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# SANITARY COMMISSION.

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## REPORT

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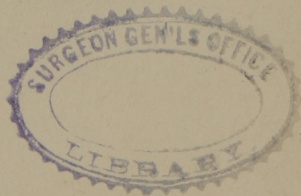
COMMITTEE OF THE ASSOCIATE MEMBERS OF THE SANITARY  
COMMISSION,

ON THE SUBJECT OF THE

NATURE AND TREATMENT

OF

YELLOW FEVER.

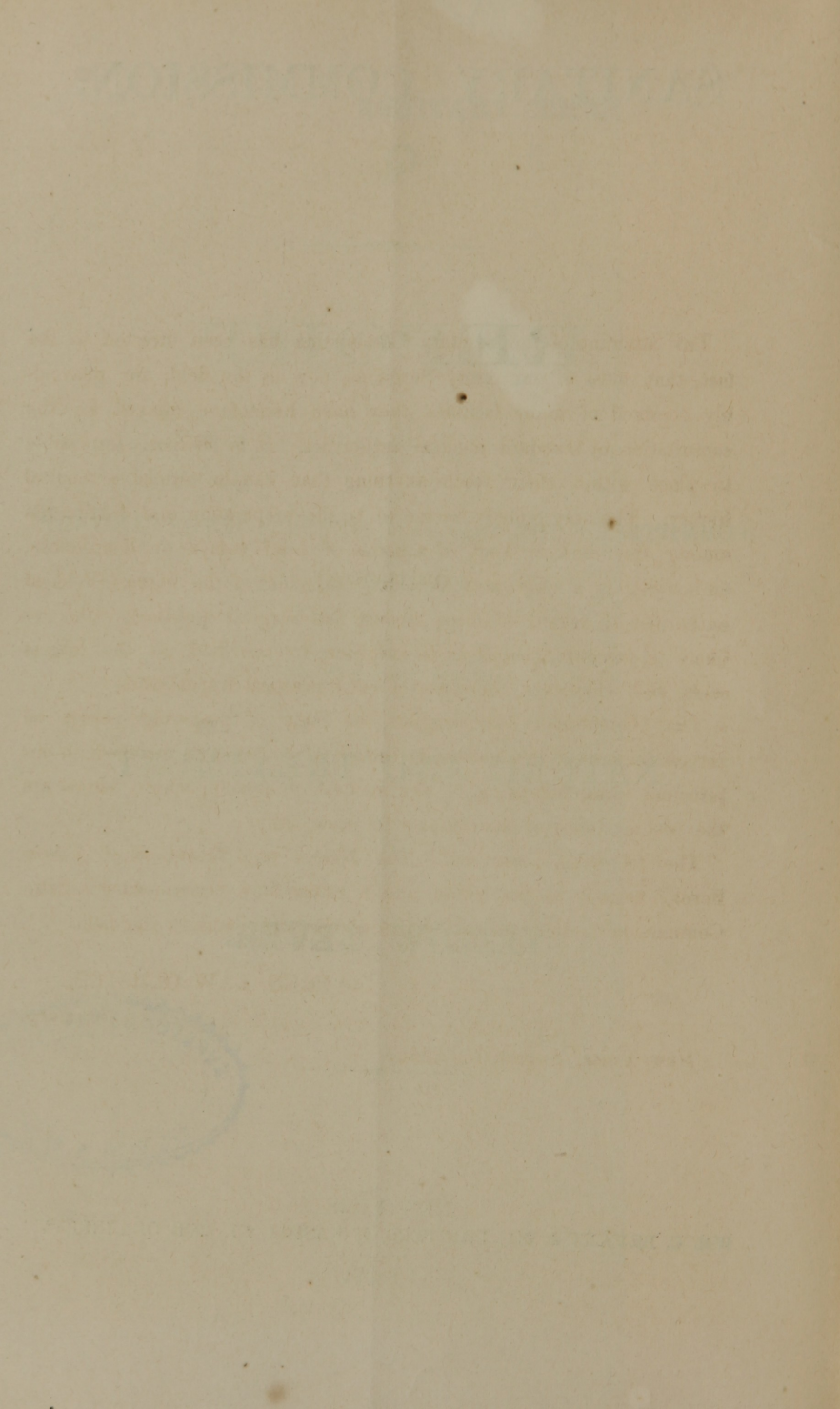


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1862.

*Aug 1, 1862*



THE attention of the Sanitary Commission has been directed to the fact, that most of our Army Surgeons, now in the field, are unavoidably deprived of many facilities they have heretofore enjoyed for the consultation of standard medical authorities. It is obviously impossible to place within their reach anything that can be termed a medical library. The only remedy seems to be the preparation and distribution among the medical staff, of a series of brief essays or hand-books, embodying in a condensed form the conclusions of the highest medical authorities in regard to those medical and surgical questions which are likely to present themselves to surgeons in the field, on the largest scale, and which are, therefore, of chief practical importance.

