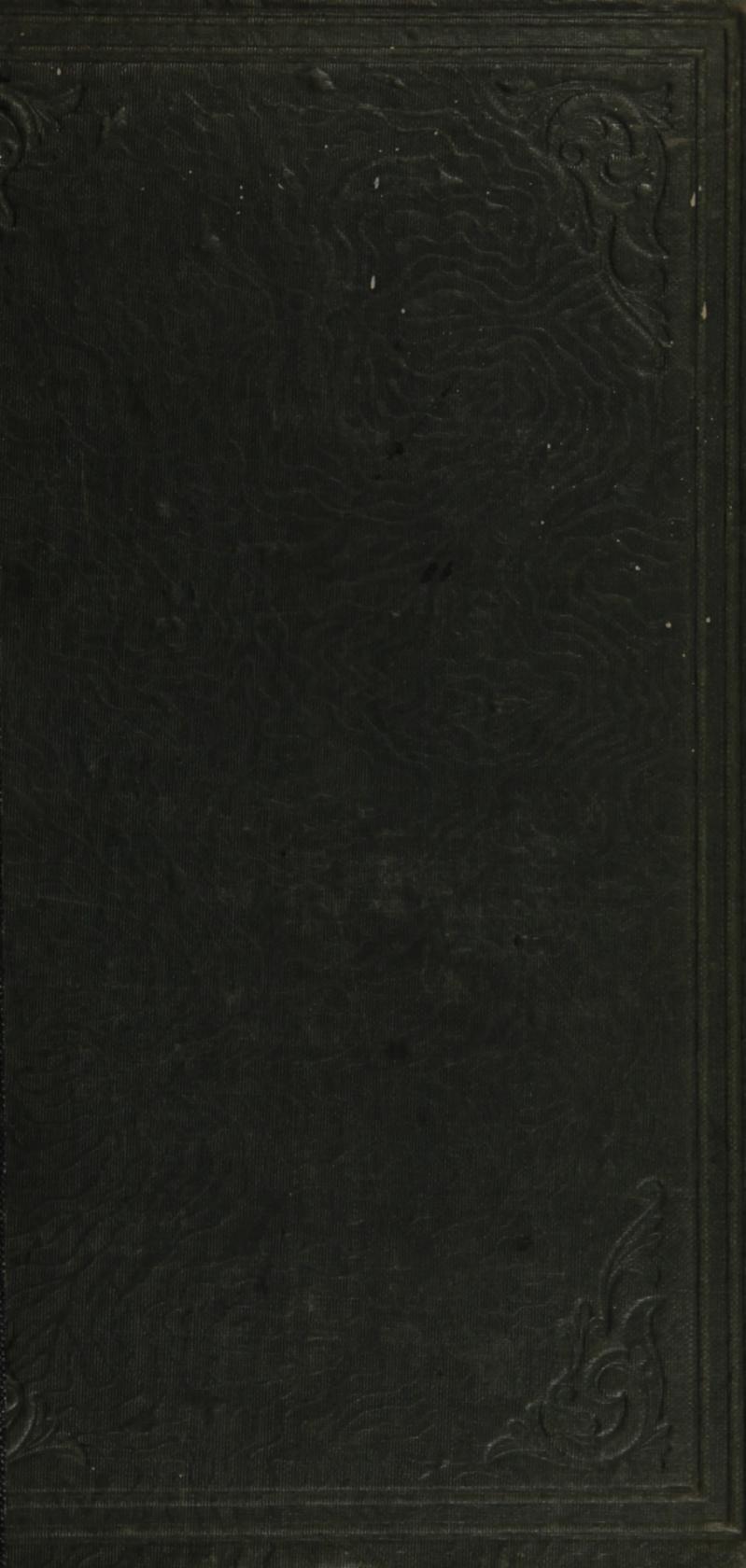


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1847





A TREATISE

ON

MALIGNANT FEVER

AND

VOMITO PRIESTO.

BY

WILLIAM INGALLS, M. D.,

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HAMPSHIRE MEDICAL SOCIETIES. FORMERLY PROFESSOR OF  
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*Venienti occurrere morbo. — Persius.*

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TO

THOMAS LAWSON, M. D.,

SURGEON GENERAL OF THE UNITED STATES ARMY,

WHO, BY HIS TALENTS, HIS ASSIDUITY AND HIS ATTAINMENTS IN MEDICAL  
SCIENCE, HAS RISEN TO THE HIGHEST STATION IN THE  
ARMY OF THE UNITED STATES,

THIS TREATISE

Is most Respectfully Dedicated by

THE AUTHOR.



## PRELIMINARY REMARKS.

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THIS treatise on yellow fever was ready for the press in 1841; but having consulted a physician on whose judgment I placed great reliance, on the propriety of publishing it, who gave it as his opinion, that as the work of Baron Louis on the same subject, translated by Dr. Shattuck, Jr., had recently made its appearance, a similar production was not at that time required. Of course its publication was deferred. As several years have elapsed since that time, and as I have come in possession of the volume by Dr. Robert Jackson, in which the application of cold water as a remedial agent in yellow fever has been, in my opinion, justly approved, and highly extolled, [I lay no claim to originality in the application of cold water, it having been suggested to me by a person from the West Indies, who had used it, it seems, much in the same manner as Dr. Jackson proceeded with his patients,] I have concluded to make public my mode of treatment in this destructive malady.

TYPE. — The yellow fever is considered by Dr. Cullen to be a species of typhus, by the ancients, an ardent bilious fever. Dr. John Hunter deems it to be an intermittent, complicated with jaundice. After expatiating on the violence of the symptoms attending the highest grade, he remarks, “When the fever is thus severe, symptoms often

occur, which have given a name to the disease as a distinct one, I mean a yellowness of the eyes and skin, from which it has been called *the yellow fever*.”\*

Dr. Robert Jackson is of opinion “The yellow fever may in many respects be similar to the remitting fever of Jamaica,” but “it possesses some characteristic symptoms of its own different from every other disease;” and that it “may be distinguished with certainty from the autumnal fevers of aguish countries, or from the endemic remitting fever of Jamaica, from the first hour of its attack.”† Not being practically conversant with the remittent of aguish countries, I am not qualified from experience to decide upon the similarity or dissimilarity respecting the destructive characters of the two diseases. From the history of the yellow fever, and its course in the cases that have come under my observation, I esteem it to be a disease *sui generis*. Because there is an apparent affinity in the symptoms of the two diseases, it does not follow that they are identical.

The assertion that in many cases of disease reputed to be yellow fever, has not been proved to be such, is satisfactorily corroborated by the facts relating to this disease, that have come under the cognizance of Baron Louis. We have the testimony of Baron Louis, whose perceptive faculties, whose tact in pathological anatomy, and whose fidelity and accuracy in the description of organic lesions that may have been subjected to his inspection, is not, perhaps, surpassed—that a body reported to be dead of yellow fever, was subjected to a post mortem examination, in which he did not detect the anatomical features of the prevailing epidemic, but found the peculiar lesions of typhus particularly characterized.

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\* On Diseases of the Army in Jamaica; by John Hunter, M. D., F. R. S. London, 1788.

† A Treatise on the Fevers of Jamaica; by Robert Jackson, M. D. London, 1791.

Again, Baron Louis was desired to give his opinion relative to the nature of diseases contained in a report of a number of fatal sporadic cases of yellow fever. After a mature investigation of the several cases, and a comparison of their symptoms and anatomical characters with those that occurred in the epidemic of 1828 at Gibraltar, he found they did not, with scarcely an exception, exhibit the characters of the yellow fever.

The anatomical character and symptoms of the fatal sporadic cases, referred to above, correspond much more exactly with the characters and symptoms of the bilious remittent fever, as described by Dr. Condie in a valuable note added to the Lectures of Dr. Watson,\* than in those which were observed by Baron Louis in the epidemic at Gibraltar.

An Anglo-French commission composed of thirteen physicians, of which Baron Louis was appointed President, was selected, whose duty it was to solve the question, "Does a first attack of yellow fever preserve from a second?" After taking the subject into mature consideration, the commission came to the conclusion, "that a first attack of yellow fever preserves from a second as effectually, and at least in as great a degree, as a first attack of an eruptive disease, of the small-pox for instance, preserves from a second attack of the same disease." It also confirms the opinion, that a change of residence from a lower to a higher latitude, does not cause that alteration in the constitution of those who have had a first attack of yellow fever, as was once the general opinion, which renders them susceptible of a second; nor does length of time produce the same effect. Here it may also be observed, that in southern climates, the

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\* Lectures on the Principles and Practice of Physic; by Thomas Watson, M. D., &c. Revised, with additions, by Dr. Francis Condie, M. D., &c. Philadelphia, 1845.

remittent and yellow fever prevail at the same time in the same place ; that the disposition in the remittent fever to relapse being in direct contrast with that of the yellow fever, the first attack of which is a preservative against the second, proves them to be in their nature different.

From these premises, we may account for natives of the North, engaged in the West India trade, and who have made several voyages there at different and distant periods, presuming they have had the disease more than once, when, in fact, it was the remittent, instead of the yellow fever, under which they labored each time. I have met with a captain of a vessel who was fully persuaded he had been attacked with the yellow fever three times ; no doubt the close resemblance between the symptoms of the remittent in its highest grade and those of the yellow fever, contributed to make on his mind the erroneous impression.

**VENTILATION.**—The dilution of the miasm of yellow fever, by which its virulence is diminished, and ultimately innocuous, is greatly promoted and accelerated by thorough ventilation. Great care was taken, therefore, to afford as free a circulation of air, as circumstances would admit, with the precaution of guarding against exposure to any sudden and great depression of temperature, as it has the tendency to aggravate the symptoms, and render the disease more intractable.

**CLEANLINESS.**—The instantaneous removal from the house of the urine and alvine discharges, as well as the wearing apparel and bedding as fast as they became imbued with the excretions, was rigidly enjoined. Such articles as would admit of it, were ordered to be immersed in water, removed from the house, and washed. Attention was paid to having the furniture, the floor, and walls of the room cleansed, when necessary. Such fumigations as could be employed to remove the fetor, without injury to the patient, were, of course, adopted.

**THEORY.** — From our total ignorance of the principle of vitality, we have no guaranty of the correctness of any theory; still, such is the structure of the mind, we cannot desist from investigating the course of morbid derangements, nor from embracing the best means in our judgment of restoring them to order or regularity. Notwithstanding my theory apparently militates with the pathological observations of Baron Louis, may not erysipelas or some morbid influence, which, like this phlegmasia, has the tendency to migrate from one organ or part of an organ to another, and after each removal, leave only the effects of its deleterious property behind; so that the altered state of the liver, or stomach, or the small or large intestines after death, may exhibit very different appearances from the changes that may have occurred, while the patient was under the immediate action of the cause of yellow fever.

**DIAGNOSIS.** — The pathognomic symptoms of the yellow fever are not so prominent as to be readily recognised. At the commencement of the epidemic, several cases generally take place before the type of the yellow fever is fully ascertained. In New Orleans, last summer, a number of instances happened before its existence was acknowledged. Such occurrences have happened in New York, and other places. Dr. Jackson, in his treatise on the yellow fever of Jamaica, gives quite a graphic description of a similar occurrence, connected with the first patient he attended.

Even when the yellow fever becomes epidemic, and its existence universally acknowledged, its pathological symptoms are not readily discerned. In the temperate latitudes an instance of typhus has been erroneously considered to be the yellow fever, and treated as such; undoubtedly instances of this kind may be multiplied during the continuance of the epidemic. In climates where the remittent is indigenous, the characteristic symptoms of the diseases are not always so distinctly marked as to prevent an erroneous diagnosis.

PROGNOSIS. — The yellow fever so often has very unexpectedly a fatal termination, that a very guarded prediction of the result ought always to be given.

