

The average duration of a case of remittent fever may be stated as about fourteen days.

Complications.—These are usually dependent on *local inflammation*. The *brain* is perhaps the organ most frequently affected, with cerebritis or meningitis. In late autumn, or other cool weather, *pneumonia* is not uncommon. *Gastritis* and *enteritis*—diarrhœa and dysentery of an obstinate character sometimes occur. When any of these affections exist, they partake to some extent of the periodical character of the fever; and are often lessened or removed by the treatment adapted to it. In other cases, however, they remain in a subacute or chronic form; and, when death occurs, in a majority of instances the immediate cause is a violent phlegmasia of some organ. *Hepatitis* and *splenitis* are more common in the chronic form than in the acute—and as sequelæ rather than complications of the attack.

The Typhoid State.—At any time after the fourth or fifth day, but particularly near the end of the second week, a patient suffering with remittent fever may pass into the condition designated by the above term. Its features vary somewhat; but it is usually marked as follows: Pulse 120 to 140, and rather deficient in strength; skin harsh, varying, however, with the slight remissions in dryness and temperature; face dark or flushed; head hot; delirium, active more frequently than comatose; bowels occasionally affected with diarrhœa, but as often costive; tongue heavily coated with sordes, brown or black, and with cracks or fissures across it. Muscular debility is usually great. Hemorrhages from the bowels, lungs, or stomach occasionally increase the danger.

The chief causes of this condition are, 1. Neglect of treatment in the early stage. 2. The premature and improper use of stimulants. 3. The existence of cerebral inflammation. 4. In the opinion of some, a particular epidemic tendency to the typhoid condition, in all diseases, at certain times. 5. In the view of others, the concurrent existence of a true continued fever, making a sort of hybrid. This last is possible, at least.

Modes of Termination.—These are, either, 1. Recovery in a week or two directly from the febrile state; 2. Conversion into a distinctly *intermittent* fever; 3. Cessation of the fever with remaining organic inflammation or other disease; or, 4. Death during the progress of the fever.

The first of these occurs sometimes even when the onset has been violent, and the circulation much disturbed. How frequent its spontaneous occurrence *might* be, is difficult to determine under ordinary practice in miasmatic regions; where the first intermission is made use of to introduce antiperiodic remedies. But it appears that remittent fever may much oftener recover under palliative treatment alone, than intermittent.

The rule, however, with many historians of the disease is, to consider that favorable cases terminate in curable intermittent. This change is generally accompanied by a discharge from some excretory organ or surface, with propriety termed critical. Copious perspiration; free urination, with a *lateritious* or other thick de-

posit; the discharge of abundant, dark, offensive stools; one or all of these, may precede or accompany the commencing improvement of symptoms.

A local inflammation, as pneumonia, enteritis, cerebritis, or hepatitis, may survive the attack which kindled it, and proceed as if it had been an original malady.

Where death occurs within the first three weeks, it is almost always the result of some inflammatory complication. Remittent fever rarely proceeds to a fatal termination, *in this vicinity*, by mere exhaustion of the powers of nature. In feeble or aged persons, however, this may occur.

Sequelæ.—A slow and imperfect convalescence not unfrequently follows a violent attack; attended with sallowness of the skin, feeble digestion, muscular and nervous debility. The only organic alterations at all constant are enlargements of the liver and spleen.

Morbid Anatomy.—The most striking observation upon this was that made at the Pennsylvania Hospital by Dr. T. Stewardson, in 1841, of the unusual color of the liver; bronzed without and olive-green within. Subsequent confirmation of this has been afforded; although Dr. Drake, of Cincinnati, failed to find it in his autopsies. The spleen is almost always enlarged, congested, and softened. Inflammation of different organs (making fatal complications), especially of the brain, lungs, or bowels, may exhibit its usual results. Such lesions, however, are sometimes absent in the most malignant cases.

Causation.—This has been considered already, under the head of intermittent fever.

Diagnosis.—Yellow fever has by some physicians been regarded as identical with remittent, differing mainly in the grade of its violence. The correct view is, that they are specifically distinct diseases. To prove this, we might be satisfied with the simple facts of the different localization of the two fevers. Remittent is always a country fever; yellow fever almost invariably a disease of towns and the vicinity of the sea. The latter is restricted much more narrowly, also, in its actual geographical limits.

But there are symptomatic differences also; which may be best pointed out after giving a description of yellow fever. Among the important facts is, that one attack of the latter disease commonly gives immunity from it for life; but this is not at all the case with remittent fever.