The Commission has assigned the duty of preparing papers on several subjects of this nature, to certain of its associate members, in our principal cities, belonging to the medical profession, whose names are the best evidence of their fitness for their duty.

The following paper on "The Nature and Treatment of Yellow Fever," belongs to this series, and is respectfully recommended by the Commission to the medical officers of our army now in the field.

FRED. LAW OLMSTED,

*Secretary.*

NEW YORK, August 1st, 1862.







# SANITARY COMMISSION.

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## ON YELLOW FEVER.

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It will probably fall to the lot of many Army Surgeons to treat this disease during the occupation of Southern territories by the Union Forces.

Inasmuch as it is eminently desirable that easy reference to correct authority concerning its nature and management should be within reach of the Medical Staff of our service, the Sanitary Commission have thought proper to prepare for circulation the following paper :

In medical literature the affection is now so well known and so universally recognized by the name at the head of this page as to render unnecessary an enumeration of its synonyms.

*Locality.*—In America the disease is met with, habitually, in the West India islands and in the cities of the Atlantic and Gulf shores, south of Charleston, the latter being included. Occasionally its visitations have extended farther north, to Philadelphia, New York, and Boston. Nor have cities and towns on the Mississippi River been exempt from its ravages. New Orleans has suffered many fatal epidemics, whilst Memphis, in Tennessee, has hitherto been its northern limit in the Great Valley. More recently, it has appeared in inland towns and on plantations not remote from the river banks. It is

probable that fifteen miles is as great a distance as has been known to exist between navigable water and the locality of an epidemic. Woodville, in Mississippi, is more remote from the river than any other place known to have been thus visited.

It frequently originates and prevails extensively on ship-board, when the affected vessels have lately been in the neighborhood of places suffering from the fever. In some very rare instances it has occurred in vessels "without the operation of external agencies or the introduction of contagious germs." (La Roche.) In 1799 the frigate *General Greene* left Newport for Havana. Before reaching port, yellow fever appeared on board, although Havana, at that time, was free from the disease. When occurring thus, in a majority of cases, "it begins in the vicinity of the pumps and the main hatchways, where the shell of the ship is most dependent, where, consequently, there is the greatest amount of moisture and of heat." In Newcastle, Jamaica, 4,000 feet above the sea, Lawson records an epidemic.

Wherever it may occur, there is often a remarkable tendency to limitation as regards the space over which it extends. A berth in a ship—one side of a vessel—a block of a city—one side of a street, may, for a long time, furnish all the cases in an epidemic.

*Season.*—In the United States, we most commonly meet with the early cases during the months of July or August. The disease is prone to last until the first hard frost. During twenty-one successive years, in New Orleans, the extreme limits between the arrival and departure of yellow fever were the 23d May and the last day of December.

*Heat and Moisture.*—A certain degree of heat seems necessary for the development of the disease, and it is common to



find the opinion expressed that warm, wet weather, is propitious to its development. Ample experience exists to prove that but little reliance can be placed on the absence of undue heat and moisture, in the way of ensuring exemption from epidemics. The testimony of New Orleans physicians and of Doctor Blair, in Demerara, conclusively prove that "more or less rain or a greater or less degree of heat has very little to do with the production of yellow fever."

*Age and Sex.*—Neither of these etiological elements are sources of exemption; nor do they exercise an influence which would make their consideration a matter of importance to the Army Surgeon. Fever may occur and prove fatal at any time of life. That men die in larger numbers than women admits of a self-evident explanation.

*Race.*—Negroes *may* take yellow fever, and they may die of it. In comparison with other races, their slight liability to suffer is very remarkable. In the United States, this exemption is observed, in the mulatto, in direct ratio to the amount of African blood. The more Caucasian, the greater liability to sicken and to die. A full-blooded African rarely contracts the disease, even when freshly imported from his native country and placed in the midst of an epidemic.

It has been said, and is generally believed, that robust, stout, or plethoric people are more apt to be attacked than those of opposite temperament. Inasmuch as such persons constitute the majority of individuals liable to the disease, from want of acclimation, we may find a more philosophical explanation of their greater susceptibility than by reference to temperament.

*Condition and Occupation.*—Of all persons, soldiers and sailors suffer most from yellow fever. It is very fatal among prostitutes. Many cases have been observed, in some of the



Spanish visitations, among those suffering from venereal or chronic disease. Any occupation which tends to lower the standard of vitality, or any condition tending to depress the morale, is a powerfully determining cause of the malady. Excessive indulgence in sexual intercourse should be especially regarded in the same light.