DURATION. — The pathological investigations in the work of Baron Louis on yellow fever, will warrant the induction, that the shortness of the disease, which is considered by this illustrious physician one of its peculiar characteristics, is dependent in an essential degree on the deoxydation and liquidity of the blood. The various phenomena, that attend this epidemic, in many respects, indicate that the cause of yellow fever has the tendency to generate carbon in excess, or obstruct the oxydation of the blood. The crisis is seldom prolonged to the seventh day.

BLACK VOMIT. — With regard to the source whence the black vomit is derived, various theories have been advanced. The prevalent opinion, however, is, that it arises from an effusion of blood into the stomach, either by exhalation, transudation, or rupture of the vessels. Vogel maintains the latter opinion. “Extravasation of blood,” Vogel says, “always proceeds from the vessels, and results from their laceration. This view, that at least some of these effusions of blood may accrue without injury to the vessels, is altogether untenable. It frequently happens that in consequence of laceration of the vessels, the blood escapes from them, and is effused in the cavities of the body.” This author further observes; — “Blood effused into the intestinal canal, coagulates in a peculiar manner; the fibrin remains fluid while the albumen of the plasma becomes coagulated by the free acid of the gastric juice, and encloses the blood-corpuscles. Moreover, the acid converts the red color of the blood into a blackish brown tint.” Again; “Blood effused into the stomach and intestinal canal, and either found there on dissection, or discharged by the mouth or the rectum, has, however, a different character, from the infiltrations of hæma-

tin.”\* “Instead of being red, it is of a brownish black color, and of the consistence of tar, or else flocculent, and resembling coffee-grounds.”

If the above pathological description of the manner in which the effusion of blood takes place, and its results be correct, it will be of the utmost importance in a therapeutical point of view, as it may lead to the selection of the appropriate remedy for the black vomit.

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Boston, Sept. 25, 1819.

MR. P. P. F. DEGRAND,

SIR, — *The Malignant Fever* which has prevailed here, is denominated by Cullen, Typhus Icterodes, and by the ancients, Biliosa Ardens Febris. It may be traced to two sources, viz. : — Communication with the ship Ten Brothers, and residence on the south side of Fort Hill.

#### SHIP FEVER.

On the day after the arrival of the ship Ten Brothers, viz. August 2d, I was requested to visit a seaman by the name of Bates Lincoln. I found him laboring under highly inflammatory symptoms. I was requested, at the same time, to visit another seaman, Mr. Hardy. On the next day I was desired to prescribe for another seaman by the name of Dillingham. These three all belonged to the ship Ten Brothers. In the evening of the day that Dillingham was taken, these three men embarked on board of a coaster for Provincetown, Cape Cod. The prescription which was made for Bates Lincoln procured, by the next day, a complete intermission of the fever; and directions were given him, to be used as circumstances might render it necessary. He recovered, and returned to this place in a few weeks.

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\* *The Pathological Anatomy of the Human Body*; by Julius Vogel, M. D., &c. Philadelphia: Lea & Blanchard, 1847.

When I saw Hardy he had already taken physic. I, however, prescribed on this and on the following day.—Dillingham had labored under the disease for twenty-four hours, before the prescription was made. It was his misfortune to retire to his room and lie all night laboring under the disease, without making any one of the family acquainted with the circumstances; which delay rendered his case, as it would every other, much less likely to yield to the power of medicine.

Lincoln adhered to my directions altogether. The other two seamen did not pursue the course I had prescribed.—They died of the Black Vomit, in about thirty hours after they arrived at the Cape.

On the 14th, Mrs. M'Farland was attacked with great violence.—She recovered.

On the 15th, Mr. Ezekiel Shattuck was seized with the fever in its most aggravated form.—He recovered.

On the same day Mr. M'Farland was taken. He died on the 5th day.—He suffered for the want of suitable accommodations, and the impossibility of procuring an additional nurse.

On the 16th, Mrs. Bennett was taken sick.—She recovered.

On the same day Captain Eaton, inspector of Customs, aged sixty-four, was seized with the symptoms of fever about an hour and a half previous to my receiving a call to attend him. He had taken a portion of jalap and calomel before I arrived; the effect of calomel, in a large majority of cases, I esteem to be highly deleterious.—He died on the 5th day.

On the 17th, Mrs. Fanby had a mild attack.—Afterwards, a sister, who lived with her had a mild form of the disease, and two children in the same family had it severely.—These four recovered.

About this date, three of Mr. M'Farland's children became sick of the same disease.—They recovered.

August 25. Mr. Wendell was taken with the fever, and was removed to Hospital Island on the third day.

On the 24th, a son of Captain Dutch ; on the 28th, Mr. Thacher ; and on the 29th, Messrs. Kimball and Rufus Shattuck were taken. In these, the symptoms were strongly characterized, and the disease very severe.—These gentlemen recovered.

All these cases were distinctly traceable to direct communication with the ship Ten Brothers, or persons or things coming from the ship.—They were all attended by me.

It appears to me that the Typhus Icterodes is as much subject to the control of medicine, as the Epidemic Peripneumony ; and, with proper treatment, as many recover.

I formerly thought that the removal of the inhabitants from the infected place could not be too rigidly enjoined. I think I have now the most ample ground to justify me in entertaining an opposite opinion.

The cases of fever attended by me and traceable to the other source, will be the subject of another communication.

For the last week, so far as my knowledge extends, the town has been almost exempt from fevers of a malignant nature.

Although Mr. and Mrs. M'Farland, their three children, the two Messrs. Shattuck, Mrs. Bennett, Miss Fanby, sister and two children, resided on Fort Hill, my opinion is that their sickness is attributable to a communication with the ship Ten Brothers, directly or by coming in contact with goods brought from the ship Ten Brothers.

I am,

With sentiments of esteem,

Your obedient servant,

WM. INGALLS.

Boston, Oct. 2, 1819.

MR. P. P. F. DEGRAND.

SIR,—In your last Report I gave an account of the Typhus Icterodes or Biliosa Ardens Febris, as it appeared to arise from communication with the ship Ten Brothers. On looking over my minutes, I find two cases were omitted; one of which was mild, and the other hazardous. Both recovered. I also visited a man in consultation.

It likewise appears no case has occurred beyond the time thought necessary by the Board of Health for a vessel to remain at quarantine. This fact is important, as it shows the term appointed for the quarantine is sufficiently long, and will exonerate the Board of Health and their physician from censure for permitting the ship to come up, and discharge her cargo.

It is also ascertained, I believe, to the satisfaction of those who have inquired into the subject, that the disease is not contagious. It seems, however, that the formites of the disease may be found so concentrated and active in certain situations and under certain circumstances, that persons may become infected by exposure for a short time to the contaminated atmosphere. This point is very generally conceded, so far as it relates to infected ships and wearing apparel.

I shall now, as I promised, give an account of those cases, that did not originate from the Ten Brothers.

That the most of these which came under my immediate care, occurred on the south side of Fort Hill cannot be denied; but it is by no means satisfactorily decided, that the disease was generated there. In order to determine this point, we must understand the causes which pollute the atmosphere.

We can say, I think, with safety, the decomposition of animal and vegetable matter, or the vapor arising from the stagnation of fresh water do not alone beget the fomes of

the yellow fever. So far as my limited knowledge of the history of this disease extends, it is always to be found in the vicinity of salt water. Hence we must look for some agent or principle, that is dependent for its existence on some modification of sea water.

The intermittent fever arises from the influence of fresh water marsh miasma, where, of course, there is an exhalation of a vapor saturated with vegetable matter, producing a morbid excitability, so that, upon the application of an exciting cause, a fever takes place. In a country where there is an abundance of narcotic plants and vegetable matter in a state of decomposition, the air becomes impregnated with a noxious principle, that prepares the system for a highly inflammatory bilious remitting fever. But, when the temperature and state of the atmosphere are favorable for effecting a change upon sea water near the shore, and also upon animal and vegetable matter, then the fomites of yellow fever is engendered.

The yellow fever is not generated at sea, nor far inland. We must therefore look for its production, to causes existing on the sea-coast.

It seems to me much more probable, that during a hurricane an immense quantity of sea water is carried to a very great height in the air, where it is diffused over a vast space, and undergoes an alteration, by which a subtle principle is evolved, that gradually subsides to the ground, and produces the influenza, than that the same effect, as has been supposed by some philosophers, happens from a subtle matter thrown by volcanic eruptions to a great height, and diffused over the globe. If it be admitted, that in this way a noxious gas, effecting a great derangement of the functions, can be evolved, may we not infer, that a chemical change may occur in sea water, which might alter the specific character of the bilious remittent, and produce the yellow fever?

The causes which produce the greatest changes in nature,

are simple. The narcotic effects of the exhilarating gas, applied in a moderate quantity for a considerable time, might occasion the most alarming disturbance in the functions. I have met recently with several cases of persons who have suffered from symptoms arising from the influence of vegetable narcotics. The disease, these destructive substances cause, has been severe, and overcome with difficulty. The symptoms were too well defined to admit the possibility of a doubt respecting the nature of the disease, though it could not be learnt that they had been exposed to anything of a hurtful nature.

Many symptoms of the malignant fever correspond with those arising from the use of articles of this class, and the method of cure is, in some respects, similar.

These suggestions have often been with me the subject of contemplation and investigation, so far as opportunity has offered. I, however, submit them as crude observations, rather than as established facts. Notwithstanding, an extensive view of the whole subject, not only as to the causes, but as to the symptoms and remedies, affords some foundation for the belief, that there is one common principle, which gives the intermittent, remittent, and yellow fevers a generic character, and that their specific difference depends upon the operation of an additional agent.

Though the causes requisite for the propagation of the fever may have existed to a considerable degree in a particular part of the town, still it is worthy of particular inquiry, whether it is not probable, that the infection was first introduced from a foreign source. On this subject, I have not in my possession a sufficiency of well-authenticated documents to form a correct judgment.

Yours, respectfully,

WM. INGALLS.

P. S. No new case of malignant fever has come to my knowledge, since my communication in your last Report.

Boston, Oct. 9, 1819.

MR. P. P. F. DEGRAND.

SIR, — It was observed in my last communication, that it was the prevalent opinion among those who had investigated the subject, that the malignant fever was not contagious. This, however, should not be admitted without some qualification.

Diseases arising from animal or vegetable effluvia, are called contagious. The word contagion is derived from *contingere, to touch, to handle, or to influence*. But diseases are called contagious, that are taken not only by actual contact, but exposure to an atmosphere corrupted by morbid *effluvia* issuing from persons, goods, ships, wearing apparel, animal and vegetable substances in a state of decay; and, as it is said, by pestilential vapors, conveyed even at a great distance through the air.

If the above comprehensive definition of contagion be granted, we may with propriety place the yellow fever in the class of contagious diseases, because it may be taken from exhalations proceeding from holds of vessels, walls of houses, and wearing apparel. Still we have no evidence that the disease has been derived directly from a subtle poison emanating from the body; or, in other words, where cleanliness and ventilation have been carefully attended to, we find no instance of the reception of infection, unless the constitution of the air be favorable for the production and propagation of the epidemic.

The only person within my knowledge, who could have been supposed to take the malignant fever by merely visiting the sick, was Mr. Wendell, whose name is mentioned in my first letter. This person repeatedly visited Mr. Ezekiel Shattuck; and presumptuously boasted, that he was proof against the infection, had no apprehension of taking the disease, and treated with levity every remonstrance against the rashness of his conduct. In order to make his hardihood

and daring more conspicuous, he was in the habit of protracting his visits. Again, he was intimately acquainted with Mr. Shattuck, and it is not impossible, he may have been exposed to the same causes which occasioned the disease of the latter. I have been thus circumstantial in this account, because it is the only case that in the least favors the opinion of those who advocate the contagious nature of the disease.