When the typhoid state supervenes, there may exist very considerable similarity to the true typhoid fever. It is asserted that a coexistence of the two diseases occurs. Some hold the opinion that they are not specifically different; but that *typhoid fever* is merely a protracted remittent of low form. This is, however, contradicted clearly by at least two facts: 1. the comparative rarity of typhoid fever in regions where remittent most abounds; and 2. the frequent prevalence of the typhoid where remittent fever is almost unknown; as in some of the Northeastern States.

The mode of onset in the two, moreover, is usually quite different; in typhoid, insidious and almost imperceptible at first; in bilious fever, after a day or two of malaise, a chill abruptly ushers

in the attack. Vomiting is extremely common in the one, quite rare (in adults) in the other; the converse is true of diarrhoea—and still more particularly of tympanites and abdominal tenderness. The *deafness* and *sleeping stupor*, and *livid* countenance of typhoid fever, are almost entirely peculiar. Epistaxis, bronchitis, and the rose-colored eruption, so nearly constant in the latter, are rare in the typhoid remittent; the last mentioned is perhaps never observed. The yellowness of the skin, also, and the *distinct* remissions, mark well the remittent attack. In dissection, we find more *gastric* and *hepatic* change after bilious fever, and more *enteric* and *splenic* alteration in the typhoid.

Prognosis.—Recovery may be anticipated in a majority of instances. The writer is of the opinion that the typhoid prolongation of the attack ought scarcely ever to occur, under proper treatment from the beginning. Before the use of cinchona, remittent was quite often fatal. Alexander the Great, Emperor Charles V., James I., and Cromwell are said to have died of it.

Favorable signs are, the earlier occurrence and prolongation of the remission, and its becoming more and more complete; moistening and cleaning of the tongue; copious perspiration; turbidness of the urine, from increase in the amount of its solids; tar-like and offensive stools; and the appearance of vesicles about the lips.

Unfavorable, of course, are the shortening and postponement of the remission, and its indistinctness; dryness, and blackness of the tongue; retention, or still worse, suppression of urine; extreme frequency, with weakness, of the pulse; hiccough; and other important evidences of the victory of disease over the vital functions—not, however, peculiar to the fatal termination of this disease. The supervention of the usual symptoms of *inflammation of the brain* is always very alarming; *gastritis* may occasionally threaten to wear out the patient's strength; and *pneumonia* is attended with more danger when occurring as a complication of fever, than when an original disease.

Treatment.—In sections where it is very prevalent, this disease has been subjected to a variety of experimental practice—pushed, in some States, with a boldness and energy characteristic of border populations. At one time, the early use of large doses of tartar emetic to produce vomiting; at another, of calomel, administered by the half ounce or ounce; and, more recently, of quinine with corresponding extravagance—have been the methods used, until fairly proved to be needless or improper in violence.

The other extreme, however, of trusting all to nature, would meet with more signal disappointment in this than in most other affections. A decided treatment is imperatively required; what then are its best and most promising weapons? It would be interesting and instructive to collate and compare many authorities upon this point; but we will discuss the subject in reference, chiefly, to the experience of our own physicians. It will be proper to state the valuable testimony of Dr. Drake, to the mode of practice which the separate judgment and observation of medical men throughout the great Western Valley now converge upon. "Its fundamental principles," he states, "are—that autumnal fever is

the product of a specific cause, and, therefore, consists in a morbid action of a peculiar kind, requiring a specific remedy; that we possess such an antidote for the intermittent variety of the fever; and that we have only to abate all the causes and points of difference between the two varieties, to render the sulphate of quinine as efficacious in one as in the other."

No clearer or more correct expression need be demanded, I believe, for the safest and best plan of management of our own fall fevers. Yet many voices may demur at this assertion.

Some will quarrel with the *terms* of the above paragraph; objecting, and with some force, that we go beyond what is known in proclaiming the specific nature of the cause of these fevers—and still more in awarding the name of *antidote* to the sulphate of quinine or Peruvian bark. But this is a verbal question. We do know that malarial fevers are *quite peculiar*—in locality—in periodicity, and in other characters; and we do know that the salts of the alkaloids obtained from cinchona control and arrest them, as few, if any, other remedies can—and with a power which those salts do not exert over other fevers.

This power, however designated or explained, is now fully acknowledged; the danger is, in fact, of its causing us to lose sight of other important points.