*Acclimation.*—Residence for a long time, in yellow fever countries, is acknowledged to exert a certain prophylactic influence. Thus, “in healthy years, what are called *sporadic cases*, are confined to strangers. In years when the disease does not prevail so generally as to amount to an epidemic, the *grave cases* are confined to the unacclimated. In epidemics, the natives and old residents are frequently mildly attacked; but strangers are very generally seized, and have, in fact, to bear the violence and malignity which belong to the fever.” (Bartlett.)

A person may be said to be thoroughly acclimated *who has previously had yellow fever*. Instances, it is true, are recorded, in which two well-marked attacks have been observed; but the experience of all extensive observers goes to prove the extreme rarity of such exceptions to the general rule. It is highly probable that one attack is as completely protective against another, as in the case of small pox, and this independently of the element of *severity*.

The above remarks apply only to places more or less commonly visited by yellow fever. In the Woodville epidemic of 1844, *nearly every one*, except a few who had previously had the disease, suffered from it.

It is doubtful whether removal to and residence in countries exempt from yellow fever has the effect of lessening the prophylaxis by acclimation. Probably this would not impair the ordinary immunity from a second seizure.

Our knowledge concerning *epidemic influences* is altogether too vague to arrest our attention here. Nor can we foretell whether or not the yellow fever will prevail in any given year, from our present acquaintance with its nature and history. It were equally unprofitable to enter upon the discussion of the numerous theories advanced to explain its essential cause. It is to be hoped that the day may arrive when our ignorance on those points will be enlightened. It is very certain that it has not yet come.

Miasmatic fevers have only to be understood to be distinguished, at once, from the disease under consideration. The following table will explain the principal differences between them :

MIASMATIC FEVER.	YELLOW FEVER.
1st. Exists in the hottest and coldest climates.	1st. Does not flourish in either intense heat or cold.
2d. Affects country localities by preference; rare in cities.	2d. Eminently a disease of cities and large gatherings of human beings.
3d. One attack invites another.	3d. One attack prevents another.
4th. Curable by Peruvian bark or its preparations.	4th. Not curable by these means.

Finally, in many parts of the world scourged by visitations from malarious fevers, yellow fever is unknown.

*Contagiousness and Communicability.*—These much vexed points have been most elaborately and learnedly discussed. From the present state of our knowledge, we may fairly infer :

1st. That there is no danger in allowing contact between persons ill of yellow fever and others in good health, the latter being in places where the disease does not exist epidemically.

2d. It is extremely probable that certain articles of merchandise, of dress, and of bedding (fomites) convey a material which, under peculiar circumstance, tends to develop the fever.



3d. Infected ships are especially to be dreaded.

4th. To abandon Quarantine restraints against yellow fever, is to put a price on human life and barter it for trade.

*Symptoms.*—Yellow fever may attack suddenly, and this, commonly, is the case; or it may have the usual prodromata of febrile affections. Generally, a chill is the forerunner of the violent pains in the eye-balls, over the forehead or in the neck, back and limbs; neuralgic symptoms which, in part or assembled, are scarcely ever absent. It will often be observed that the first manifestations of the fever occur in persons during their sleep, having gone to bed in apparent good health. In malarious affections, the immense majority of cases commence during the day, thus affording another element in which they differ from “the peculiar fever of a single paroxysm” considered in this paper.

When premonitory symptoms exist, they are either neuralgic—generally headache—or the patient complains of languor, anorexia, furred tongue, or of chilly feelings—these disordered conditions preceding, it may be by two or three days, the almost inevitable chill.

After this succeeds the *febrile stage*, furnishing, as a rule, no extreme heat of body nor quickness of pulse—in fact, in many instances, the ordinary pyrexial phenomena are so slightly manifested, as to afford no indication of the real gravity of the case. Even should there be undue heat of skin, it rarely lasts beyond twenty-four or forty-eight hours—to be followed, on cessation of the fever, by a decided diminution of temperature below the healthy standard. Not often strikingly dry, the cutaneous surface may be gently moist or profusely perspiring. Many observers have recorded the common fact that the skin seems to be in an *atonic* state. The capillary circulation is *easily*



*congested*, and irregular in its distribution and there is a great tendency to fall of temperature, in parts of the body left uncovered for a short time. This point is of exceeding importance in the treatment.