Contagion is not imparted from the body upon the first indications of disease. Its manifestation, in all cases, depends upon some excrementitious substance, that has received a change at the time it was separated from the circulating system, or afterwards.

The variolous infection does not become active, until the eruptive stage is completely established. The matter first discernible in the pustules is serous and pellucid; and is gradually converted into pus. The formation of these two kinds of matter is attended with two kinds of fever, the eruptive and secondary; and it is during the secondary fever, the formation of scabs, and their falling off, that the matter becomes virulent. Hence the matter of contagion must be eliminated, and probably undergo a change at the time it is secreted, or soon after, before it becomes infectious. The facts adduced to prove, that the blood may produce the small-pox previous to the eruptive stage, do not in the least militate against this inference.

The yellow fever becomes contagious, not by secreting a matter which is deposited on the surface, as happens in the small-pox, but by a subtle matter which escapes with the excretions, and which afterwards is subjected to a sort of fermentation, before it is rendered active. At least the *effluvia*, arising from an infected body, and transmitted through the air, are found not to generate the disease, so readily as the *miasmata* proceeding from substances imbued with infected excretions.

There is, however, a decided distinction in the character of these contagions ; for if, in a case of small-pox, the room be ever so perfectly ventilated, the excrementitious matter that passes off through the emunctories be ever so carefully removed, and the greatest attention to cleanliness observed, still the contagion will be propagated with the greatest certainty, and for a very plain reason, because the matter on which the specific contagion depends adheres to the body ; whereas the subtle matter, which occasions the yellow fever, is eliminated in conjunction with the excretions, and assumes scarcely any activity, until it has been separated from the body a certain length of time. Thus, while it is wholly impossible to prevent the spreading of the small-pox, the yellow fever, under favorable circumstances, may be, in a great measure, arrested in its progress.

The variolous contagion is called specific, because it always produces a similar disease. The contagion of the yellow fever undoubtedly, at all times, operates in the same way.

From what has been said, we may make the following deductions.

1st. The necessity of constantly and immediately removing every nuisance, and purifying every thing that may be impregnated with the excretions. By which,

2dly. The danger of affording ample attendance on the sick is diminished, and their condition in every respect meliorated.

3dly. Under these circumstances, a degree of intercourse with the infected may be permitted with impunity.

4thly. That the dispersion of the inhabitants from the infected spot may be dispensed with ; and the immoral effects, and the interruption of domestic comfort and social happiness, attendant upon such a procedure, avoided.

Yours, respectfully,

WM. INGALLS.

P. S. No new case of malignant fever in Boston has come to my knowledge, since my communication in your Report of 2d inst.

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MR. P. P. F. DEGRAND.

SIR: — I observed in your paper of the 25th September a communication from Dr. Ingalls, on the subject of the Malignant Fever (so called), which prevailed in this town the last summer. He has there started an opinion in which I cannot agree with him. He writes thus :

“ I formerly thought that the removal of the inhabitants from the infected place could not be too rigidly enjoined. I think I have now the most ample ground to justify me in entertaining an opposite opinion.”

This appears to me an abstract opinion without any reasons given to justify it. So important is the question, that it ought not to be decided without some arguments and facts brought forward to establish it beyond a doubt ; for upon its decision the lives of thousands may depend. The opinion is so novel, and so contradictory to facts and universal practice, that the writer of this is solicitous to know upon what “ ample ground ” this opinion is founded.

Yours, respectfully,

DEMOCRITUS.

Boston, Oct. 14.

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Boston, Oct. 23, 1819.

MR. P. P. F. DEGRAND.

SIR, — After having stated in my former communications, that the yellow fever generally originated on the sea-coast, and that a salt water atmosphere had, perhaps, some agency

in giving it its peculiar character; having made some explanations with regard to contagion; and it being also more than four weeks since a case has come to my knowledge, and the disease having probably disappeared for the present season, I shall now, with such incidental remarks as may be deemed proper, mention the patients who have come under my care, and who had no communication with the ship *Ten Brothers*; and afterwards, I shall treat of such subjects connected with the disease, as may require particular notice.

On the 1st of August I visited Mrs. Morton. I found her laboring under the symptoms of the prevailing epidemic: She was not violently seized, but the disease did not yield so readily as might have been expected.—She recovered.

I visited on the same day, and in the same house, Mrs. Robinson. The inflammatory symptoms were not remarkably severe, but soon subsided into what is usually esteemed the second stage of the fever; from which time she gradually recovered, till the fifth day, when, prompted by the desire of making a trial of her strength, she walked, with the assistance of her husband, several times about the room. This exertion, just at this time, conjoined perhaps with other causes arising from want of discretion, brought on a relapse. All the symptoms which characterize the disease became more aggravated, and more unmanageable; and the most active remedies served no other purpose than to mitigate their violence. — She died on the eighth day.

It may not be improper to remark, that these persons were simultaneously exposed to similar exciting causes, and were seized with the fever at the same time.

That the existence of the malignant fever depends upon the combined action of its remote, predisposing and exciting causes, is universally allowed. The last, however, determines the period of attack; for the system may be subjected

to the influence of the first two, without having its functions perceptibly impaired.

On the 8th of August, I was called to Mrs. —. She labored under the most excruciating pain in the head, that I recollect to have met with in any instance. It was evident, the most energetic measures must be promptly taken to subdue the violence of the disease. Accordingly, I proceeded to administer suitable remedies, but was prevented by a most injudicious interference on the part of her mother. This lady remonstrated against her taking the medicine I had prepared, as she said, on account of her conviction, that she did not require medical aid. This, however, was only the ostensible reason, for I afterwards learned, that the pill I intended to give, was the cause of her opposition, from the supposition that it was composed of mercury. She also told me, with much sang froid, “she would take her daughter under her own charge; and, if she were not better the next day, she would deliver her up to me.” Notwithstanding I represented to her, that the case was extremely urgent; there was not a moment’s time to be lost; and unless the patient were placed under my care immediately, I should positively decline attending her at all; she persisted, however, in her resolution; and the daughter acquiesced in the decision of her mother. The former, however, desired me to leave the potion I had ordered; to which, after much importunity, I reluctantly consented. She, in the course of the night, took the medicine, without receiving any permanent benefit; but the auxiliary remedies, which essentially contribute to the cure of diseases of this kind, were neglected altogether. The next morning I unexpectedly found her in the room with her son, and was requested to prescribe for her, which, under existing circumstances, I had not the resolution to refuse. — She died on the fourth day.

The complaint in her head was the leading affection,

during the whole course of the malady. The brain soon discovered signs of torpor, which continued to grow worse, until coma supervened. The abdomen became tumid, and a livid suffusion occupied the whole body. The respiration was hurried and difficult, which, in this disease, is always an infallible sign of a speedy dissolution. She, at an early period, lost the power of deglutition, and external applications were the only means of producing a salutary excitement. These were extensively employed, in particular, affusions of cold water to the head and chest, without any other result than a temporary reaction.

On the 14th, a young woman was taken at Mr. Hills, and removed on the following day to Hospital Island.

On the 18th, I visited Mrs. Duncan. At first the disease was very mild, but on the third day it was much worse than was anticipated.— She recovered.

On the 23d, David Cushing and Nathaniel Reed were attacked with great severity.— These recovered.

On the 2d of September, an apprentice of Mr. Page was severely seized, but soon recovered.

On the 7th, I was called to Mr. John Wheeler.— He recovered.

On the same day, Horace Brooks was attacked with great violence.— He recovered.

On the eighth day, Edgar Brooks was severely attacked.— He recovered. In the evening I prescribed for a man at Mr. Jones', who was removed to Hospital Island on the fourth day.

On the 12th, Mrs. Ruddock was taken. Her case was mild, the only threatening symptom being a sphacelation of the part that was blistered, which, in the event, proved to be superficial.— She recovered.

On the 14th, Mrs. Bacon and Mr. Huntley were seized. They were dangerously sick.— They recovered.

On the 23d, Mr. James Reed was attacked. His disease was very obstinate.—He recovered.

In addition to these, I visited four persons in consultation.

Of the above mentioned patients, so far as information could be obtained by the most careful inquiry, five had not been exposed to the atmosphere on the south side of Fort Hill; if we add also those who probably took the disease from communication with the Ten Brothers, and who resided at this place, the number that received the disease from a domestic source, will be, upon the whole, very much circumscribed.

The cases of those who labored under disease, resembling the malignant fever, are of course omitted, as well as of those who had so strong a predisposition to this disease, that, unless they had, in season, availed themselves of medical aid, they would probably have had to encounter this formidable epidemic.

Yours, respectfully,  
WM. INGALLS.

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Boston, Oct. 29, 1819.

MR. P. P. F. DEGRAND.

SIR,—I send you for insertion in your Report, the following meteorological observations, made by my pupil, Mr. Champney, presuming it would be interesting to know the temperature and state of the weather, during the prevalence of the fever.

Yours, respectfully,  
WM. INGALLS.

## METEOROLOGICAL JOURNAL

*For July, August, and September, taken at 3 o'clock, P. M.,  
in situation just four degrees cooler than the shade of the  
Oak Tree on the Common.*

<i>July.</i>	<i>Ther.</i>	<i>Winds.</i>	<i>Weather.</i>
1	80	SE	cloudy.
2	81	SW	do
3	76	SW	do
4	72	SE	clear
5	65	W	do
6	66	E	do
7	72	SE	do
8	82	SW	do
9	83	W	do
10	89	W	do
11	89 5	W	do evening showers, thunder and lightning.
12	85	W	clear, evening lightning.
13	86	W	do
14	73	ENE	do
15	81	ESE	do
16	83	SSE	rain fell $\frac{4}{5}$ of an inch, on level.
17	78	ESE	clear, evening showers.
18	81	E	do
19	78	E	do
20	78	E & SE	do
21	78 5	E	do
22	79	W	do
23	84	SW	do
24	81	ESE	do
25	78	E	cloudy
26	73	ENE	do
27	73 5	NE	rain fell $1\frac{1}{4}$ inch on level, after- noon, thunder.
28	83	SE	clear. Evening shower, and thun- der and lightning.
29	84	SW	clear. At 5, P. M. showers, thun- der and lightning.

July.	Ther.	Winds.	Weather.
30	88	SW	clear
31	91 5	SW	clear

Greatest heat in July at 3 o'clock, P. M., 91 5.

Least heat in July at 3 o'clock, P. M., 65 0.

Average 80.

August.	Ther.	Winds.	Weather.
1	92 5	SW	clear
2	89	SE	rain fell $1\frac{7}{10}$ inches, with thunder and lightning.
3	84	W	clear.
4	76	W	do
5	78	W	do
6	79	W	do
7	87	W	do. Evening shower, thunder and lightning.
8	85	SE	cloudy, showers, thunder and lightning.
9	84	W	heavy rain morning, clear day.
10	83	W	clear
11	82	S	do
12	88	W	do
13	87	W	do
14	83	NW	cloudy
15	79	E	do
16	70	NE	cool, cloudy, and rain, fell this day $\frac{7}{10}$ of an inch.
17	68	E	rainy, fell this day $\frac{3}{4}$ of an inch.
18	73	E	clear.
19	76	W	do
20	83	W	do
21	82	E	do
22	83	S	cloudy
23	74	W	clear
24	71	W	do. cool nights
25	74	E	do
26	70	E	cloudy
27	72	E	clear

<i>August.</i>	<i>Ther.</i>	<i>Winds.</i>	<i>Weather.</i>
28	69	NE	rainy, fell this day $\frac{3}{4}$ of an inch.
29	75	NW	cloudy and rainy, fell this day $1\frac{1}{10}$ of an inch.
30	73	NW	clear
31	72	E	do

Greatest heat in August at 3 o'clock, P. M., 92 5.