In some tropical latitudes, especially, in which depletion is not comparatively well borne—and in districts *poisoned* with malignant miasm—it has been proved that quinine is often required in liberal doses—is borne in very large ones—and acts favorably even without any of the preparation of the system, once thought indispensable. These facts have been fully proved. But the remaining questions to be settled are—is not success greater in remitting fever, even in those regions, if some evacuant treatment at least *accompanies* the use of the great remedy?—and—is not a modified treatment, at least, in this respect, necessary in less malignant cases, and different climate? The weight of evidence favors the affirmative of both of these questions.¹

It remains, then, to state in a few words, what is the plan of treatment proper to be adopted. The physician is rarely called until the febrile condition has fairly set in. In a person of *robust* constitution, if the headache be very severe, skin hot, and pulse full as well as rapid, moderate venesection will be *safe* at least. But it is much more common now to administer *first* a saline cathartic, and decide on the grade and resistance of the fever by its effect. Epsom salts may be best when the stomach is little disturbed, effervescing solution of citrate of magnesium, or the Seidlitz powders in repeated doses, under contrary circumstances will answer. But many commence the treatment with a dose of calomel or blue pill with rhubarb, to be *followed* by a saline purge. If obstinate vomiting prevail, as will frequently happen, no purgative will suit so admirably as the effervescing solution of the citrate of magnesium.

¹ Drs. Hammond and Roosa have proved by experiment, aided by ophthalmoscopic and microscopic examination, that the use of quinine produces or promotes cerebral congestion. See Phila. Med. Times, June 27, 1874, p. 619.

The utility in many cases of *leeches* or *cups* to the nucha, and sometimes to the epigastrium, is undoubted. As a refrigerant diaphoretic, the citrate of potassium solution, with or without effervescence, may be given.

Special treatment may often be called for by the great intractability and distress of stomach. Lime-water or *magnesia* in small doses with ammonia and an aromatic will frequently relieve. Sinapisms and pediluvia are, of course, useful adjuvants. *Ice* will answer better to quench thirst than water, where gastric irritability is great; otherwise free dilution by drink is an advantage.

As soon as the violence of systemic excitement has been moderated—without waiting for its entire subjugation—if the pulse has begun to subside—lowering for instance from 110 or 120 to 90 or 100, and the headache is less intense—the bowels freely moved—we may begin with quinine; but it is unnecessary here to give large doses generally. Unless where some malignancy is suspected, or the remission is very complete, a single grain every two hours will be sufficient at first. Under this, we may find the pulse continue to subside, the skin to moisten, and all the symptoms to improve. At all events in the next remission the dose should be increased to a grain every hour—not, as a general rule, however, awaking the patient from sleep. Two grains every hour for eighteen hours is the freest administration I have ever seen to be necessary in a case even threatening malignancy. This term, it need hardly be said, is used to express the existence of a state of prostration attended with signs of visceral congestion, increasing dangerously with each paroxysm; reaction being deficient from an unusual intensity of the morbid cause, or from defect of constitution. Such cases do require a large amount of the special remedy; and such cases are no doubt much more frequent in warmer Southern States than here. We have no difficulty in believing in the toleration, or even the propriety, of considerably larger doses than are here given; but there is a limit even there, to go beyond which is excess. Many Southern practitioners of large experience insist that, as a rule, no preparation for quinine is necessary in remittent fever; and some give larger doses of quinine in remittent than in intermittent. Perhaps we should allow somewhat in the estimate, in some remote places, for the immense adulteration of valuable drugs which prevails.

After two or three days of constant “quininization,” the amount usually may be diminished to six or eight grains distributed through the day. In rather smaller quantities it should be continued even through the period of convalescence.

The treatment of inflammatory or other complications must of course superadd modifications appropriate to each. We have named in the above sketch all the main elements of the plan which is found successful in such cases as ordinarily occur.

The existence of local inflammations in a genuine malarial case does not contraindicate the use of quinine. Being lit up by the fever-poison, and aggravated by its febrile state, the treatment which annuls or removes these will often lower or check the phlegmasia. But this maxim should be applied with caution and some

exceptions, in cases particularly of cerebral inflammation or great pulmonic oppression.

In slow convalescence, with sallowness and deranged digestion, the daily administration for a few days of minute doses of blue mass may prove useful. And to improve sanguification, as well as lessen the danger of relapse in some form, the *protocarbonate of iron*, in pill with a portion of sulphate of quinine, will make a very valuable termination of the treatment. Arsenic also may sometimes be required in prolonged cases.

PERNICIOUS FEVER.

Synonyms.—*Congestive Fever; Malignant Intermittent; Malignant Remittent.*

Symptoms and Course.—Unlike ordinary intermittent, a paroxysm of the pernicious form may commence either in the day or at night. At first, however, in many cases it begins like the common type of chills and fever, or remittent fever; after one, two, or three days becoming more alarming.