To the febrile stage, succeeds that of *calm* or *apyrexia*, in which many or all serious symptoms may seem to subside—this may be the commencement of true convalescence, but it is too often the prelude to the third stage—that of *collapse* and death. Sometimes, a fever of reaction follows the second stage, terminating in recovery or death, as may be. In yellow fever, the pulse is accelerated, but not, according to general experience, to the same degree as in nearly all other serious diseases of febrile or inflammatory nature. In different epidemics it varies in regard to strength, sometimes being full, hard and bounding; at others, small, soft and easily compressed. During the post-febrile stage, it is typically adynamic—often feeling as though the artery were filled with gas, instead of blood, so remarkably unresisting is it to the pressure of the finger—extreme slowness is often conjoined with these latter characteristics. In the last case treated by a member of the committee, it was only forty to the minute, for several days; having previously been as high as one hundred and twenty. Great muscular soreness is often complained of.

*The state of the tongue* varies, in different epidemics—it is usually furred, with whitish or yellowish white coating of epithelium until the latter stages, when it may be red and smooth—the papillæ having seemingly disappeared. Sometimes it is natural in shape, with the coating already described, and with a red narrow margin and tip. At others, large, flabby, milk white and bearing marks of the teeth against which it has pressed. Sordes around the teeth are rarely observed. In the late stages, the tongue may present the dry and brown appearance of typhus. *Anorexia* generally characterizes the disease

until the commencement of convalescence. Rush mentions the fondness for tobacco as being remarkable, with some of those under his observation—one patient continuing to chew, through every stage of his fever. Of *thirst* we may say that there is, usually, no great desire for drinks—in some epidemics however, (as at Portsmouth, Va.) the thirst was so urgent that the desire for cold drinks could not be satisfied.

*Nausea and Vomiting* scarcely ever fail to command our attention in a well marked case of yellow fever. Gastric disturbance, thus evinced, is generally one of the early symptoms. At first the matters vomited consist of the contents of the stomach, and are not characteristic. To these, mucus, bile, and, perhaps, a streak or speck of blood may succeed. According to Dr. Blair, the ejecta, thus far, are of *alkaline* reaction. Emesis may continue from first to last; but, as a general thing, when once the stomach has been well emptied it becomes quiet, until some time between the second and fifth day; then, with or without an apparent exciting cause, it manifests irritability, and a quantity of clear, pale, or opalescent *acid* fluid is thrown up. This has received the name of *white vomit*. Dr. Blair looks upon this as being coincident with the cleaning up, reddening and smoothing of the tongue, already referred to. Exceptionally, bile may be ejected at this stage. Its appearance may be regarded as a good prognostic element.

When emesis does not cease shortly after the above-mentioned characteristics have shown themselves, the white vomit is apt to contain small, snuff-like specks, forming a sooty sediment—this is the commencement of *black vomit*, which may, now, be confidently looked for. This well known fluid, of bad omen, has received much consideration of late years. It is not always black, but has been noted as being “dark, dark coffee color, dark chocolate, and dark green.” In some cases it is



brown. All these shades of color are due to that of the hæmatoidin, in each particular case. Blood globules presenting a normal appearance are not met with in ordinary black vomit; but the shrivelled cell-walls, dyed brown, constitute a portion of the sediment—colorless, granular, epithelial scales composing the remainder. All infusorial and cryptogamic elements found in the fluid are to be regarded as accidental. When allowed to stand for several hours an opalescent or clear supernatant fluid is left, after the sedimentary deposit has occurred. Muriate of ammonia has always been found present by the analyses of Blair and Davy.

Black vomit varies greatly in abundance, sometimes being unobserved—even when *post mortem* examination shows the stomach filled with it—at others being measured by the quart. Occurring, generally, during the last day of life, it may commence as long as forty-eight hours before dissolution. The vomiting, not usually difficult, is often spoken of as simple *gulping* or *pumping*.

When an abnormal state of the bowels has been noted, *constipation* has been the general rule. Exceptionally, cholera and diarrhœa have been observed. The most accurate account of the alvine dejections is by Doctor Blair. He says, “ordinarily, the stools first observed were those produced by calomel and castor oil, early prescribed. These were bilious, and not worthy of particular description. Occasionally, in the early stages, a greater or less quantity of dark matter appeared in the evacuations—the first tangible morbid product of the disease, and highly diagnostic of the first stage. It is black, as after taking preparations of iron, or blackish brown, or gray and pultaceous.” After cessation of these melanotic (hæmatoidin) stools, the dejections become of a dirty grey color, abilious, liquid, and on standing, deposit a sediment, revealing, to the microscope, crystals of uric acid, and of the



the triple phosphate, properly belonging to the urine. Towards death, the discharges become scanty and mucous, green, olive, fawn-colored, rusty, brown, black, or streaked—the latter being called *black vomit stools*. These redden litmus paper, all the others are alkaline. No unaltered blood globules need be looked for in these dejections.