Least heat in August at 3 o'clock, P. M., 68.

<i>Sept.</i>	<i>Ther.</i>	<i>Winds.</i>	<i>Weather.</i>
1	80	SW	clear.
2	85	SW	do
3	88	SW	do
4	85	SW	do
5	78	NE	do
6	77	SE	do
7	76	SW	cloudy and rainy. Evening, thun- der and lightning.
8	74	NE	rainy
9	79	NW	clear
10	74	N	do
11	72	W	do
12	75	SE	do
13	73	SW	do
14	70	NW	clear day, morning rainy, night frost.
15	65	NW	cloudy
16	65	E	do
17	64	SW	do
18	73	S	clear
19	66	N	do
20	61	NE	cloudy
21	58	NE	clear
22	62	NE	cloudy
23	64	NE	do
24	68	SE	do
25	65	SE	heavy rain, commencing at 3 A. M.
26	62	NNE	heavy storm, excessive rain, fell nearly three inches on level.
27	71	SW	clear

<i>Sept.</i>	<i>Ther.</i>	<i>Winds.</i>	<i>Weather.</i>
28	68	SSE	cloudy
29	63	NNW	do
30	67	N	clear

Greatest heat in September at 3 o'clock, P. M., 88.

Least heat in September at 3 o'clock, P. M. 58.

Average 71.

N. B. Adding four degrees to each month, gives the average heat at 3 o'clock, P. M., as it was on the Common under the shade of the oak tree, where the thermometer was repeatedly placed without being exposed to the open sun.

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Boston, Nov. 6, 1819.

MR. P. P. F. DEGRAND.

SIR,—I am so much impressed with a belief in the general, and almost necessary connection of an exciting cause of the yellow fever, that were I to enter a city, and meet its inhabitants under the first impressions of terror and distress from its appearance, my advice should be, “Beware, not of contagion, for the yellow fever of our country is not contagious, nor of putrid exhalations, when the duties of humanity or consanguinity require your attendance, but beware of exciting causes!”

This pathetic appeal of the eloquent Rush to the sensibility of the reader, must make a deep impression on the mind of every person, who has been conversant with the scenes of distress, occasioned by the alarm attendant on the prevalence of the yellow or malignant fever. The numerous evils to which the inhabitants, who are deserted, and those who betake themselves to flight, are liable, cannot be too strongly portrayed.

How much the distress and misery of those who remain, are augmented by the departure of their neighbors, may be readily comprehended by a little reflection.

1st. The very removal of the inhabitants is predicated on the belief, that the place is contaminated by the most deadly pestilence ; and, therefore,

2dly. All business is suspended, and the industrious become idle and disconsolate, and consequently predisposed to receive contagion.

3d. The supposed contagious nature of the disease, which is also inferred from the flight of the inhabitants, so far impedes the intercourse with those who remain, that the means of subsistence are not easily obtained, and the sufferings of the poor are increased by being debarred from seasonable supplies from the fair hand of charity.

4. Owing to the same cause, the sick, however affluent their circumstances may be, have it not in their power, on any condition, to procure such assistance as their cases demand.

On the other hand, were we to view the yellow fever, to be one of those "ills flesh is heir to," and, instead of permitting ourselves to be appalled by terror and dismay, were we to confront this formidable enemy, attack him with those powerful weapons which the God of nature has kindly put into our hands, and at the same time fortify ourselves by a regular diet and regimen, we should soon have cause to rejoice in the successful issue of the contest. Danger always lessens as we approach it. The first impression of terror is soon effaced, and the mind is enabled calmly and deliberately to devise the best methods of counteracting the desolating inroads of this horrid scourge. By tarrying to assist those who are not in a condition to remove, we have the proud satisfaction of enlisting ourselves in the cause of humanity, and substituting acts of beneficence for the degrading and selfish policy which induces us to abandon our fellow-citizens in distress. It is not my intention to persuade my fellow-citizens not to quit their habitations, or relinquish their employments, for the mere purpose of performing a

benevolent deed, or making a display of heroism ; but to convince them, the amount of evils attendant upon a general removal, is, by far, greater, than what would be experienced by the inhabitants, were they all to remain. As it is, the preponderance of evils is evidently on the side of those who desert the infected spot.

Were our cities and towns to be forsaken by the inhabitants, when a malignant epidemic occurred, their ruin would be the inevitable consequence. There are, indeed, many diseases whose course is marked with as great ravages and devastation, as the yellow fever, without producing any extraordinary commotion among the people.

The epidemic peripneumony which prevailed in this place, and many other parts of the country, in the winter of 1812 and 1813, was proportionably more destructive than the malignant fever ; yet the community remained undisturbed ; and each man pursued his business with as much regularity and unconcern, as in the most healthy season. Many places in the vicinity were exempt from its ravages ; consequently, the escape from an attack was as practicable, as in the late epidemic, and perhaps even more so ; for there exists such an intimate connection of the remote, predisposing, and exciting causes with the particular constitution of the atmosphere, that the production of the disease may be ascribed to the combined and simultaneous operation of the whole. The impression made upon the system by the atmosphere, which, without doubt, is the remote cause, is transient, and by change of place, almost immediately vanishes.

In the yellow fever, the remote, predisposing, and exciting causes, arise from different sources, and may be successively applied, and at times considerably remote from each other, before the disease manifests itself. Thus, a person who has been exposed to the influence of the contagion, or the remote cause of the epidemic, when he repairs to a

healthy situation, may carry with him the seeds, and, of course, is not secure against an attack; nor is the disease rendered less virulent.

If in the peripneumony, as in the yellow fever, the inhabitants on the first impression of alarm had always fled, such confusion would have followed, that the attendance on the sick would have been irregular and insufficient, and confidence in remedies so much diminished, that physicians would scarcely have been capable of forming a proper estimation of the effects of their prescriptions. On the reappearance of the disease the alarm would be renewed, the same scene would be acted over again, less confidence placed in remedies, and, consequently, more indecision in the treatment, until the increasing apprehensions of the multitude would have magnified it to a most deadly pestilence. But by remaining and affording to the sick all the aid in their power, the physicians had a fair opportunity of investigating the cause and seat of the disease, and the proper remedies; and, after having tested several modes of treatment, they have generally adopted one, that is attended, for the most part, with success, and the disease is in a great measure disarmed of its terrors.

Yours, respectfully,

WM. INGALLS.

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Boston, March 24, 1820.

MR. P. P. F. DEGRAND.

SIR, — The *CYNANCHE MALIGNA*, or, as it is in this place vulgarly called, the canker rash, the putrid sore throat, or throat distemper, is, in some seasons, a most destructive epidemic.

Those who have been much conversant with the history of this distemper, will allow, that the terror of the people and the anxiety of physicians have heretofore been too well founded.

While I was prosecuting my medical studies, an elderly gentleman told me, that in the town where he resided, and at an early period of his practice, the cynanche maligna was so general among children from one to seventeen years of age, and the cases which terminated fatally were so multiplied, that a chasm was made in the number of the inhabitants, which was perceptible at the time he was conversing with me, among persons of a particular age. Soon after I commenced practice it raged with great violence; breaking over its usual boundaries, not sparing even those of an advanced age, and proving extremely mortal. Since this period it has prevailed repeatedly, but owing either to the mildness of the symptoms, or to the adoption of a more appropriate method of cure, it has much more readily yielded to the influence of medicine.

This malady generally prevails in districts, and rarely extends over an extensive territory at any one period, hence an escape from the vitiated atmosphere is quite practicable; and its being confined principally to children, the avoidance of the remote causes can be accomplished with infinitely more ease, less expense and interruption to business, than in the malignant fever, in which youth are principally the subject of attack. But the general disposition to omit the observance of precautionary measures, is not wholly destitute of benefit to the community. It has afforded an opportunity of examining minutely all the phenomena of the disease, and establishing a rational mode of cure, which desirable object would have been frustrated, had the people been embarrassed with the indecision and confusion necessarily connected with a state of alarm and the hurry and bustle of a removal.

The SMALL POX has been the most destructive scourge with which mankind has ever been afflicted. Neither climate, nor season, nor country, have prescribed bounds to its desolating progress. The inroads it formerly made in every quarter of the globe, form a melancholy proof of its uncon-

trollable nature. It spared neither age, nor sex, nor rich, nor poor. Whole nations have become extinct, and whole districts nearly depopulated, by its exterminating influence. This disease, whose sphere of activity had not hitherto been circumscribed by any law of nature, was at first disarmed of its malignity by the ingenuity of physicians, and at length fortunately subdued by a most providential discovery.

In Boston the prohibition of the propagation of the small-pox by general inoculation, and the laws for preventing its introduction by casualty, are still in existence. In consequence of these provisions, we had, previous to the discovery of the kine-pock, an opportunity of observing the effects of the quarantine laws, and the sources whence proceeded the fomites of this disease. Sometimes, after a vessel had undergone a thorough process of purification, and had arrived at the wharf, some of the crew were attacked with the symptoms, but as the disease does not become contagious until some time after the eruption has made its appearance, they were, in general, seasonably removed to Hospital Island to prevent its communication to the inhabitants. The disease, however, was more commonly introduced by seamen, who had come by land from some sea-port of the United States. These were also usually removed in season, or if any of the inhabitants were subsequently attacked, they were also sent to the island, provided their consent could be obtained. In case they refused to comply with the orders of the selectmen, they were excluded from all intercourse with their fellow-citizens. Notwithstanding similar regulations existed throughout the State, the disease, in some of the outposts, would break out, and attack such a number, as to produce a general alarm. As the disease was known not to have a domestic origin, and the people not readily yielding to the belief of its importation, they almost invariably imputed its propagation to the designs of interested and avaricious physicians.

In this place similar alarms occurred, and were often at-

tended with serious consequences, by deterring the people from visiting Boston, either for the purpose of supplying the market, or transacting business. In those years, when the constitution of the atmosphere was particularly favorable to the dissemination of variolous contagion, in spite of the utmost vigilance of the police, instances of the casual small-pox were numerous, and exaggerated reports respecting the state of the disorder were extensively circulated, and all the evils arising from a temporary suspension of intercourse between town and country were experienced.

After all the precautions that were taken to prevent the introduction of the small-pox, it became necessary in the course of every fifteen or twenty years to permit it to go through the town. It does not come within our province to detail all the disadvantages attendant upon the sudden and general introduction of a destructive disease in a populous place. The last time it prevailed here, afforded a melancholy evidence of the inefficacy of the policy that had at all times been adopted by the citizens of Massachusetts. Those cities that had made no restrictive regulations with regard to the small-pox, have suffered comparatively much less inconvenience.

These observations do not, perhaps, in all respects apply to contagious diseases which may attack the constitution more than once; this, however, is certain, that in those countries where the small-pox came daily under the cognizance of physicians and men of science, they had an opportunity of observing its phenomena, ascertaining the best means of counteracting its baneful effects, and in the end of discovering a preventive of this loathsome malady. Precautionary measures should at all times be observed, so far as they are necessary to prevent the introduction of contagious diseases; but the dispersion of the inhabitants to stop their progress, must be admitted with great caution.

Yours, respectfully,

WM. INGALLS.

Boston, April 10, 1820.

MR. P. P. F. DEGRAND.

SIR, — The importance of this subject to the mercantile part of the community, and the numerous classes of citizens that depend upon commerce for their maintenance, is my apology for being rather prolix and circumstantial in the arguments, that may tend to support the opinions I may advance.

The indestructibility of the various cōtagion by frost, as well as the contagions of the cynanche maligna, measles, hooping cough, mumps, &c. ; and also the fact, that in cold weather a constitution of the atmosphere may be formed favorable to the production of these diseases, show that several destructive maladies may prevail in the depth of winter. If to these be added spotted fever, and influenza, it will appear that cold, which arrests the progress of malignant fevers, forms no barrier to the invasion of diseases, whose termination is equally rapid and fatal. On these occasions, the people rarely resort to a change of residence.