Then the skin grows lividly pale, shrunken, and sometimes clammy with cold sweat; the countenance anxious; the tongue either pale, furred, or natural; in the worst cases it is cold. Thirst is intense, with a sense of internal heat. The stomach is excessively irritable, and vomiting very common, of mucus or a muco-serous or even bloody fluid. The bowels are in most cases loose, the dejections resembling bloody water. The pulse is usually small, weak, and rapid or irregular; in a few instances corded. The respiration is interrupted and sighing, with a sense of oppression.

Restlessness is usual; but the mental faculties in many cases are clear. There are, however, many others in which the weight of the attack falls on the brain. Then the early symptoms are drowsiness and hesitation of speech. Stupor marks the depth of the paroxysm. The breathing may be stertorous, or tetanic spasms may occur. The pulse in the former case may be slower than in the other form described; but it is still weak, and, even if the head be somewhat warm, the vessels of the neck and temples are not apt to be swollen, and the skin of the body is cold.

Partial, or, it may be, complete reaction in most instances follows after three or four hours of the above symptoms, though death may instead take place in the collapse. Again the fever may intermit or remit, and at the same or an earlier hour the next day another paroxysm occurs. This is more dangerous than the first. If a third be allowed to take place, it is generally fatal.

Morbid Anatomy.—*Congestion* of the brain, liver, spleen, and alimentary mucous membranes is so prominent an autopsic phenomenon as, with the symptomatic appearances of the same, to have seemed to justify the older and more common name of the disease. We have good reason to believe, however, that the toxæmic impression of malaria, and its effects upon the nerve-centres (either of organic or of animal life), are primary, and the congestion secondary.

Diagnosis.—The *intensity* of the symptoms, and the general prostration or coma, will distinguish this from ordinary intermittent or remittent. The condition of a severe case is not unlike an attack of epidemic cholera; but the discharges are different, and the locality and season, unless in the presence of that epidemic, will point directly to malarial causation.

As pernicious fever is rare in the latitude of Philadelphia (much more common further south, especially near the rice plantations of the Southern States), I have seen but two or three cases of it. One of them gave me difficulty in diagnosing it from apoplectic coma, as it occurred in a lady over sixty years of age. The distinctness of the cold stage at the beginning of the attack, and my knowledge of the patient's history, and the possibility of exposure to malaria, led me to prescribe quinine with some freedom; and the result established the nature of the case, as entire recovery followed.

Prognosis.—Without appropriate treatment a large majority of cases would be fatal. There are few diseases displaying a greater tendency to death. Under cinchonism and other proper management not more than one in eight, probably, die.

Treatment.—As above implied, quinine is our great reliance in this disease. Larger doses are required than in ordinary intermittent. While opinions differ, the best evidence I can obtain convinces me that from thirty to sixty grains of quinine in twenty-four hours will do all that the remedy can do; more will be wasteful and dangerous.

But in *most* cases other means must be employed, sometimes before quinine can be kept upon the stomach to promote reaction. External stimulation is foremost among these means. Direct heat may be applied by hot-water bottles or tins, hot bricks, or bags of hot salt or sand laid along the spine, or by the *hot bath*. Thirst should at the same time be quenched by cold water, or, if the sense of heat be great and vomiting occur, with ice. Mustard plasters may be placed upon the spine, epigastrium, or limbs; or the extremities may be rubbed with brandy and red pepper.

The opposite of this plan is preferred by some upon asserted favorable experience, viz., the pouring or dashing of cold water quickly upon the naked body. Extensive dry cupping along the spine is recommended by others. From what I have seen of the good effects of dry cupping along the spine in the collapse of cholera, I should have some confidence in it for this analogous condition.

Internal stimulation is demanded under the same circumstances. Most used have been camphor, opium, ether, oil of turpentine, ammonia, and capsicum [F. 163], besides wine and brandy or whisky. The best testimony is in favor of camphor and opium, with quinine [F. 164], in moderate doses, every half hour during the chill, when no comatose symptoms are present. If these exist, oil of turpentine, by the mouth or rectum, has its decided advocates.

Calomel has been largely used in the same cases. My experience in pernicious fever has not afforded me data for an opinion about it; but I respect the evidence of those who think they have

seen it to be beneficial. I should give it in the dose of a grain, every three hours at least, for a day or two.

Alcoholic stimulants seem to be indicated in the collapse. A tablespoonful of brandy or whisky every half hour or hour until *reaction* occurs would be suitable in very feeble cases. Yet the abstraction of blood was formerly a not uncommon remedy in the same condition, and was certainly sometimes followed by recovery.