To the eye and touch the abdomen presents nothing abnormal, excepting the well-known discoloration of the skin. This symptom, from which one of the old names of yellow fever, *typhus icterodes*, was taken, is not always present, even in fatal cases. As a rule, it appears in the latter half of the attack, but it may appear among the earlier phenomena. It is apt to be first observed in the conjunctivæ and about the chin, extending subsequently to the chest, where the hue is often deeper than elsewhere, and to the body generally. The tint varies from a delicate straw color to a deep ochre. It is, no doubt, a true jaundice, and is intimately connected with a peculiar state of the liver, to be hereafter mentioned.

*Epigastric pain, oppression, and tenderness* are exceedingly frequent symptoms. Even when no complaint has been made—especially in the stage of prostration—very slight pressure on the epigastrium will cause pain, distress, or vomiting. Flatus has been often observed to an extreme degree, constituting a very annoying symptom. In cases of unfavorable epidemic constitution, and toward the later stages, *hemorrhage* constitutes a very important phenomenon. It may occur from any mucous surface—from a recent blister, from any wound or puncture of the skin, as that made in venesection, from a leech or mosquito bite, or in cupping. A woman, whether the catamenia be due or not, scarcely ever fails to menstruate. The tongue and gums furnish the most frequent source of the bleeding, especially where ptyalism has unfortunately been produced.

Lawson observes, concerning sanguineous discharges, that if normal blood corpuscles appear in the flow, it is often a beneficial process, by the relief it affords to congestion. In the form of dissolved hæmatine, without globules, it seems to be rather a secretion than a true hemorrhage, is often copious, always unmanageable, and almost of fatal import. Blood passed by stool, and free from fecal matter, though of good crassitude and color to the naked eye, is always found under the microscope, with *all its corpuscles ruptured*.

Since the attention of medical men was called to the *state of the urine*, by Staff Surgeon Collins, of the British Army, much valuable information has been acquired, with regard to the kidneys and their secretion. We now know that *uræmia* constitutes one of the most important elements in the pathology of yellow fever. Doctor Blair, after observing eighteen hundred cases, states that "albumen appeared in the urine in every fatal case of normal duration." It appears on the second or third day, generally, and may show itself within twenty-four hours. Rarely was its appearance deferred until the day of death, or the supervention of black vomit. In cases where the fever aborted, the urine was seldom albuminous. In a few it was noted during convalescence. Purging with croton oil seemed to make it later in showing itself. As in ordinary albuminuria, the phenomenon was not constant, occasionally disappearing for a day or two, to return. It ceased to exist, permanently, from the eleventh to the twentieth day, its disappearance being the indication for discharging the patient from the hospital. The color of the precipitated albumen is primrose or sulphur; never white, as in Bright's disease. Possibly this, too, is due to some form of hæmatoidin, as no bile was discovered by analysis.

In the urinary sediment, granular casts of the tubes were commonly found, mingled with disintegrated amorphous epithelium, in the early period from the bladder, later from the urin-



iferous tubes. Doctor Lawson observed that the chlorides commence to diminish with the appearance of albumen and are nearly entirely absent when active tubular desquamation is at its height. They began to reappear about the seventh day, in favorable cases, and increased in abundance from day to day. It is proper to observe, that in repeated instances, Dr. Porcher found the urine free from albumen. Its presence was exceptional.

The urine is not usually abundant until the establishment of convalescence. "When the secretion was copious and transparent, even though dark colored and most highly coagulable, the struggle was hopefully maintained." (Blair.)

Acid, during the first stage, it habitually preserves this reaction, until convalescence or admixture with bile, when it becomes alkaline. Its color is normal, until the third day, when a sulphur, straw, or primrose tint is observed. This deepens, until it assumes a yellow or orange hue—sometimes, in large quantity, seeming even black. Globuline and casein, creatine and creatinine have been noted by Dr. Lawson in his Jamaica experience. Urea is deficient, as Porcher's excellent observations have shown.

*Suppression* is commonly abrupt. Not even black vomit is a more fatal symptom. Hæmaturia is not often met with, and is not highly unfavorable, *per se*.

The occurring of *neuralgic* pains is mentioned as being among the early symptoms. These, as a rule, last through the fever, and are, in many instances, inexpressibly agonizing, causing the stoutest and bravest men to complain and groan. Another neurotic trouble, scarcely more supportable, is the unspeakable malaise, under which many labor. Even whilst denying the existence of any discomfort, the patient will be incessantly occupied in changing his position in bed, in rising to go to the window or to walk the floor.