The cause of the general disposition to remove, when a report is in circulation that the malignant fever has made its appearance, may be traced to the measures European countries have employed in preventing the introduction and propagation of pestilential diseases. The salutary results of the quarantine laws, whenever they have been adopted and rigidly observed, have been so manifest, as to beget a general conviction, that the exclusion of pestilence is at all times possible.

The wisdom of these regulations have been so apparent, as also to induce the belief, that similar benefits would ensue from the desertion of infected places ; but upon a full investigation of the events which happen at such times, it seems that such a procedure may, at least, be deemed problematical.

A communication which appeared in the Daily Advertiser,

will preclude the necessity of an attempt to give a general history of the malignant fever; I shall, therefore, content myself with detailing those facts, that came particularly under my notice.

The persons who belonged to the ship Ten Brothers, and who came on shore, and for a short time took lodgings in Ann street, did not communicate the infection to a single individual.

The residence of Captain Eaton was in Belknap street, in a large, well ventilated house. This gentleman received the most particular and assiduous attention from his relations; who did not relax one moment in their exertions to render his situation as comfortable as possible, nor in their observance of the directions which his case appeared to indicate. Not an individual was infected in the slightest degree, unless it were Captain Morfield.

This gentleman, the son-in-law of Captain Eaton, was most indefatigable in his attendance, scarcely allowed himself a moment's repose before his father expired, and after his death accompanied his corpse to the place of interment. Owing to some circumstance, he was obliged to tarry some time in the burying-ground for the sexton, in order to obtain precise information of the place where the body was to be deposited. Being exhausted with fatigue, he incautiously laid himself down on a small mound, and fell asleep, in which state he remained for some time. Soon after his return, he began to experience slight pains in the head and limbs, dizziness, and some debility. He immediately made a cold application to his head, immersed his feet in tepid water, and when I arrived, which was in about an hour and a half after the attack, there was a fine moisture on his skin, and he was much relieved. A few doses of laxative medicine restored him to health. How far these symptoms were the precursors of the malignant fever, I will leave the reader to determine.

Mr. Kimball was taken sick in Water street, in the house of a Mr. Meriam, who had just expired with the malignant fever. There is no doubt, that these gentlemen received the infection from the same source. The family did not remove, nor did they suffer the slightest attack.

It is not necessary to enumerate all the instances of the kind, where contagion was not communicated to the members of the family, in which those who labored under the disease lived.

On the south side of Fort Hill, where the fomites of the fever was considered to be the most concentrated, according to my observation, nothing was gained by a change of residence.

In the house belonging to Mr. Whitney, Mr. Rufus and Ephraim Shattuck, and Mr. Bennett, had the disease, and recovered. Mr. Whitney and family removed to a distant part of the town, on the day that Mr. Ephraim Shattuck was taken sick; he lost his wife and one child with the malignant fever. After the recovery of Mrs. Bennett, she and her husband went into the country, where the latter was taken sick with the malignant fever, and died. Mrs. Shattuck, the mother of the two young gentlemen of the same name, came into town to visit her son Ephraim, who was laboring under the disease, and after his recovery returned to her residence in the country, and died of the fever.

It seems from the foregoing account, that out of the number that removed four died, of those that remained not one. It ought not, however, to be omitted, that Mr. Whitney and several children did not experience the slightest indisposition; and the nurse, who continued in the house during the whole sickness, did not suffer in the least.

The melancholy fate of so large a portion of those who removed from this house, made a deep impression on my mind, and first suggested the idea that it was possible, that the almost universal practice in the United States of desert-

ing the place, where the fomites of the malignant fever was believed to exist, had its origin not in a deliberate examination of the subject, but in the hasty yet natural inference, that "it is more wise to shun danger than to encounter it."

Mr. Whitney's was the first of a wooden block consisting of three houses. In the second I visited a family who were affected with the fever, in which it did not prove fatal in a single instance. In the third and last of the block, a family consisting of seven, five of which had the fever, and one case terminated fatally. In the next house there was a large family, and only two took the disease, one of whom died.

There was, perhaps, no spot considered to be infected, where the atmosphere was so vitiated.

I visited a young woman in Purchase street, at Mr. Hill's, for about two days, when she was removed to Hospital Island. — She recovered. The violence of the disease, however, had in some measure subsided previous to her removal.

Mrs. Badger, a relation, who had devoted her whole attention to her, while the former remained in town, returned to her own house in Middle street, was attacked with the fever, and died. It may be remarked in this place, 1st. That Mrs. Badger's fate could not have been worse, had she remained at Fort Hill. 2d. There was not one of her family, attendants or visitors, who suffered from the effects of the contagion.

Mr. Wendell, who had repeatedly visited Ephraim Shattuck at Mr. Whitney's house, was taken sick in Broad street, and removed to Hospital Island, where he died. By a change of residence at that period of the fever all the symptoms were aggravated, and his chance of recovery was greatly diminished.

From what has been said, it is presumed it will not be hazarding too much to say, that not one patient was benefited by change of residence; and, of those persons who were

exposed to contagion, there is no evidence that any avoided an attack by having recourse to the same expedient.

Yours, respectfully,

WM. INGALLS.

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Boston, May 22, 1820.

MR. P. P. F. DEGRAND.

SIR,— In my last number, it was inferred, that not one patient was benefited by a change of residence; and, of those persons who were exposed to contagion, there is no evidence that any avoided an attack by having recourse to the same expedient.

It would be in vain to attempt to conceal, that not only the practice throughout the United States, but particularly the measures pursued by the Board of Health of the City of New York, in 1819, tend to establish the converse of the opinion here advanced. Consequently, it becomes my duty, to give to such objections as may be urged the most mature consideration. This will be in my power partly to accomplish, by having in my possession a pamphlet written by Dr. Felix Pascalis, an able and learned practitioner of medicine in the city of New York, containing a statement of occurrences during a malignant yellow fever, in the summer and autumnal months of 1819.

This production is divided into five sections; the first two treat of subjects to which we shall turn our attention on a future occasion; the next two give the proceedings of the Board of Health in effecting a removal of the inhabitants from the infected spot. These are immediately connected with the subject of this communication.

The third section contains an account of the cases of the malignant yellow fever, which occurred “from the 30th of August, 1819, to the end of the epidemic season.”

In this section we find, indeed, much useful information, but it by no means confirms the benefit that is supposed to arise from flight, in checking the progress of the malignant yellow fever. On some points we are left in the dark, and are not furnished with data sufficient to form a correct deduction. At the outset, the learned Doctor, with an honesty and frankness worthy of a liberal and independent mind, acknowledges he has “excluded, as the Board of Health have done, instances of disease not exactly defined by competent authority, as malignant or yellow fever. Cases originating on board of vessels, or, as has been supposed, on the quarantine ground, have been omitted as irrelevant in the examination of the question of domestic or foreign origin in the city. Many persons who had removed from the proscribed limits or vicinity, and who had carried with them the seeds of the disease, and perhaps died at a distance, could not with authenticity be added to our catalogue. We will, therefore, take notice only of those who remained under the jurisdiction of our Board of Health.”

Thus the ability of forming a correct estimate of the depredations, committed by this destructive epidemic, is much lessened, and the means of information reduced to very narrow limits. The acknowledgment, that the fever proved fatal to some of those who were dispersed over a large extent of country, and “who carried the seeds of the disease with them,” demonstrates, that the expectation of escaping by flight from the disasters that are incident to exposure to contagion, is not realized. If, indeed, the great object was gained, still it might remain a question, whether the people would not be liable to evils of equal magnitude with those they hoped to shun. It is a consideration of no little moment, that the diseases, casualties, and privations, which may happen to those who are compelled, suddenly, without preparation, and even without the means of providing comfortable accommodations, to seek a refuge among strangers,

some of whom, apprehensive of danger, would forbid their approach, while others, taking advantage of their necessity, would subject them to every species of extortion, are sufficient to counterbalance the advantages to be derived from change of situation. But if, in addition to these sufferings, they continue to fall victims to the malignant fever, their condition is rendered more deplorable, than it was before they abandoned their homes.

Besides the class of citizens who removed, and of whose fate we have no correct documents, we are furnished with an account of two hundred and fourteen. Of this number, seventy-six were seized with the malignant yellow fever, of which thirty-eight died. The fate of four is not mentioned.

The nine first, that were assailed with the fever, died. Upon this fact the author remarks, "At this period of time, and within two or three days from the first intimation of the appearance of the malignant fever, we already count nine victims, and no case of recovery; which result unquestionably proves, that without the promptness of execution in the measures of the Board of Health, which we will hereafter indicate, the mortality would have been truly calamitous."

In Boston the first six that were taken, died, and although there were no prompt measures taken to remove the inhabitants, yet the mortality was not greater in proportion to the number of sick in this place than in the city of New York. In this last place, some of the physicians were not decided as to the type of the disease, until many cases of this number had become incurable. Hence it may, at least, admit of a doubt, whether the first nine patients who fell victims, can with propriety be adduced in favor of the course that was taken by the Board of Health of New York. To confirm this inference, we shall transcribe the case of John Davis.

"This is the fourth fatal case of a lurking disorder, before any official communication was given to, or promulgated by,

the Board of Health. He lived at 72, Front street, and in a spot where the mortality had been proportionally the greatest. He had complained many days; took to his bed on the 3d; and died on the 5th of September. It was when nearly expiring, that a neighbor reported him to the Board. Dr. Hicks, one of the assistants, who saw him a corpse, pronounced him a case of yellow fever, as bad as he had seen in 1798."

It seems that this patient was reported by a neighbor, and that no physician saw him till he was a corpse. It is true the skill of the physician, and the most faithful attention on the part of friends, cannot ensure life, but these are requisite conditions to make the interposition of municipal authority necessary.

In case No. 2, we are also indebted to the observation of an intelligent neighbor for information respecting the nature of the disease.

Even in No. 5 and 6, the physicians were not fully satisfied of the type of the disease, until a late period.

Again, one of the nine was taken sick at Governor's Island, and two others were sent to quarantine. That the exposure attendant on a removal, and the consequent absence of that attention and those remedies, required in a complaint so rapidly deleterious, augment the malignity of the fever, and diminish the chance of recovery, will not be denied.

Upon the whole, the fatal termination of these cases must be attributed to the confusion and consternation that always take place on the first appearance of the yellow fever, rather than to want of success in the treatment of diseases of this description.

In No. 38 it appears, "Gaul Bogg resided in the third story of the house No. 19, Old Slip, the corner of Water street; he had been removed by the public authorities, and afterwards returned. No person, except his family, knew anything of him. He had no physician, and the first information received was that of his death."

I have transcribed this case, because it affords an argument of considerable weight against adopting compulsory measures to effect a removal of the inhabitants. In this place a disposition was manifested by many to conceal their cases from the public, for fear of being subjected to the orders of the Board of Health. The same motive impelled some to defer sending for medical assistance, until their situation became truly deplorable.

The advantage of ventilation and cleanliness in preventing the immediate communication of contagion from one person to another, is established almost beyond a doubt. Incontestable testimonies may be brought to verify this assertion. From the cases of the Messrs. Van Ness, who undoubtedly lived in a house with spacious and well ventilated apartments, it appears the most free and unlimited intercourse was permitted between them and numerous acquaintances without imparting contagion to any one, unless it were the nurse. This person was in the habit of frequenting houses situated on the infected spot; and the doctor thinks her sickness was owing to this cause, and not to her nursing the Van Nesses; but were this not the case, she might have been exposed to the noxious vapor arising from the clothes of the deceased, which might not have been subjected to proper purification before the excretions had undergone the change required to produce contagion.

