful sequences.

Catarrhal and Purulent Conjunctivitis may occur, although not so common as in former years, owing to the better care and more aseptic

measures that are used.

Baldness may result from the destruction of the hair follicles.

Otitis Media occasionally results, leaving the patient with a disgusting fetid discharge from the ear.

Diagnosis.—If an epidemic is prevailing, with a history of exposure, there is but little difficulty in a diagnosis; but in this age of rapid transit, where a patient may be exposed one day and be a thousand miles away in twenty-four hours, it is often impossible to obtain a history of exposure, and we are to be guided by the more positive symptoms which are characteristic of the disease.

For the first few days there may be danger of mistaking this for measles, scarlet fever, or chicken-pox. The sudden onset of the disease, the great pain in the head and back, the high fever, and dirty, pasty tongue, are at once suggestive of small-pox, while the absence of catarrhal symptoms and the marked papular and shotty feeling of the eruption, excludes measles.

In scarlet fever there is merely the exanthematous redness and the deep scarlet redness of the throat. It is distinguished from varicella by the mildness of the symptoms of the latter, the irregular vesicle, together with an early maturation, which makes the diagnosis easy.

The hemorrhagic form may be diagnosed with difficulty when the patient dies before the eruption appears, and one must be guided by the history and general symptoms. Where the epidemic is of a very mild character, like the one, that prevailed in Cincinnati in 1899-1900, where the patient had but little if any fever, and was not compelled to go to bed, the vesicles being small and insignificant, much doubt existed as to its true character, and, although it was denied by some, the Health Department regarded it as true small-pox and compelled its recognition.

Prognosis.—Although the mortality is far less than in former years, the prognosis will be determined by several conditions.

First, as to its form. The milder cases all recover; for example, in the epidemic of 1899 in this city, two hundred and fifty cases were reported and no deaths. In the confluent form, where there is early disorganization of the blood, or where there are serious complications,

the prognosis must be guarded. The hemorrhagic form is also grave, and a certain per cent of cases will prove fatal.

Age and race will also figure in the prognosis, the disease being more fatal in the young and in the colored races. Taken as a whole, however, the prognosis is favorable, especially if diagnosed early and if modern methods are employed.

Treatment.—As soon as the diagnosis is made, the patient should at once be isolated and placed, when possible, in a large, airy room. All unnecessary furniture, drapery, and carpets should be removed and the room kept thoroughly ventilated. The impregnated air must be removed and fresh air take its place. While cleanliness is of great importance in any disease, it is doubly so in this. The bed clothing must be daily changed as well as that worn by the patient, and warm water and soap must be freely used, especially during the period of maturation.

As a disinfectant, Platt's chlorides can be freely used. It may be sprinkled on the bed, on the carpet, and some placed in shallow vessels around the bed; and where the odor is especially disagreeable, the room may be sprayed with the solution.

Veratrum.—We begin the treatment by the use of the sedative. Just in proportion as we keep control over the fever will we modify the poison. When the pulse is full and bounding we add specific veratrum, twenty or thirty drops to a half a glass of water, and give a teaspoonful every one or two hours. If the patient is a child, or if the pulse be frequent but small, aconite takes the place of the veratrum, although we add only five drops of the latter to half a glass of water. These remedies have a controlling effect upon the circulation, and so modify the disease that the patient passes safely through the trying illness.

Macrotys.—For the backache and other distressing symptoms macrotys has earned a deserved reputation. To a half glass of water add specific macrotys from one-half to one drachm. Should the skin be dry and constricted, specific jaborandi, one drachm, to water, four ounces, should be given.

Specific Echinacea.—This is to be used for the sepsis, which is shown by the full broad tongue and purplish tissues.

Baptisia.—The indications for baptisia are similar. When there is a full

purple tongue and all the tissues look as if frozen, baptisia is the remedy.

Sodium Sulphite.—One of the most reliable of all agents is sulphite of sodium. The moist, dirty, pasty tongue calls for a saturated solution, a tablespoonful every one, two, or three hours.

Rhus Tox.—In children, where there is irritation of the nervous system as shown by the sharp cry and starting in the sleep, rhus tox. 5 drops, to water, 4 ounces, a teaspoonful every hour, is one of our best remedies. Also where the tongue is red at tip and edges, and the stroke of the pulse is sharp.

Gelsemium.—This is to be used where there is great irritation of the nervous system, and the flushed face, bright eyes, and contracted pupils suggest either convulsions or delirium.

Other agents may be called for, but these remedies will be needed most frequently, and if faithfully used will show a very low death rate.

The room should be darkened, care being taken that, in the darkening process, the free flow of air is not obstructed.