After reaction has been established, even imperfectly, and an intermission or remission exists, the "sheet anchor" is quinine. Then, if the stomach bear it, five to ten grains may be given every two or three hours, until cinchonism is fully established. When the quinine is rejected by the stomach, hypodermic injection may be resorted to. Ten grains or more may be introduced at once in solution in water, with sulphuric acid enough to dissolve it perfectly.

In the *cerebral* cases calomel is particularly appropriate. A blister to the nucha may be recommended in the same case. Purgatives also are apt to be required; and, if the heat of the head be great, iced water may be kept applied over it, while hot bottles or sinapisms are put in contact with the legs or feet.

When the critical period in pernicious fever has passed, it will need treatment like an ordinary case of intermittent or remittent, according to the type which it assumes. A modification of this affection, sometimes called "winter fever" in the South, has been already considered under the head of *typhoid pneumonia*.

PROPHYLAXIS OF MALARIAL FEVER.

When avoidance of malarial localities is impossible, during the season of fevers (from July until frost in some parts of the United States, from the first of August at least in this vicinity), exposure should be especially guarded against at night, and just before and after sunrise and sunset. Residents in such places should have a fire burning to dry the house whenever the weather is damp, whatever the season. Going into a marshy place with an empty stomach is very exposing. Long ago, it was believed by many that the growth of the sunflower (*helianthus annuus*) is preventive of malaria. Lately this opinion has been revived in the Netherlands. Dr. Salisbury, upon his theory of the *palmellar* (minute vegetative) origin of marsh-miasm, advises covering the swampy ground with lime. Sometimes it would be cheaper to drain it.

Quinine may be used as a prophylactic. Livingstone and Du Chaillu have tried it in Africa; the former too sparingly to succeed perfectly, the latter with better results. In the United States army during the late war it was found useful. Six grains daily is the least amount to be relied upon.

TYPHO-MALARIAL FEVER.

Trusting that this, having had its origin in the circumstances of the late war, may be now altogether a matter of past history, it yet requires a place among recognized diseases. It was the result of a threefold causation; the elements of which were *malarial influence*, *crowd-poison*, and *scorbutic taint*. According to the pre-

dominance of one or the other of these, its character in different cases was determined. During service in a United States General Hospital in the summer and fall of 1862, as well as in the Episcopal Hospital, I saw many cases of this, called from its local origination the Chickahominy fever.¹ Of the form in which the malarial element predominated, the somewhat abrupt commencement, gastric disturbance, and icteroid skin and tongue, with remissions, tolerably distinct, were predominant features. The lenticular spots of typhoid fever, and the sudamina and tympanites were often wanting together.

A slower onset, less distinct remissions, more cerebral disturbance and diarrhoea, with epistaxis and bronchitis sometimes, but with both less constantly than in civil life, marked the predominance of the typhoid pathogenetic element. Deafness, under my observation, was less frequent than in civil life, but was sometimes very well marked. The aspect of the countenance, and the character of the somnolence and delirium, were precisely the same as in ordinary typhoid fever.

The scorbutic complication was recognizable, in the third group of cases, by the peculiar mental and bodily prostration which preceded and followed the disease—the remarkable irritability of the heart, the state of the gums, tendency to hemorrhage, discolorations and petechiæ, pallid, large, and smooth tongue, and extremely protracted convalescence.

Morbid Anatomy.—Most important was the intestinal lesion, similar to that of typhoid or “enteric” fever, though not identical. The following account of this is from Dr. Woodward.²

“In the earlier stages there is little to distinguish the intestinal lesion from the corresponding process of ordinary enteric fever, except perhaps the great tendency to the deposit of black pigment in the enlarged follicles. In the latter stages, certain peculiarities are often distinctive enough to enable the anatomist to recognize typho-malarial fever by the post-mortem appearances alone. The tumefaction in typho-malarial fever rises very gradually from the surrounding mucous membrane, and attains a moderate degree of thickness (three to six lines) on the edges of the ulcer. In this it differs materially from the ordinary typhoid ulcer, in which the enlarged patch rises abruptly from the mucous membrane in such a way that the summit is often larger than the constricted base, giving rise to the comparison made by Rokitansky, who likens the shape of the tumefaction to that of flat sessile fungi. The umbilicated depression, so frequent in the ordinary typhoid patches prior to ulceration, has never been observed in typho-malarial fever. The ulcer itself presents ragged, irregular edges, which are often extensively undermined in consequence of the erosion extending more widely in the submucous connective tissue than in the glandular tissue of the mucous membrane. This characteristic undermining of the edges is much more extensive in these than in ordinary typhous ulcers.”