The *mental condition* is usually one of integrity. In the early stages, much apprehension is commonly felt as to the nature and issue of the disease. As soon, however, as the first or febrile stage has terminated, a most extraordinary indifference to life and its concerns is manifested. Even whilst persons were dying, in their immediate vicinity with black vomit, patients have been known to amuse themselves by trials of dexterity, in seeing which one could most successfully squirt the fatal fluid at flies on the adjacent walls. Doctor Blair, perhaps correctly, attributes this psychological state to uræmic intoxication. The analogy between yellow fever and cholera, in this respect, of indifference to the result, will be apparent to one familiar with the latter disease. Except shortly before death, *delirium* is not commonly seen. Whilst sopor and stupor are not unfrequently met with, coma is not often encountered. The sleep is restless, dreamy, and unrefreshing.

The *expression of the face* has been dwelt on by authors; but, whilst acknowledging its peculiarity, it would serve but little useful purpose to state more than that the eyes are suffused, red, sometimes having a drunken look, and that hope, indifference, or despondency may be observed, according to the stage or especial nature of the case.

In yellow fever countries, it is common to speak of *walking cases*. By this term is meant a very peculiar type of the disease, in which death occurs with scarcely any *feeling of illness* and without symptoms, such as have been described. To avoid unjust suspicions of malingering, it is necessary to be well aware of this insidious form. Louis mentions the case of Doctor Mathias, who died, after an illness of four or five days, without chill, fever, nausea, or vomiting. He experienced no other symptoms, but severe pains in the calves of his legs and urinary suppression. This latter indicated the severity of his case. Begging a friend to write a few letters from his dictation,

he urged him to finish the last rapidly, that he might have time to sign it. Soon after, unable to speak, he thanked his friend, with a sigh, and in a quarter of an hour was dead. Doctor John Wilson speaks of "cases like these, where I have ordered a man to do his duty, because I could not see *much the matter* with him. He continued to do duty, after a fashion, for nearly two days, when the eruption of black vomit gave irresistible and mortifying evidence that the man was no impostor."

It has been remarked that there is, in general, more or less marked diminution of muscular strength. In cases of hæmorrhage, and during the second stage (of apyrexia), a patient may be almost perfectly helpless from this debility. Cramps are not usually met with. Spasmodic action of the diaphragm, giving rise to hiccough, is by no means rare. With black vomit and ischuria, it belongs to the category of very bad symptoms.

Of the *type* of yellow fever, enough has been said to establish its difference from remittent, intermittent, or congestive fever, as these terms have been explained in the paper devoted to those affections. In some epidemics, occurring in malarious regions, the disease has presented elements of periodicity; but every one familiar with the pathology of miasmatic ailments knows how easily this peculiar feature may occur, as a simple epiphenomenon, having no essential connection with the main malady. Doctor Lewis, by analysing twenty carefully-observed cases of yellow fever, concluded that the *first stage*, that of febrile excitement, lasted twenty-two hours; the *second stage*, that of remission or of calm, of "deceiving tranquillity" (Mosely), one hundred and twenty hours; that of collapse, fourteen hours. Of course, in different epidemics, these numbers will be found to vary, materially.

Few diseases progress so rapidly and are of such short duration. Sometimes fatal cases occur within forty-eight hours, the great majority not being protracted beyond a week.



In mild cases, convalescence may be established as early as the third day. Some epidemics have been characterized by speedy and uninterrupted return to health, others by a slow and lingering process, extending to several weeks, even where the type of fever was benign. Although the symptoms subside on the fourth day, the patient is stripped of all his strength, and can neither sit up nor take exercise for five or six days.

Generally speaking, *relapses* are not to be dreaded, although some observers, in particular years and places, have mentioned them as being frequent.

*Recovery* may be expected to occur without sequelæ of serious nature.

*Incubation* may be said to have for its usual period about a week. It has been known to extend to twice that time.

As to *mortality* in yellow fever, the usual law of grave epidemic is observed. The largest proportion of fatal cases occur early in the visitation. Some years will be noted by the comparative rarity of deaths, others by sweeping devastation. "In Mobile (1819) out of a population of one thousand souls, more than one half of whom were acclimated, four hundred and thirty died!" (Lewis.)

After what has already been said, it will be useless to the practitioner to allude further to prognosis in general. Nor need the matter of differential diagnosis claim our further care.