To prevent pitting, the face and hands should be kept softened by the free use of olive-oil, and a mask, made of oil silk, with openings for eyes, nostrils, and mouth, should be used. All parts of the body *must* be protected from the light.

The patient must be thoroughly impressed with the necessity of restraining from scratching, and thus tearing the pustules, causing ulceration and, necessarily, resulting in scarring. Children's hands should be encased in mittens and carefully guarded by the nurse. If properly cared for in this way, there will be little, if any, pitting, and one of the horrors of small-pox is thus removed.

Diet.—The diet should be of the simplest character. Milk in some form, either cow's milk or some of the artificial preparations, such as malted milk, lacta preparata, buttermilk, or koumiss, should be given. Where an acid is indicated, pepsin or sherry whey will prove useful. Broths and gruels may be given as soon as the fever subsides. During convalescence the patient is to be cautioned as to the danger of overeating.

VARIOLA VACCINIA.

Synonyms.—Cow-pox; Vaccination.

Definition.—An infectious, eruptive disease which appears upon the teats or udder of the cow in the form of small papules, which soon become vesicles, the virus of which, introduced into the human body by vaccination or otherwise, results in a systemic disturbance, the effect of which is to effect immunity, more or less permanent, against small-pox, the local lesion being followed by the well-known pit or scar.

The virus—vaccine—is obtained either directly from the calf, bovine lymph, or from a healthy person, preferably a child who has been recently vaccinated, human lymph.

History.—There is no more interesting chapter in medical literature than the discovery of vaccination by Jenner, and he is justly entitled to rank as one of the greatest benefactors of mankind. Although not the first to practice vaccination, he is justly entitled to all honor, for he conceived the idea of its great value, and pursued the subject until it passed from the realm of speculation to that of an assured fact.

As early as 1774 Jesty, a Dorsetshire farmer, who had had cow-pox, vaccinated his wife and two sons, then went to London and presented himself and family to the inoculation hospital and defied them to give him or his family small-pox; but the hospital physicians failed to appreciate the fact that a great discovery had literally been thrust upon them, and it remained for Jenner, after twenty years of study and observation, to prove to the world that the belief in cow-pox as a preventive to small-pox, was not a dream, but as certain in its effects and as easily proven, as a problem in Euclid.

While a student at Sudberry he early heard of the popular belief which prevailed in the dairy districts, that any one having had cow-pox could not take small-pox, and when one day he was consulted by a young-woman and the subject of her taking smallpox was mentioned, she said, "O, I can't take that disease, for I have had cow-pox," there took root in his fertile brain an idea that was to grow and develop until it should bring forth fruit that would gladden the hearts of mankind throughout the world.

Mentioning his views to the celebrated Dr. Hunter, he was told not only to think but to act, to prove his thoughts correct, and, with a patience and perseverance born of genius, he pursued his studies for over twenty years till they thoroughly satisfied him of the truth of his discovery. He published, in 1798, "An Inquiry into the Causes and Effects of Variola Vaccinia."

At last, after years of thought, the crucial test was made, and on the 14th of May, 1796, "he took matter from the vesicle of one Sarah Nelmes, who was suffering from cow-pox, and inoculated a boy by the name of James Phipps, aged eight years." The cow-pox ran its natural course, and when a little over six weeks had elapsed he was inoculated on July 1st with the virus taken from a small-pox pustule, and was rewarded by finding that, as he had predicted, the boy was proof against small-pox.

For two years cow-pox disappeared, and his labors were suspended before he could give further proof of its prophylactic power, at which time he published to the world the result of his investigations.

Was it hailed with acclamations of great joy and its author proclaimed a benefactor? Not so. His fate at first was like that of nearly all great benefactors; viz., persecution and obloquy. Even the profession rejected his views; but this could not long prevail, for proof was at hand, and in less than a year after his first announcement "several of the most distinguished physicians of London signed a declaration of their confidence in it."

From this time the spread of vaccination was marvelous. It was introduced into the United States in July, 1800, by Benjamin Waterhouse, Professor of Physics at Harvard, who vaccinated his seven children. In 1801 it was practiced in France. "In 1803 the court of Spain sent out an expedition for the purpose of carrying vaccination to all the Spanish possessions in the Old and New World." It returned in three years, having made a circuit of the globe.

All nations hailed the discovery with joy and gladness. "In Russia, the emperor gave the name of Vaccinoff to the first child vaccinated, and made its education a public charge;" while in Germany the day of Jenner's birth and the date of his first vaccination were made feast days. Foreign courts vied with each other in bestowing honors upon Jenner. He was voted honorary membership in many learned societies,

but what was more substantial was the appropriation by Parliament, in 1802, of fifty thousand dollars, and five years later one hundred thousand dollars more.