¹ A full account of all varieties of typho-malarial fever is given by Dr. J. J. Woodward's “Camp Diseases of the United States Army.”

² Op. citat., pp. 102-3.

Pathology.—Doubting not at all the presence of the malarial element, the question occurs, was the modifying “febrile” cause of the typhous or of the typhoid character? Granting, that is, that these are pathogenetically distinct, we should expect that the typhous or “crowd-poison” element must result from the circumstances, as from those which have made typhus or “camp fever” the scourge of armies in Europe. Only, against this, we have the local lesion, of the glands of Peyer and mucous membrane of the bowels, recalling enteric or typhoid fever.

But—as, where typho-malarial fever occurred, causes of intestinal irritation (bad water, deficient food, etc.) were present—I am not satisfied that such an appearance (not, as we have seen, identical with that of typhoid fever) should exclude the idea of the zymotic action being that of the typhous cause. In that opinion, as a probability, not, of course, now demonstrable, I rest.

Treatment.—From the above view of the hybrid and threefold nature of the disease, came its rational treatment. More quinine than in typhus, more alcohol than in remittent, more fresh vegetable food and fruit than in either. Experience justified this plan. In our hospitals in Philadelphia, few died from fever who were not moribund on their arrival from the seat of war.

YELLOW FEVER.

Only certain localities have ever been subject to this disease; and of those, most have had it but occasionally. In Philadelphia, it first appeared in 1699; then in 1741, 1747, 1762, 1793, 1819, 1820, 1853, 1854, and 1855; the last visitations being to a very moderate extent. The worst epidemic in New Orleans, where it has been frequent (almost annual), was in 1853. Sanitary measures, under General Butler's military rule, in 1862, appeared to avert it, in that city, amid circumstances which might have been expected to promote it. A very severe visitation of yellow fever occurred at Norfolk and Portsmouth, Virginia, in 1855. A still more destructive one devastated Memphis, Tenn., and Shreveport, La., in the summer of 1873.

All the places which it has ever visited are upon the borders of the Atlantic Ocean, or its tributary waters, the Gulf of Mexico, and the Mediterranean Sea. Although with like climatic conditions, it is common in the West Indies and West Africa, but unknown in the East Indies, the eastern shores of Africa, and the Pacific coast of America.

Symptoms and Course.—With an abrupt beginning, or an indistinct cold stage, with pains in the back or limbs, commencing often in the night, a febrile stage occurs, of long average duration; sometimes three days without remission. Violent cases have it shorter; sometimes lasting only a few hours.

The skin, at this period, is hot and dry. Thirst is extreme; the tongue is generally furred. Nausea and vomiting are common on the second day, with great epigastric tenderness. The bowels are costive; if discharges occur they are very offensive.

A flush of the forehead, with a fiery look of the eyes, is charac-

teristic. Delirium is frequently present. Violent headache is nearly universal.

The stage which follows this pyrexia is a sort of remission or intermission. All the symptoms abate except the epigastric tenderness. The flush of the face and other portions of the skin is succeeded by yellowness, which grows deeper as the disease advances. The pulse becomes slower, heat abates, respiration becomes natural in frequency, the patient sits up and feels better. This state of things lasts for a variable time, averaging about twelve hours.

Sometimes convalescence now takes place. Much more often a third stage succeeds, of prostration or collapse. Muscular debility becomes great; the pulse is rapid, irregular, and compressible; the capillary circulation sluggish; the skin deep yellow or bronzed; the tongue brown; the stomach excessively irritable. It is at this time that the *black vomit* occurs, which is pathognomonic of this fever. Hemorrhages may also occur from the mouth, throat, or bowels. The mind grows apathetic, or low muttering delirium exists. In bad cases, which are many, hicough, clammy sweats, convulsions, and involuntary discharges precede dissolution. Death most frequently occurs on the fourth, fifth, or sixth day.

When reaction from the collapse takes place, there follows a secondary fever, of very variable duration, and which may terminate in a tedious convalescence, an almost equally prolonged typhoid condition, or death by exhaustion.

Black Vomit.—This has been found, upon chemical and microscopic examination, to consist essentially of blood, altered by action of the fluids of the stomach. It is usually acid to test-paper.

The *urine*, in yellow fever, is scanty and high-colored at the beginning, and especially deficient in amount from the third to the fifth day. About the fourth day, it becomes cloudy and deposits a sediment. Granular tube-casts from the kidneys may be discovered in it on the fifth day. Blood and bile may also appear in it; as well as large amounts of creatin or creatinin. Urea is apt to be below the normal quantity.