In mild cases, occurring in regions where bilious remittent fever prevails, there will always be a likelihood of mistake, for a short time and among the early patients—but this source of error cannot long exist in epidemics. "An initiatory chill, of moderate duration and severity, immediately followed by intense pain in the head, back, and limbs; *redness and suffusion of the eyes*; moderate excitement of the circulation, and moderate heat of surface; anorexia; thirst; white tongue, with red tip and edges; these febrile symptoms of the first

stage continuing for a day or two, and then, accompanied or followed by epigastric pain and distress; nausea and vomiting; restlessness and anxiety, often more or less paroxysmal; and, in from three to five days after the attack, by yellowness of the eyes and skin; vomiting of matter resembling coffee-grounds, held in a dark colored fluid; very dark or black stools; coldness of the extremities; increasing and excessive restlessness, with occasional hiccough, hæmorrhages from different parts of the body, and suppression of urine—the mind, in many instances, remaining clear to the end, and death taking place in from five to seven days from the attack—these phenomena, thus combined, and thus following each other, constitute a disease which it seems impossible to mistake for any other.—(Bartlett.)

Of the *Pathological anatomy* of yellow fever, much has been made known, while much still remains for future research.

Cadaveric rigidity is usually well marked. In general, the surface of the body and conjunctiva are yellow, the color being commonly most marked in the face and trunk. As epiphenomena, traces of inflammation may be met with in different parts of the body.

The *blood* has been more satisfactorily examined by Doctor Blair than by any other observer. He has moreover, the merit of having made his observations in fluid taken from the patients during life. In the first stage, nothing abnormal was found, except an occasional admixture with bile. The alkaline reaction was always observed. Only in the last stages and *post mortem*, were changes observed. And yet, cases terminating fatally, after normal black vomit and hæmorrhages were numerous, in which no abnormal condition, save this bilious tinge, could be detected. On the other hand, certain observations showed great changes to have taken place in the circulating fluid, during the last stages. "Scarcely any fibrine,"



“power of fibrillation lost,” “color dirty brown,” “corpuscles altered and misshapen, with no tendency to form rouleaux, and with adherent granules,” “great rapidity of decomposition,” “no separation occurring in the coagulum.” Finally, Doctor Blair concludes that the healthy condition of the blood depends upon the free action of the kidneys, a copious black vomit, and alkaline exhalations of the breath.

The *brain* shows no special pathological condition in its structure. Congestion, with occasional ecchymotic apoplectic extravasations are not very uncommon.

The *stomach*, sometimes natural in appearance, has more frequently its mucous membrane discolored, mammelonated, thickened, and softened, with patches of ecchymosis; ulceration is very rare. Its contents vary, according to circumstances.

In many cases there are analogous lesions of the mucous membrane of the intestines. These latter frequently contain the matter of black vomit, as is so often the case with the stomach itself. The *æsoophageal* mucous membrane, as a rule, is found altered, especially by softening and by discoloration, and by loss of epithelium—the latter condition being probably due to the acrid matters vomited.

The *liver*, in fatal cases of yellow fever, as a rule, is in a state of acute fatty degeneration. This was first conclusively shown by Doctor Alonzo Clark, in 1852. It is usual to say that it has the color of *café au lait*, that it is dry, not of necessity altered in size, and that it contains little or no bile. Some observations have spoken of large, dark colored livers, yielding abundance of blood, on section. These are exceptional, as Clark well states, in one case, hyperæmia produces much hæmatoidin, and a moderate amount of oil; in the other, much oil and little hæmatoidin. The *gall bladder* may be empty or full. The cases are very exceptional in which normal bile is found in it. Light colored mucus and blood have been met with.

Of the *kidneys* Doctor Blair remarks: "In cases which have been inspected, after protracted illness in apparent convalescence, the bloody condition of these organs has passed away, and the hypertrophied cortex is of a dull ochery color. *I have never been able to detect oil globules in the kidney.* The congestion, during life, has only been signalized by albuminous urine. The pains complained of are lumbar. Occasionally, I have noted the kidneys in an almost apoplectic state; and yet their function was scarcely interrupted. On the other hand, I have been disappointed in the amount of congestion, in cases of entire suppression. Further investigation is needed, on these points. The bladder is often empty, and its mucous membrane may show marks of extreme congestion. Of the *spleen* and other abdominal organs, nothing constant or important has been observed.

The *heart* is, as a rule, soft and flabby. Doctor Riddell, of New Orleans, in examining nearly thirty cases, found "in general, that the transverse striation of the muscular fibres was indistinct, in some instances nothing but a granular degeneration of the contents of the myolemma being recognized by the microscope.

Beyond such results as would follow, of necessity, from the state of the blood, in the latter stages, and from the universal tendency to capillary congestion, the *lungs* present nothing worthy of note.