From the best information that I have been able to obtain I am fully persuaded, that infected clothing and goods were the most fruitful source of the malignant fever in this town; and I feel inclined to believe, that the fever in New York originated from a similar cause *from a fact stated in the pamphlet before mentioned.*

In the fourth section it is stated, that "for securing the district from depredation, the Board of Health, in the name and by the authority of the Common Council, provided watchmen and a double guard employed in the safe keep-

ing of an immense property within prescribed limits. Public authority was pledged to afford them medical aid in case of sickness, and a liberal continuation of their salaries during the time in which they might incur the common danger for the public good."

The large body of men employed in this service, without an individual falling a sacrifice to the epidemic, affords an instructive lesson to the advocates for vacating the infected spot. What was effected for the protection of property, shows what might have been done for the preservation of the health of the inhabitants, had they remained. Had the Board of Health hired men to have seen that regularity and order were preserved by day and night, that a suitable number of responsible nurses and attendants were appointed to take care of the sick, and a faithful and capable person to conduct the purification of the apartments when necessary, and dispose of the bedding, and that medical aid was had at the first intimation of indisposition, the disease, it is presumed, would have been arrested, and the bill of mortality would not have exceeded its present number. I do not mean by these observations to deny that the spot designated by the doctor was the place where the disease originated. Nor is it material whether the disease had a foreign or domestic origin, with regard to the doctrine I wish to establish, because the watchmen and double guard, who escaped unhurt, must have been exposed to the influence of contagion, daily, and for a sufficient length of time.

Yours, &c.

WM. INGALLS.

## REMARKS ON YELLOW FEVER.

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A LETTER ADDRESSED TO WILLIAM INGALLS, JR., M. D., RESIDENT  
AT LAUREL HILL, WEST FELICIANA, LOUISIANA.

Boston, August 6, 1841.

MY DEAR DOCTOR:—It is announced in the public prints, that the yellow fever is prevalent in Havana; and, as at former periods, it is not impossible it may make its appearance at New Orleans; and having been informed last summer, by your friend Mr. Barrow, that the last time the yellow fever prevailed at New Orleans, it extended as far as Bayou Sara, in the vicinity of the place where you reside, and that scarcely an individual attacked with the malady recovered, I am induced to submit for your consideration the mere outlines of the manner in which I treated the disease, supposed to be imported into this city in the ship *Ten Brothers*, in the summer of 1819. To effect this object as briefly as possible, I shall relate the history and treatment of three of the worst cases that came under my care, which recovered.

CASE 1st.—I was called at early dawn to visit E. Shattuck, a grocer.\* The patient had been laboring

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\* In his store were found a number of coffee bags, which were burnt in Broad street, opposite to the store which Mr. Shattuck occupied.

under the disease about six hours. This was the most *ardent* case of fever I attended during the season. His eyes were bright and glistening, accompanied with a malignant and stern look; the face flushed, and did not assume the indescribable aspect peculiar to the yellow fever in less ardent cases, until the yellow suffusion made its appearance;\* the heat pungent and burning; the action of the heart, as indicated by the pulse, rapid, struggling, and very irregular, imparting to the touch, however, the sensation of fulness and hardness; and the countenance expressive of great anxiety and distress; pains in the head, back and limbs; the tongue was thick, narrow, and pointed, with the borders red, and a white fur in the centre.

*Treatment.* — The first step taken was to shave the crown of the head; then the application of large linen cloths wet with cold water, fresh from the pump, was made to the head suddenly and repeatedly — this mode of applying cold water was substituted for affusion — until the violence of the action of the heart was, in some measure, abated, when a vesicatory was applied. After the application of cold water, an emetic, composed of six grains of tartrate of antimony, was given, which continued to operate copiously for about four hours; in this, and in most instances, accompanied with dejections. The stools and the matter ejected from the stomach were bilious. As soon as the vomiting ceased, the patient was ordered to make use of, for his com-

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\* The appearance of the countenance has been represented to be similar to that of "any person with a florid complexion, during the burning of spirits of wine in a dark room;" to me as unsatisfactory a resemblance, as the highly extolled paintings by Henry Williams, Esq., in the room of the Board of Health; or as the description of the pulse by Dr. Rush, justly entitled to the highly honorable appellation of the American Sydenham.

mon drink, an infusion of one ounce of the leaves of senna, and an equal quantity of balm\* [Melissa Officinalis. Herba], in a quart of water. The infusion was continued until the discharges became small, and assumed a light brown color. At this period, which may be considered as the termination of the first stage, a remission took place, that lasted several hours, when the fever returned with aggravated force.

During the remission the patient was allowed to sit in a chair, until he took a cup of tea; and his bed-clothes and bedding, if necessary, were changed. The remission of the fever, the corresponding subsidence of its symptoms, and the consequent tranquillity experienced by the patient were so great, as would be likely to deceive the unwary practitioner. These flattering appearances were soon changed into symptoms of great severity and danger. In this instance a circumstance took place, which determined, with very considerable precision, the duration of the *first stage*. On the second day of my attendance, at ten o'clock, there occurred a remission, which was announced by hemorrhage from the nose, amounting, according to my best judgment, to a gill. In about half an hour afterwards as much more blood was discharged. I saw the patient at early dawn — say four o'clock; from this time to the time the epistaxis happened was thirty hours; to this add the time at which we dated the attack, and it will make the duration of the first stage to be thirty-six hours. The *second stage* was ushered in by a tense, circumscribed, and excessively tender tumor in the epigastric region, and the return of porraceous dejections.

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\* The balm is added to render the infusion more palatable.

*Treatment.* — To counteract the effects of these symptoms, a blistering plaster of four inches by five was applied, and the administration of the infusion of senna and balm resumed and continued, until the tenderness and tumefaction of the stomach subsided, when a slight remission followed.

The *third stage.* — The prominent symptoms of the third stage were a puffy, or meteorismic, inflation in the hypogastric region, easily compressible — or, in other words, by no means tense — and but slightly tender when compressed; a cessation of the pulse in the radial artery; a lividness commencing at the fingers and gradually extending upwards to a little above the wrists, and at the toes to a little above the ankles; stomach extremely irritable, rejecting instantly the least particle of liquid; dejections had ceased, the last were small and of a light brown color; and the patient lay motionless on his back. The lividity of the extremities remained more than twenty-four hours before it began to disappear; and it was nearly forty-eight hours before a slight fluttering in the pulse was perceived, or the stomach retained liquids. During the convalescence solid food was introduced with great caution.

*Treatment.* — The application of a vesicatory four inches square to the tumor, with strict injunctions not to give the patient even a particle of liquid of any kind.

CASE 2d. — August 29th, Mr. — Kimball was taken. He resided in Liberty square. He had been engaged in collecting the “scrapings” of the hold of the ship Ten Brothers, and was consequently exposed to the fomites of yellow fever. I visited him at noon, just after Mr. Meriam — who was attended by Dr.

Mann, Surgeon in the United States Army — with whom he boarded, had expired. He had been indisposed several hours before I saw him. His symptoms at the onset and during the course of the disease were not of so high a grade as in the first case. A similar course of treatment was adopted, with the exception of the application of cold water and the vesicatory, that is, the head was shaved and an emetic administered. The duration of this stage was conjectured to be about forty-two hours.

The remission, which occurred on the morning of the 31st, lasted from six to eight hours. During this period he sat up in his chair some time, drank a cup of tea, had his bed made up afresh, and was perfectly tranquil till four o'clock, P. M., when

The *second stage*, as was anticipated, commenced, attended with symptoms similar to those in the first case; and, of course, a similar mode of cure was pursued.

The *third stage* presented the same phenomena as in the first case, and similar remedies were prescribed. It, perhaps, may be proper to observe, in this case, that the irritability of the stomach was not so great, nor the cessation of the pulse of so long continuance, nor the lividity of the hands and feet of so deep a hue, as in the first and third cases.

CASE 3d. — September 7th, 1819, J. W. was seized with the fever. The source whence the disease originated was not ascertained. His sister was previously attacked with the fever, of which she died. In Mr. W.'s case the several stages of the disease were as well marked as in the first case, and the same course of treatment was observed, with the exception of the ap-

plication of a vesicatory to the head. In the last stage, when the pulse had ceased to throb, the hands and feet were intensely livid a little above the wrists and ankles, and the stomach became excessively irritable; abstinence from liquids was rigidly enjoined. On my evening visit, however, I found a large pitcher of water was placed on a chair by his bed-side. I expostulated with him and the family for the breach of my express command. His bed was placed in the centre of a large square room, for the purpose of rendering the advantage to be derived from ventilation more complete; and, notwithstanding my positive injunction to abstain altogether from liquids, he took the pitcher and drank a large draught of cold water in my presence, which was instantly rejected with such force as to strike the opposite wall; and notwithstanding my apprehensions, that this indiscretion would render the case desperate, nothing occurred to show that this act was attended with the slightest inconvenience.

REMARKS.—The narrative of the following fatal case is here introduced, as it may, in some measure, serve as a guide in the treatment of this malady.

*August 15*, William McFarland, a house-carpenter, was attacked. On the Friday previous to the incursion of the fever he was indisposed, and called on me for advice. The arteries of the tunica conjunctiva being turgid, the pulse somewhat accelerated, and the tongue coated, denoted the period of incubation had commenced. These symptoms were so evidently indicative of the approach of the disease, I did not hesitate to advise him to go home, and make use of such remedies as the state of his case required. He was desirous of not relinquishing business till after Saturday; for

on that day, as is customary, he wished to pay off his hands, as well as to finish some work he had promised to do. I remonstrated against any delay, as it would greatly lessen the chance of recovery, but without effect. On Sunday I was sent for, and found him laboring under the disease. His head was shaved, and cold water applied in the usual manner, at various times, in the course of the day, until it had the effect of inducing a rigor. Being apprehensive this result might prove disastrous, recourse was had to such remedies as were calculated to produce most speedily a reaction. It did not appear, however, that the course of the fever was much disturbed by the occurrence. Mr. McFarland was sick in the upper room of a house in a block of buildings, and his wife, who was taken on the 14th, lodged in a lower room of the adjoining house. He rose on the night of the 17th, descended two flights of stairs, went out of doors, entered the room where Mrs. McFarland lay, and encamped on the floor. Thus, there was an interruption in the continuity of treatment, which is considered essential to the cure. On the fifth day, the powers of life being much prostrated, I procured a bottle of claret wine of a superior vintage, and permitted the patient to drink of it *ad libitum*. It was about three o'clock when he began to drink of the wine. At that time he sat up in a chair and conversed with me some time; his intellectual faculties through the whole course of the disease had not been much impaired. He expired about six o'clock. It appeared to me the wine was far from being attended with a beneficial effect. From this case I drew the inference in two important respects, that the application of cold may be persisted in

too long; and that stimulating remedies in the last stage, owing to their being liable to bring on reaction prematurely, should be avoided.

THEORY. — The cause of *yellow fever* produces an inflammation\* of the mucous membrane of the stomach, intestines, and the pori biliarii.† That the inflammation partakes, at least in one respect, of the nature of erysipelas,‡ appears from its frequently commencing in one portion of the alimentary canal, and being diffused over its whole extent, either uniformly, or in successive patches. In confirmation of this position, in many instances in 1798, the first intimation of the approach of the yellow fever was pain in some portion of the digestive tube, to which soon succeeded unequivocal symptoms that it had taken possession of the system. In the course of my practice in the same year, I met with two persons, each of whom complained of pain and tenderness in the right iliac region, embracing a spot of an extent just sufficient to cover the region of the cæcum. I told them these affections arose from an inflammation, which was the precursor of the prevalent fever, and that as soon as it extended as far as the stomach, its characteristic symptoms would make their appearance. My prediction was verified. Again, it appears from the anatomical investigations

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\* I am aware that Baron Louis says the inner membrane of the biliary ducts was not inflamed; but he has not shown what were the particular tissues of the liver that suffered from the action of the contagion, or "cause" of yellow fever.