Morbid Anatomy.—Congestion of the brain is not uncommon; inflammation of the stomach is usual. The liver is most frequently dry, pale yellow, and anæmic; but occasionally it is engorged. Fatty accumulation in the liver has been repeatedly observed; and exudation into its substance is asserted. The spleen is little altered; the kidneys are always congested.

Diagnosis.—The only doubt likely to be entertained is as to its identity (or rather that of an example of it) with bilious remittent fever. As already remarked, the latter is a disease of the country, in any warm quarter of the globe. Yellow fever is restricted geographically, and is but seldom met with except in towns and near the sea. The order of stages in the two diseases is different; remittent never has a pyrexia lasting over twenty-four hours without mitigation. There is more epigastric tenderness in yellow fever. The jaundiced hue of the skin is more com-

monly met with, and more decided, in that disease. Albuminuria and hemorrhages are usual in yellow fever; not so in remittent. The black vomit, when it occurs, is decisive. Possibly, even probably, in a few localities, the combined causation of the two fevers may produce hybridity between them. Immunity for a lifetime after one attack is common with yellow fever; not at all with remittent.

Prognosis.—This is a very dangerous disease; the deaths from it averaging about one for three cases. A long and moderate febrile paroxysm, without excessive irritation of the stomach, is favorable. So is the occurrence of secondary fever instead of collapse, after the remission. Black vomit is almost always a fatal sign. Some instances of the disease are called *walking* cases, because their early symptoms are slight, only the countenance and pulse betraying the danger, until near the end.

Pathology and Causation.—There seems no room for doubt that yellow fever is a zymotic disease, whose cause is generated by certain local conditions. That cause must be itself material; and, *probably*, being slow and limited in transportation, it is a microscopic vegetation.

The local conditions observed are, 1. Continued high heat; about 80° for one or two months. 2. Excess of moisture in the air; a high dew-point.¹ 3. Vicinity to the sea, or to a large river emptying into the sea. 4. Organic, especially vegetable, matter in a state of decomposition. This is furnished not only by the offal, etc., of cities, but by decaying wharves and causeways (as at Norfolk, Va.), and by newly upturned earth. Mobile was almost relieved of danger from yellow fever by paving the streets of the city with oyster shells.

But it is very remarkable, as already stated, that certain quarters, only, of the globe ever have this disease, though presenting all the above conditions. It *never* visits the Pacific coasts either of America² or Asia. Canton, Calcutta, Bombay, Alexandria, Constantinople, and Athens, have never seen it. Nor have any of the interior cities of either continent. It visits *often* the western coast of Africa, the tropical islands of the Atlantic, the north coast of South America, Vera Cruz, the West India islands, New Orleans, Savannah, Charleston; *occasionally*, Rio Janeiro, Buenos Ayres,³ Bermuda, Natchez, Mobile, and other United States ports and cities, as far north as Boston and Providence; also, Gibraltar, Marseilles, and other places on the Mediterranean, as far as Sicily. It was very destructive in 1870, at Barcelona, in Spain.

The *contagiousness* of yellow fever, from person to person, is disproved by the immense preponderance of facts incompatible with it. A very few apparent examples of transmission by individuals,

¹ This is not without exception. Matthew Carey relates that at Philadelphia, in 1793, the months of August and September, and much of October, were *remarkably dry and sultry*.

² A single instance of its occurrence on shipboard off the west coast of South America has been asserted. If so, no doubt it was a case of limited transportation.

³ At Buenos Ayres, in 1871, the mortality from yellow fever reached, for a time, over 700 daily.

if admitted to have occurred, are otherwise explained. *Transportation by ships* is admitted, because a ship may carry a section, as it were, of a locality, with all its conditions and atmosphere. But, then, the port to which the ship goes must have all the conditions rife for the propagation of the disease, or its "germs" will not be maintained so as to cause an epidemic.¹ More will be said of this, under the head of *Prophylaxis*.

Treatment.—No specific has been found for yellow fever, and no abortive treatment. All kinds of remedies have been tried for this in vain; especially bleeding, calomel, and quinine. I say in vain as to cutting it short; but in palliating and conducting it through its stages with safety, those and other remedies may be of use. Bleeding is suggested by the relief often attending spontaneous hemorrhages in its course; but, as in other malignant affections, the cases for it must be well selected, the time early, and the amount moderate. Much the greater number will gain only by the application of leeches or cups to the epigastrium or back of the neck.²

Many authorities approve of the use of calomel as a cholagogue cathartic, at least in a single dose (say of three or five grains), followed by a saline laxative, as citrate of magnesium, near the beginning of the attack. All the result of the use of *quinine* of which I feel sure, is, that it is not likely to do good at any early stage, but only when prostration begins to appear; and then in tonic or supporting, not *cinchonizing* doses. It is undoubtedly of service during convalescence.