Nature of Vaccine.—The true nature of cow-pox is still unsettled. Some hold to the theory that it is small-pox modified by its passing through the cow, and numberless experiments have been made by inoculating cows with small-pox virus, the result being small-pox, and virus from the vesicles thus produced introduced into a child gave the same results as from original virus. Recent experiments by Celli, Babcock, and others, seemingly prove that genuine vaccinia may be produced by inoculating a heifer with variolous virus; on the other hand, French writers are equally positive that there is no relation existing between cow-pox and small-pox.

Browardel, in the “Twentieth Century Practice of Medicine,” says, “The question is to-day settled, and settled by experiment.” Chauveau, of Lyons, and some of his colleagues of the Lyons Medical Society, instituted some experiments which appear to us to leave absolutely no doubt as to the non-identity of variola and vaccinia. The experiments were as follows:

“In the first series, thirty beasts were selected without distinction of sex or age, and were inoculated with animal vaccine, cow-pox furnished by Lanoix, of Paris, and Pallasciano, of Naples. In all of them, without exception, a beautiful eruption was obtained. In all of these cases the eruption remained strictly localized.

“In a second series, about twenty animals were inoculated with humanized vaccine. The success was almost as complete as in the first series. These two series of experiments gave perfectly satisfactory, distinct, and unmistakable results, and proved clearly the identity of cow-pox and of vaccinia cultivated in the human species.

“Let us now see whether inoculations with true small-pox virus gave the same results. Seventeen young animals, heifers and bullocks, companions of the preceding, were inoculated with the virus of small-pox. The inoculations were made with the greatest care, but none of the animals acquired cow-pox. The inoculations were not absolutely without effect, for in every case there was a formation of very small reddish papules, which disappeared rapidly by a sort of absorption, without leaving any scab. We may conclude from this that vaccine virus and

that of small-pox do not give identical results.

“But what was the papular eruption determined by the inoculation of variola? Was there anything specific about it, or was it simply the result of inflammation caused by the puncture? Fifteen of these seventeen animals were also vaccinated, ten with the virus of genuine cow-pox, and five with humanized virus. Of these fifteen animals, only one showed a typical cow-pox eruption. Here was a new fact of capital importance, for it proved that the papules produced in the bovine species by variolous inoculation constituted a specific eruption, and that this eruption was related to cow-pox just as vaccinia and variola in man; that is to say, variola protects the bovine race from cow-pox just as vaccinia protects the human race from small-pox. Was this variolous eruption in the cow purely and simply smallpox? In order to determine this, a non-vaccinated child was inoculated with the serous fluid obtained from these variolous papules, and the result was a generalized, confluent small-pox. A second child was inoculated with virus taken from the primary pustule in the first child, and it had a discrete but perfectly characteristic small-pox, but it was the papular eruption of bovine variola. We may conclude, therefore, that small-pox may be transmitted by inoculation to the cow, but it was not transformed into vaccinia in this animal's organism; it remains variola, and requires the characteristics of variola when implanted again in the human species.”

This lengthy quotation, which shows the most recent views on this most important subject, makes clear to us that, despite the evident relation between variola in the human and the bovine races, these two affections are nevertheless perfectly distinct and independent, one of the other, in their essence and can not be transformed one into the other.

Vaccine Virus.—The virus consists either of the lymph taken from the vesicle, or of the scab or crust resulting from the desiccation of the pustule. Of the latter but little is used. There is an idea prevalent in the minds of the laity that disorders of various kinds, such as tuberculosis, syphilis, leprosy, and, in fact, bad blood in general, may be transmitted by means of vaccination, and, although this is possible, it has been greatly exaggerated.

Ever since Dr. Robert Cory, chief vaccinator to the National Vaccine Establishment, England, succeeded, after repeatedly vaccinating himself with virus taken from actively syphilitic children, in contracting

syphilis, all doubt that it can be transmitted has been removed; and if this is the case with syphilis, then it may be true for any other disease.



FIG. 10. VACCINE VESICLE, NINTH DAY, SHOWING PRONOUNCED AREOLA. (Welch and Schamberg.)



FIG. 11. TYPICAL VACCINE VESICLES, TENTH DAY. (Cutler.)



FIG. 12. VACCINE LESION IN A MOLLATTO, TENTH DAY, SHOWING IRREGULAR SHAPE. (Welch and Schamberg.)