† "Nor can we regard this alteration of the liver" — speaking of its paleness — "as the product of inflammation." — *Baron Louis*.

‡ "Un des caracteres non moins remarquable d'erysipèles, et qui lui mérite ce nom, c'est la facilité avec laquelle la phlegmasie se déplace, et tend à gagner en étendue."

of Baron Louis, in his invaluable work on the yellow fever at Gibraltar (translated by G. C. Shattuck, Jr., M. D.), that, at times, the "cause" of the disease acts with unequal energy on the several portions of the digestive canal, and even on different parts of the liver; so that the features of the disease are modified according to its seat, as well as the intensity of the inflammation. The fever does not assume its true character, or proper type, until the inflammation\* reach to the mucous membrane of the pori biliarii, and excite a secretion of acrid bile, which irritates the already too susceptible mucous membrane of the digestive tube. To remove this source of irritation, I placed my chief dependence on the thorough evacuation of the contents of the stomach and intestines. I did not, however, neglect to employ such adjuvants as might assist in subduing this formidable malady.—I shall now proceed to detail the effects of the REMEDIES that were prescribed, in the order in which they were administered.

*Cold.*—Having found cold applied to the head had a powerful effect in controlling the inordinate action of the heart, this remedy was resorted to in a degree proportionate to the violence of the febrile incursion. In severe cases the head was shaved, and large cloths wet with cold water were applied suddenly and repeatedly, until an impression was made upon the central organ of circulation, indicated by the diminution of the frequency and irregularity of the pulse. In milder cases the shaving of the head alone was suffi-

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\* The reader, if he choose, may substitute the terms, the "cause of fever," or irritability, or any other word, as by the term inflammation, I mean merely a morbid state of the tissues diseased.

cient. In some states of the disease, and some states of the patient, the application of cold in any form was thought to be inexpedient; and, of course, it was not advised.

There is a reciprocal relation between the functions of the liver, heart, lungs and brain, through the medium of the nervous system, and that of the circulation.\* When the function of one of these organs is disturbed, those of the rest suffer in a greater or less degree; and, therefore, the affusion of cold water to the head undoubtedly makes an impression on all the organs above mentioned; but, in this disease, the inordinate action of the heart is moderated mainly by the sedative power the remedy possesses of mitigating the morbid irritability of the tissues concerned in the secretion of bile. The application of cold may be carried so far as to produce a cold fit, a result that should be avoided. The application of cold to the head while the feet are immersed in warm water, has been recommended, and no doubt, under favorable circumstances, its use has been beneficial; but the difficulty of putting it in practice will be an obstacle to its being generally adopted.

Cold water dashed upon the chest makes a powerful impression on the respiratory apparatus, and on the organs of circulation; and, at times, in the last stages of this formidable malady, has arrested its career to a fatal termination. In one case that occurred in 1798, the foundation of recovery was justly attributable to the nurse's throwing cold water on the chest, laid bare, with both hands, from a pail at the bed-side, until it

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\* See Appendix.

roused the patient from the comatose state into which she was rapidly falling. From this time reaction gradually took place, and ultimately a restoration to health ensued. But in my practice in 1819, it did not appear to me advisable to adopt this remedy in a single instance.

During the prevalence of the yellow fever in 1798, mentioned in the above paragraph, by the recommendation of Dr. Eustis, afterwards Governor of Massachusetts, I threw several buckets of cold water on two individuals, who were in the last stage of the disease, without the slightest advantage. Dr. Whipple informed me he attended a patient in the same year, who recovered;—he attributed his success to sponging the patient several times a day all over the surface of the body with cold water.

*Epispastics.* — Subsequently to the application of cold water to the head, a blistering plaster was applied of a size sufficient to cover the crown of the head, as in the case of E. S.; but finally, when the shaving of the head, as it afterwards did, had the effect of controlling the action of the heart, the application of cold water to the head and vesicatory—these remedies being considered merely in the light of adjuvants—were omitted. In one instance, when the disease had continued twenty-four hours before I was called on to prescribe, I directed the head to be shaved and a blister applied; but the application of cold water was omitted from the apprehension—so much time had elapsed from the commencement of the attack—there was not energy enough in the vital powers to produce a reaction; and, therefore, the result might be disastrous. Blisters were applied to the epigastric and hypogastric regions, as will be seen in the sequel.

*Emetics*, — in 1798, were not much used in the yellow fever, owing partly to Dr. Rush's plan of treatment by venesection and drastic cathartics, namely, jalap and calomel, taking the precedence of every other method, was, perhaps, the principal reason that other remedies were not duly appreciated, nor submitted to the test of experience; and partly from the excessive irritability of the stomach occurring soon after the incursion of the fever, in which state the stimulating property of emetics was found to aggravate the disease, and hasten it on to a fatal termination. It is undoubtedly of very great importance to be in possession of a criterion by which we can ascertain when the stomach is in such an irritable condition, that the administration of an emetic would be hazardous. With respect to my practice, at any time within six hours from the attack, if there were no nausea, I did not hesitate to have recourse to this mode of depletion. When spontaneous vomiting came on, the patient seldom recovered, and an emetic given at this time, according to the received opinion of the day, would destroy the patient. In the case of Mrs. McFarland, in consequence of her being in the third month of utero-gestation, ipecacuanha was substituted for the tartrate of antimony; and in the case of Mrs. Bennett, who was in her eighth month, as the symptoms of the disease were of a mild character, this remedy was omitted; and, as a general rule, it was not ordered when the disease continued more than twenty-four hours. I used to carry with me pills containing two grains each of tartrate of antimony, to prevent the delay that might be occasioned by sending a recipe to the druggist's store. With regard to the dose, I was

guided by the circumstances of the case; sometimes giving a pill every ten minutes, till vomiting was produced; sometimes two pills at first; if they did not operate in ten minutes, the third was given; in cases of extreme urgency three were administered at once; six grains proved to be a sufficient portion in every instance but one.

*Cathartics.* — In 1798, cathartics of jalap and calomel — fifteen grains of the former, and ten of the latter — were prescribed; or some other formulæ, in which calomel was the active ingredient. Some, however, preferred giving calomel in divided and repeated doses, with the view of inducing ptyalism, which, if attained, would, in their opinion, never fail to effect a cure; calomel by some was administered in scruple and even drachm doses. So highly was the remedial power of mercury esteemed, that inunction was made use of, and carried to an illimitable extent. This formidable scourge, indeed, was deemed incapable of withstanding the combined influence of these formulæ. So far are the preparations of quicksilver, when this malady is established, from being productive of advantage, their tendency is evidently deleterious.

Any purgative compound of which calomel is a constituent, administered on the first intimation of the approach of the yellow fever, if it procure a thorough evacuation of the bowels, may, in many instances, like other cathartics, prove prophylactic.

Calomel acts on the system primarily through the medium of the mucous membrane of the hollow organs and skin, and possesses the properties of a purgative, a sialagogue, and a remedial virtue which may become manifest without causing any perceptible al-

teration in the functions. In whatever mode the preparations of quicksilver may be administered, either by rubbing the gums with calomel; or by sprinkling it on an ulcerative surface; or by giving it in repeated, or even in single, cathartic doses; or by inunction of the unguentum hydrargyri; or by the application of emplastrum hydrargyri; the mercurial action may be diffused throughout the whole extent of the mucous and cutaneous tissues; and, either by their separate or conjoint operation, the following results may ensue, namely, dejections, salivation, and an efficient and sometimes a curative influence on the constitution, without the occurrence of any sensible change in the functions. To these extraordinary effects, if we add their efficacy, as a specific, in one of the most loathsome, and, if neglected, destructive maladies, it is not strange, that a medicine endowed with such various and active properties, should induce practitioners to consider its remedial power applicable in the treatment of numerous diseases, even of a diversified character. The position, that one disease may be cured by the substitution of another, and therefore, in almost every lesion of an important organ, provided a salivation be once established, a cure will ensue, has had no inconsiderable agency in bringing mercury into general use. From its known activity, calomel, regardless of its liability of subjecting the whole system to a mercurial action, has been employed more than any other article in the materia medica, in purgative formulæ. Thus, under whatever form preparations of quicksilver may be administered, the mucous and cutaneous tissues, throughout their whole extent, are subjected to the mercurial action; and, of course, the mucous mem-

brane of the pori biliarii will partake of the same influence. In 1798, calomel was given with very great freedom as an evacuant; and no doubt, so far as its cathartic property is concerned, by removing from the bowels the colluvies as fast as it is generated, may be attended with advantage; but this is more than counterbalanced by the irritation of the inner membrane of the digestive tube and that the pori biliarii will follow its use.

It was the prevalent opinion, that in the acute stage of all inflammatory affections, the irritation arising from the operation of calomel was pernicious. I found this opinion to accord with my experience in the cases of yellow fever that came under my care. Dr. Wood, in the United States Dispensary, has the following remarks: "As a purgative, calomel owes its chief value to its tendency to the liver, the secretory functions of which it powerfully *stimulates*." He moreover remarks, that "it is peculiarly useful in the commencement of bilious fevers." It would be presumption in me to pretend to controvert this assertion, as the location of Dr. Wood affords him an ample opportunity of testing the merit of every article employed in the treatment of this class of diseases. In the passive, or chronic stage, indeed, of the inflammation of the tissues concerned in the secretory function of the liver, calomel in cathartic doses is of very great utility; in this northern climate, one portion of ten grains alone has removed the hepatic affection, and restored the patient to health. May not the relief arising from evacuating the contents of the digestive canal in bilious complaints, have the tendency to make us overlook the irritation which calomel may produce, when the

mucous membrane of the hollow organs is in a state of inflammation?

Entertaining not only a strong prejudice against calomel as a remedy in the yellow fever, but esteeming its effects to be hurtful, I have abandoned its use altogether, both as a purgative and as a sialagogue. As, however, the use of mercury with both intentions has received the support of men eminent in their profession, it may not, perhaps, be improper, in this place, to cite the several opinions in favor and in opposition to this therapeutic agent. This task will be accomplished with greater facility by having recourse to Dr. Good's Study of Medicine,\* in which there is a compilation of the various modes of treating the yellow fever by men celebrated for talents, experience and acquisition of medical science.

“Dr. Rush was not less alert in his purgative plan, than in active, profuse and repeated venesections. Ten grains of calomel and fifteen of jalap, was the force with which he opened his remedial attack, and which he repeated every six hours, till the alvine canal was effectually evacuated. This mode of treatment, he tells us, he was led to by accident; and with it he became as successful as he had been unsuccessful under the tamer and more established method. This remedy has, however, still more lately been employed on a different ground, under a different mode of management.

“Calomel, instead of being employed as a purgative, has been enlisted as a powerful alterant and deobstruent, and persevered in to salivation, by doses of from five to five-and-twenty or thirty grains every third or

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\* Vol. II. pp. 183 to 192. Wells & Lilley. 1826.

fourth hour, according to circumstances, till this point is obtained; which, however, is not regarded as important in itself, but as showing that the system is under its influence. Dr. Chisholm seems fairly entitled to the honor of having first tried and recommended mercury with this intention." His chief reliance is placed on MERCURIAL PTYALISM, as it appears from the following:—"Let it never be forgotten that at whatever period of the disease salivation is excited, whether the supposed signs of putrefaction have appeared or not, the accession of it is the certain signal of cessation of disease, and of returning health."\*

"This general plan of Dr. Chisholm has in the present day become highly, and perhaps chiefly popular, and is powerfully recommended from personal experience of its advantage by Dr. James Johnson, Dr. Burnett, Dr. Boyd, Dr. Denmark, and a long list of valuable authorities, some of whom regard it as the 'sheet-anchor.'