Attention to the *stomach* is demanded by urgent symptoms. Ice, by the mouth, is refreshing and useful. So is mineral water, or iced champagne, a little and often; lime-water, charcoal water, and hot coffee have sometimes done service in arresting vomiting. A mustard or spice plaster over the epigastrium, or a blister dressed with acetate of morphia, may have an important effect upon the same symptom.

During the hot stage, cold sponging to the face, body, and limbs will sometimes promote perspiration better than any other measure. Enemata of cold water (with care not to chill too powerfully) have been used for the same end. Dr. Miller, U. S. N., has found the hot bath (114° Fahr.) especially serviceable.

On the other hand, Dr. F. Peyre Porcher,³ of Charleston, South Carolina, urges the application of *ice-cold* water to the head, hands, and arms, as long as there is a continuance of abnormal heat.

In the collapse, stimulation will be needed, by wine, brandy, or whisky, etc.; along with concentrated liquid food, in small amounts at short intervals.

¹ On the whole subject of yellow fever, see La Roche's exhaustive treatise.

² The following may be regarded as a curiosity of medical history. Matthew Carey, in his account of the yellow fever of 1793 in Phila., says: "The efficacy of bleeding in all cases not attended with putridity, was great. The quantity of blood taken was, in many cases, astonishing. Dr. Griffiths was bled seven times in five days, and ascribes his recovery principally to that operation. Dr. Mease, in five days, lost seventy-two ounces of blood, by which he was recovered when at the lowest stage of the disorder. Many others were bled still more, and are now as well as ever they were."—*A Short Account*, etc., p. 25.

³ Trans. of S. Carolina Med. Association, 1872.

Experiments with antiseptic substances, as chlorine, the sulphites, and carbolic acid, already made with other affections analogous to yellow fever, may be properly tried with it also. Dr. Fiddes of Jamaica reports very favorably of the sulphites.

Prophylaxis.—Besides what has been said, the following statements will indicate the principles of prevention of this disorder:

1. The infection of yellow fever is rarely diffused over regions of great extent; mostly its limits may be measured by fractions of a square mile.

2. The removal of the inhabitants of an infected spot will inevitably put an end to an endemic or epidemic of it.

3. Sanitary police may effectually prevent it (as at New Orleans in 1862 and 1873), and will mitigate it even after its outbreak.

4. The material cause of yellow fever is never generated or multiplied in the bodies of those having the disease; they may be taken anywhere without fear of communicating it, any more than well persons.¹

5. The germs of the disease are extremely seldom, if ever transported by *fomites*; *i. e.*, clothing, bedding, merchandise, etc. If they exist in any such material, they are certainly destructible by cleansing and disinfecting measures.

6. A ship may carry yellow fever on board of it for a length of time (during warm weather) and to a great distance; but the disease will not spread far from the ship; at least unless local conditions add their propagating influence.

7. Thorough airing, cleansing, and disinfection of ships (especially by dry heat or superheated steam) will always deprive them of the power to generate or transport yellow fever.

8. Against yellow fever, the true prophylactic method must be that of sanitary police; a part of which should be, the inspection, near ports liable to it, of all vessels arriving during warm weather.²

9. At the place of such inspection, all foul vessels should be detained until cleansed, being first emptied of their passengers and cargo. The cargo also should be inspected, and, if unwholesome, destroyed or disinfected.

10. No *personal* detention whatever, other than of those ill, for necessary hospital *treatment*, should be imposed upon the passengers or crews of vessels which have yellow fever on board. There are no facts which give reason for any such detention.

RELAPSING FEVER.

Prof. Aitken³ thus defines this disease: "A continued fever, having a very abrupt invasion marked by rigors, chilliness, and severe headache, vomiting, and often jaundice; a white moist tongue, epigastric tenderness, confined bowels, enlarged liver and

¹ This was illustrated in Philadelphia in 1870; when from local infection from a foul vessel, a number of deaths from yellow fever occurred at the Lazaretto; but none in the city, although several of the patients were ill there, having left the vessel before being taken sick.

² The substance of these conclusions was clearly advocated by Dr. G. Milroy, 1867, before the London Epidemiological Society.

³ Science and Practice of Medicine, Philadelphia ed., vol. i. p. 438. See on Relapsing Fever in Philadelphia, a valuable paper by Dr. J. S. Parry, in Am. Journal of Med. Sciences, Oct. 1870.