#### TREATMENT.

The treatment of yellow fever has varied very much, according to the theory of the practitioner, and the nature of peculiar epidemics. Many physicians, encountering mild types, the normal tendency of which, without gross mismanagement, is to recovery, have systematically medicated their patients, in some



peculiar way. Attributing to drugs, what was simply a part of the natural history of the disease, the particular therapeutical course pursued by them has been heralded to the world as the true and only one to be relied on.

Is there a possibility of carrying an *abortive* treatment? *Can yellow fever be cut short?* In the present condition of our knowledge, this question must be answered in the negative. Medical journals contain not a few contributions, announcing the discovery of ectrotic remedies; but there are two obvious sources of error, in their reasoning. The first has already been alluded to above. The second consists in the fact, that nearly all such observers have exercised their profession in localities subject to prevalence of bilious remittent fever.

Certain it is, that subsequent experience on their own part, or on that of the general profession, has failed to confirm the value of the supposed discovery, in any single instance. We are without a specific plan for the *cure* of this most grave malady.

It is strictly, a self limited disease—to be managed, to be led, but not to be driven, violently, towards a favorable issue. At the present day, no wise man places reliance on mercury, on the lancet, on cinchona, or on the muriatic tincture of iron as specific remedies. Appropriate to the treatment of certain conditions, and for the relief of certain symptoms, these therapeutical resources must no longer be regarded as systematic or indispensable in all cases.

Among the first necessities are to be reckoned cleanliness, good ventilation, quiet and *good nursing*. In bad cases, where practicable, there should be two nurses, one for the night, the other for the day. Unless diarrhoea be present the bowels should be effectually opened as soon as the patient comes under treatment. By some, ten or fifteen grains of calomel, followed by castor oil, or a saline draught, is considered the best cathar-

tic. By others, a drachm of calcined magnesia, assisted in its action by draughts of lemonade, is preferred. No other purgation will be needed, unless exceptionally, to meet particular indications. Doctor Stone, of New Orleans, if the patient be seen early, advises fifteen grains, or a scruple of quinine, immediately. This may be followed, by ten grains more, in the course of twelve hours. Beyond this, he would not go. He thinks the medicine, thus given, prolongs and promotes diaphoresis, and that "the patient is safe whilst this lasts."

During the febrile stage, cold affusion or cold sponging is grateful and refreshing. Affusion may be practiced, as recommended in remittent fevers. The violent neuralgic pains may be best relieved by dry cupping, or by rubefacients, as sinapisms, chloroform, or the like. Thirst may be assuaged by cooling drinks, such as acidulated barley or tamarind water, lemonade, or a weak sweetened solution of cream of tartar.

During the second stage, *expectation* is demanded. Great care should be taken to preserve perfect rest of mind and body pending this period of calm. Strict watch should be kept that the patients do not *uncover their bodies or limbs*, whilst care is taken that no undue weight of bed-clothes oppress or overheat them. The sick should never be moved by rough handling. When necessary to change their place in bed, a nurse should station himself on each side of it, and effect the desired end by lifting the under sheet, thus transporting the patient, without touching him. This is necessary to prevent uncovering, and on account of the exquisite muscular tenderness, and liability to bruise any part, to which strong pressure is applied.

For the thirst which sometimes exists, there is nothing more grateful or appropriate than cold carbonated water, pellets of ice, or the effervescing draught of our pharmacopœa. If



nourishment be demanded, veal, chicken, or beef broth is advisable.

Should collapse occur, or seem threatening, it is to be met by stimulation. Iced brandy toddy, or mint julep, judiciously given, will usually be taken with readiness, and easily retained, where the stomach is not utterly rebellious. For nourishment, nothing is better than the animal broths, just mentioned. In case of failure to retain them, when administered by the mouth, we can often advantageously employ them by injection.

Among the most distressing symptoms are nausea and vomiting. Rest to the stomach—the use of small doses of morphine—of prussic acid—of creosote, one drop every hour or two—of solution of camphor in chloroform, (ounce for ounce), in two drop doses, every hour, given in mucilage—of acetate of lead—of carbonic acid—minim doses of muriatic or nitromuriatic acid—rubefacients or epispastics to epigastrium—and, finally, the endermic or hypodermic application of opium or its salts, are among the means best calculated to afford relief.

Many recommendations have been made as to the proper treatment in black vomit. In this event, *let the stomach alone*, so far as ingesta are concerned. Digestion is checked, and probably absorption is impossible. The exceptional cases of recovery, after this symptom, are due to non-medicinal influences.

It would be useless to devote especial consideration to the subject of prophylaxis, after what has already been said concerning the etiology. The predisposing causes, and those which we call exciting, as far as we know, have been mentioned. Do what is possible to escape their influences.

For the Committee,

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