For this reason, the profession has almost entirely abandoned the use of the human virus. A number of vaccine farms have been established in the United States, and the scrupulous care with which everything is conducted reduces the danger to the minimum. After removing the contents of the vesicle with great care, ivory points are dipped in the virus, and when dry are ready for use. These points soon lose their vitality, in from ten days to two weeks, and should be replaced by fresh points. Glycerin-ized vaccine is now largely used. This is usually served in capillary glass tubes sealed at each end. The ivory points protected by paraffin, if kept in a cool place, retain their prophylactic power longer than the unprotected.

Vaccination.—Although a very simple operation, there is often a failure in its successful performance. If good virus is used, the percentage of failures should be very small indeed. The exposed surface should be carefully abraded, care being taken not to produce hemorrhage, and at the same time sufficient abrasion to cause an exudation of lymph. The point selected is usually the insertion of the deltoid muscle, or, if a girl, it may be in the calf of the leg.

After wiping a space the size of a silver dollar with alcohol, to insure a perfectly aseptic surface, we take either a dull knife or the vaccine ivory point and make a series of scratches, crossing and recrossing each other till the lymph oozes through; then, having moistened the virus with sterilized water, it is carefully wiped upon the surface and gently rubbed until thoroughly incorporated with the lymph. After the lymph and virus have become perfectly dry, a piece of lintine secured by adhesive stripes or a light bandage completes the operation.

Formation of Vesicle.—From the third to the sixth day after vaccination, a small red spot appears at the seat of injury, which gradually increases in size, becomes swollen and indurated, forming the base of the vesicle. This is at first circular in form and filled with a transparent, limpid fluid. The vesicle is usually three or four days in reaching maturity, when it shows the circumference hard and elevated, the center being depressed, and has a pearly gray color. The vesicle is now surrounded by a hard, inflamed surface extending for a half inch to an inch and a half in circumference, and is hot, red, and painful, and frequently the axillary glands become large and tender; or if the vaccination is on the leg, the inguinal glands become involved. About the twelfth day of the vesicle, desiccation commences, and is completed from the fifteenth to the eighteenth day, the scab dropping off the twenty-first day. The scar left is circular in form, depressed, and made up of small pits or depressions in the skin. The rete mucosum is deprived of its coloring matter, and the scar ever remains white.

During the evolution of the vesicle there is some systemic disturbance, and in nervous children there may be quite an active fever for two or three days.

The duration of immunity can not be definitely stated; in some cases it may last a lifetime, while in others it lasts but a few years, when it is said to “run out.” To secure safety it is well to be revaccinated every eight or ten years, or earlier if an epidemic of small-pox makes its appearance.

Spurious Vaccination.—We occasionally meet with cases where the vesicle develops quite rapidly, is irregular in outline, and the pustule develops early, the vesicle is filled with pus and blood, is not depressed in the center, and it dips down into the cellular tissues, resulting in a true cellulitis. Deep ulcers form, and there is serious systemic disturbance. This, of course, is not protective, no immunity following.

The most common cause is the use of old virus. In children who are debilitated and sickly, especial care must be taken, not only that good virus is secured, but that the arm is perfectly aseptic and kept so during the entire evolution of the vesicle.

With the use of fresh bovine virus from a reputable firm, there is but a minimum of danger, and the patient is perfectly safe from contracting any of the horrible diseases at one time supposed to come from vaccination.

Value of Vaccination.—One has but to compare the history of small-pox before 1796 and that which has prevailed since its universal adoption, to be convinced that small-pox has largely lost its destructive power.

While vaccination is not invariably a preventive, nor always a permanent protection, yet in the very great majority of cases its protective property is of incalculable benefit. Isolation and improved sanitation can not account for the changed conditions, although due credit must be given them.

Modern small-pox has been shorn of its terrors through vaccination, most cases assuming the discrete form or appearing as varioloid, while the mortality has been reduced from thirty to forty per cent to six or eight per cent.

VARICELLA.

Synonym.—Chicken-pox.

Definition.—An acute, specific, and infectious disease, occurring during infancy and early childhood, and characterized by an eruption that rapidly passes through the stage of papule, vesicle, and pustule, and terminates by desiccation, the entire period of this evolution not occupying more than from three to five days. There may be successive crops of the eruption.

The disease is attended by slight fever, though sometimes the thermometer will be the only means of revealing it. If ulceration takes place, the true skin is invaded and a pit or scar results.

Etiology.—All efforts to isolate the micro-organisms or the contagium, whatever that may be, have failed. While there is no doubt that the infectious material is to be found largely in the vesicle, it is also generally recognized as being in the expired air. It occurs sporadically or as an epidemic, and is essentially a disease of childhood, though adults are not entirely exempt.

It was at one time believed to bear some relation to small-pox, a modified form; but experiments have proven the erroneousness of this view, for chicken-pox never protects against small-pox, nor *vice versa*. One attack protects the individual from a second, the same as the eruptive fevers in general.

Pathology.—The only definite pathological condition arises from the exanthem. Dr. Hyde thus describes it: "Manifestly, the exanthem is exudative in type, the serum in circumscribed areas lifting the superficial layer of the epidermis from the deeper parts of the derm. Unquestionably, septa occur in typically developed varicella chambers, similar to those seen in variola, a pathological fact which is the cornerstone of the doctrine relating to the unity of the disorders. The serum contained in these septa possesses an alkaline reaction. The formation of a cicatrix is evidently due to the intensity of the process in certain exceptional lesions, as a result of which the papillae of the corium are superficially destroyed. These sequelae are often due to the picking and scratching of the lesions."

Symptoms.—The period of incubation is usually longer in this than the other eruptive fevers, varying from ten to fifteen days, with an average of fourteen days. Prodromal symptoms are generally absent, though in exceptional cases there will be a chill followed by headache, restlessness, and fever. Convulsions are very rare. Usually the eruption is the first symptom to attract the mother's notice, and the one enabling the physician to make the diagnosis.

The eruption first appears upon the upper half of the body, upon the back, chest, and face, and especially over the scalp, then the body at large.

The eruption, at first somewhat resembling the rose rash of typhoid fever, appears as slightly elevated macules or papillae upon which the vesicles early make their appearance.

Within a few hours the vesicles become filled with a clear, colored fluid, the epidermal layer being very thin, giving the vesicle the appearance of a drop of water. The vesicles are round or oval, and vary in size from a pin-head to a small pea. Within twenty-four hours the contents become opaque, and soon turn yellow from the presence of pus cells, although they do not become purulent. They maturate rapidly, so that by the third day they are becoming brown, at which time they are flat or slightly depressed, with occasionally slight umbilication. There may be slight erythema at their base, or they may appear as set upon the surface, without any inflammation.

They vary as to number, from a scattered few to several hundred. In the case of my little niece, the vesicles through the hair were so numerous that one could scarcely place a finger upon the scalp without touching a vesicle, while the face and body were but little less affected, in fact resembled very much in appearance a case of confluent small-pox.

In well-marked cases, vesicles form upon the mucous surfaces, the inner surface of the lips, the roof of the mouth, and upon the soft palate.

The roof of the vesicle soon gives way, and they appear as small ulcers.

The stage of decline begins the third or fourth day, and as the contents become absorbed or ooze away, the vesicles become wrinkled or puckered, which are now brown in color, and begin to fall off by the fifth day; this continues for several days.

At first a purplish red spot marks the site of the vesicle, though the normal color is soon resumed. If the cutis vera has been invaded, a small circular white pit or scar follows, which is retained through life.

When the eruption is extensive, vesicles form upon the prepuce in the male and in the vagina in the female, which gives rise to painful and difficult urination.

Successive crops of vesicles appear, so that one can observe, on the same patient at one time, the eruption in all its stages, from the rudimentary macule to the desiccated pustule. The vesicles of the first crop are the most perfect, those following many times being aborted, the macule disappearing or the vesicle formed is small and imperfect.

There is usually but little systemic disturbance, though occasionally the little patient has quite an active fever and is quite sick for twenty-four or forty-eight hours. In rare cases the glands of the neck are swollen and painful.

Hutchinson describes a “varicella escharotica” in which gangrene occurs about the vesicles, and Andrew describes a hemorrhagic varicella in which there is bleeding from the mucous membrane.

Diagnosis.—As a rule the diagnosis is very easily made. The absence of prodromal symptoms, the appearance of the vesicles, which more clearly resembles a small, blister, the absence of the shotty papule and swollen base and red areola, and the early maturity of the vesicle, the successive crop of vesicles, whereby all stages of development are seen at one time, enable the physician to make a positive diagnosis.

Prognosis.—This is the most simple of the exanthematous fevers, and the prognosis is always favorable.

Treatment.—But little treatment is required. We direct a sponge-bath, and, if feverish, put the patient upon aconite and asclepias, or, if there is much itching or burning of the skin, use rhus tox.; especially is this indicated where the child is restless. Should the glands of the neck become swollen, phytolacca will be the better remedy, twenty drops to a half glass of water.

Should there be much itching, sponge with a weak solution of boracic acid, and see that the hands are bandaged or placed in mittens to prevent scratching; for if the vesicles of the face are torn, pitting will follow.

If the bowels are constipated, they should be moved with a mild cathartic.