"There can be no doubt of mercury being highly advantageous, in a great multitude of cases, and of general benefit in various forms of this destructive epidemy. There is no medicine which, *primâ facie*, affords a better prospect of relief than mercury, from its general action on the excernent system, as well as its specific action on the intestinal canal, and the salivary glands. It must, however, be admitted, that it is only under a particular condition and tone of the vascular frame, that it can at any time be employed with good effect; and hence not only is a sound judgment constantly demanded in its application, which indeed is a requi-

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\* On the Climate and Diseases of Tropical Countries, p. 215.

site that ought ever to be present, but much important time is often lost in preparing the system for its remedial introduction. It is TRULY said, indeed, by the advocates for mercury, that such other remedies are all valuable adjuvants; and this is so far from being denied by those who are hostile to the use of mercury, that they affirm, on the contrary, that the benefit ascribed to this medicine, when it has obtained a sway over the system, OUGHT RATHER TO BE ATTRIBUTED TO THESE ADJUVANTS THEMSELVES; WHICH WOULD HAVE PROVED STILL MORE BENEFICIAL HAD THEY BEEN LEFT TO THEIR OWN POWER AND INTENTION ALONE. Mr. Gibson, who is a strenuous advocate for the use of mercury upon the principle now adverted to, very candidly admits both these causes of impediment." "It would seem," he says, alluding to the debilitating province of Guzzaret, "that DEBILITY AND THE PLETHORIC SYSTEM ARE EQUALLY INIMICAL TO THE SPECIFIC MERCURIAL ACTION. If the patient is fortunately invigorated sufficiently to give the mercury influence, and BEFORE ANY ORGAN OF LIFE IS INJURED, by the strictest nursing and attention afterwards the recovery is almost certain, all morbid action yielding from the moment ptyalism is brought on." \*

"Even in cases, however, in which the mercurial action is fortunately excited, the same intelligent writer tells us that he has frequently met with a very serious evil resulting from the mercury itself; for such, says he, is at times the profusion of ptyalism when once induced, that the most disagreeable consequences succeed, and the convalescence is long and precarious; on which account he laments that we have no criterion

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\* Edinburgh Medical and Surgical Journal, Vol. XI.

to determine how far we may proceed with the mercurial process, and when we ought to stop. Dr. Bancroft advances much farther than this, and asserts that not only salivation retarded the convalescence, and produced very troublesome affections of the tongue, mouth and throat, with other ill consequences, but that the salivators, even when they have been free from this evil, have not been more successful than other practitioners; and he particularly alludes to the admission of Dr. Rush, who was not unfriendly to the mercurial mode of treatment, that 'in the City Hospital (of Philadelphia), when bleeding was sparingly used, and the physicians depended chiefly upon salivation, more than one half died of all the patients who were admitted.' \*

“For like reasons Dr. Jackson speaks with as little satisfaction of the same practice, not only upon his own experience but even upon that of Dr. Chisholm himself. Alluding to the high recommendation of mercury by the latter, he observes, ‘the detail of his testimony does not warrant a conclusion so favorable; for the proportion of mortality in the detachment of royal artillery upon whom this practice is supposed to have been first tried, has perhaps scarcely ever been exceeded in a tropical climate. Further, it is a common observation, that where salivation actually takes place in continued fevers, it seldom shows itself till the violence of the symptoms has evidently abated; hence a suggestion arises that the appearance of salivation is only an indication of the departure of the disease:—no proof exists that the operation of the mercury is the

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\* Essay on the Disease called Yellow Fever, &c. 8vo. 1811.

cause of the departure. Such are the remarks which occurred in reviewing different modes of treatment in the hospitals of St. Domingo; to which it will not be superfluous to add an experiment made at the Mole in August, 1796, by Mr. Lind, surgeon to Jamaica. Out of fifteen cases of fever put under the case of Mr. Lind, on *the first day* of the disease, and treated with the utmost attention, five died; in three of whom salivation actually took place; five recovered, in whom no salivation took place; in the other five, who also recovered, salivation was evidently established, but, as is usual, not till the violence of the symptoms had begun to abate. Out of four who were under his care on *the second day* of the disease, no one died; but one only was affected by the mercury; one brought to the hospital on *the third day* of the illness, died; mercury was employed, but no salivation took place; one, on *the fourth*, likewise died, without marks of salivation; one on *the fifth*—the salivation was established, but the disease proved fatal. In none of the above cases were less than ten drachms, and in most cases not less than two ounces of strong mercurial ointment rubbed into the legs and thighs, with the employment of all other means which seemed calculated to promote the expected effect.\*

“The question, therefore, to say the least of it, is still open; and, admitting all that can be said in favor of employing mercury as a sialagogue, the evils which flow from the uncertainty of its action, both in respect to time and degree, and its frequent inroads upon the constitution, even when it has been of use, are serious and important.”

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\* History and Cure of Fever, Part I. ch. xi. pp. 293, 294.

Having relinquished the use of calomel as a purgative, as a substitute I have given the preference to the infusion of senna and balm, as mentioned above. This selection is made from the persuasion, that the remedy has the tendency to assuage the hepatic irritation, on which the malignity of the fever, in a great measure, depends; and being a liquid, it might also act as a diluent of the acrid contents of the stomach and intestines, and serve as a soothing lotion to the irritated mucous membrane of these organs. When the emetic was not accompanied with dejections, the patient was directed, immediately after he had ceased vomiting, to take an ounce of castor oil, and begin with drinking the infusion of senna and balm; if in the course of an hour there were no evacuation from the bowels, an enema was administered. This series of purgative remedies was required only in one instance. In one case [of Mrs. Bennett] the fever was treated with purgative doses of the solution of Rochelle salts (*Soda et Potassæ Tartras*) alone.

In 1801, at the corner of Purchase and Summer streets, there was situated a house called the coffin, from its shape, or because all the inmates died with the yellow fever. There was no death in the city except in the house just alluded to. In passing, I was desired by one of the sextons who were employed in disinfecting the house, to go in and see the only remaining patient, that lay at the point of death. (I understood she died in half an hour after I saw her.) I was ushered into a small bed-room, in which was a matronly-looking woman lying on the outside of the bed, clad in a silk dress, unattended by a nurse, neglected by her friends, and deserted by her relatives. Having retained her

faculties, at my request she gave me the history of her sickness, which detained me about twenty minutes. In a short time after, I gradually became costive, the abdomen became enlarged and tense, and a preternatural sensation of heat was diffused throughout the convolutions of the intestines. As soon as these symptoms had somewhat advanced, I commenced taking grain pills of calomel, as frequently as my feelings or fancy dictated, until a thorough operation was produced, which was followed by such a sudden and extreme prostration of strength as I never before or since experienced. That these phenomena were premonitory of the yellow fever, I have no corroborative testimony.

*Senna.* — This medicine, prepared in the manner already directed, was the article on which I placed the greatest reliance, not only for removing the sordes from the bowels, but for the property it possesses of exerting a direct and salutary influence in restoring the deranged functions of the liver, and its secondary effect of allaying inordinate irritability of the intestinal canal in particular, and its ultimate effect of alleviating irritations in general.

Dr. Wood, in the United States Dispensatory, says: "It is a prompt, efficient drug and safe purgative, well calculated for febrile complaints, and other cases in which a decided but not violent impression is desired." "Jahr's Manual. — Senna, a medicine as yet little known — Ebullition of blood — Anorexia — Thirst — Disgust and Nausea, and desire to vomit."

*Venesection.* — In 1798, influenced by the high authority of Dr. Rush, bloodletting was carried to a great height. From the expectation, that by the combined

force of this mode of depletion, together with the purgative properties and specific action of calomel, this formidable enemy might be overcome, recourse was had to copious detractions of the vital fluid. As to the quantity, we were scarcely guided by admeasurement; we permitted the blood to flow until we imagined the symptoms were in some degree ameliorated. In by far the greater number of cases, profuse bleedings were productive of exhaustion to such an extent, that the possibility of recovery was greatly diminished. There indeed may arise certain conditions in which a well-timed and judicious use of the lancet may be attended with benefit; but abstractions of blood, however copious, cannot extinguish the cause of fever. In contagious, or self-limited diseases, the sole object of depletion is to remove irritation, from whatever source it may spring. If the "cause" of the yellow fever, therefore, depend upon a peculiar kind of inflammation which may be increased by *excessive* vascular action, all the advantage to be derived from venesection is the emission of as much blood as is sufficient to take off the *excess*; a few ounces more than enough to produce this effect depress the strength to such a degree as to retard recovery, and sometimes induce fatal debility. Hence it requires great acumen and tact to *hit* upon the proper time for venesection, and the proper quantity of blood to be drawn. — The word *hit* is employed, because, on account of the circulatory organs being thrown into great commotion by the cause of the fever, the pulse affords no criterion by which we can ascertain the true state of the disease. It is otherwise in pneumonia, in which, when the pulse is full, hard and frequent, the taking of blood, in sufficient

quantity to lower vascular action and give freedom to respiration, may not be injurious; but when, though full and frequent, it be easily compressible, this mode of depletion must be resorted to on no consideration; the compressibility of the pulse being the result of nervous irritation, and not of inflammation.

In E. Shattuck's case, it may be inferred spontaneous hemorrhage having had a great agency in causing the recession, and determining the first stage of the fever, it affords a strong presumption in favor of the utility of vascular depletion, and therefore it ought not to be omitted. Because the violence of the fever is mitigated by spontaneous hemorrhage, it by no means follows that a corresponding relief will be experienced by drawing blood by artificial means. The spontaneous effort of nature to relieve itself, the sudden and salutary change that ensues, the precise time when the hemorrhage will do the most good, as well as the quantity to be discharged, cannot be imitated. Hence the advantage to be derived from venesection is, at best, precarious. Spontaneous hemorrhage does not often prove critical. "Mr. Gibson, of the Bombay Medical Department, pronounces, that bleeding is not to be hazarded, except occasionally, to the new-comer, and that spontaneous hemorrhages, instead of proving critical, have always seemed to hasten death, and, indeed, without a single exception, in his experience, to prove fatal." In the case before us, however, as the blood, instead of being dissolved and putrid, resembled in color and consistence that drawn in inflammatory diseases, venesection might have done no injury; but nevertheless it may be laid down as a general rule, that bloodletting does "no good."

In 1819, I performed the operation but twice; which was of no service in one instance; in the other, which was the case of Mrs. McFarland, who was enceint,\* the immediate result seemed to make a favorable impression on the disease. (It so happened, her room being in a state of disorder, I let blood while this lady was in an erect posture.) As to the quantity, which was twelve ounces, I was governed by the influence it had, while flowing, in altering the character of her pulse. The blood was contained in a pint bowl, and after standing some time, its surface was convex, sizzly and light colored; in form, consistence and color, an exact contrast to buff. But as this operation was followed immediately by an emetic, and such other remedies as the circumstances seemed to indicate, the advantage derived from it was problematical. In my opinion, however, it coöperated with the other remedies in producing a successful result.

Finally, profuse bleedings are of doubtful efficacy, and ought not to be hazarded without the most mature deliberation; the practice of indiscriminate depletion by blood-letting and calomel, with the view of extinguishing the "cause" of yellow fever, is preposterous.

With regard to venesection, it may not be uninteresting to review the conflicting opinions of practitioners who have sustained a high rank in their profession, and whose experience has been extensive. To effect this object, recourse will again be had to DR. GOOD'S "STUDY OF MEDICINE."

"Dr. Lind, Dr. Clark and Dr. Balfour, whose authorities were implicitly allowed and submitted to

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\* For orthography, see Webster's Dictionary.

some fifteen or twenty years since, shuddered at the thought of the lancet, and generally commenced with clearing the stomach and intestinal tube by gentle emetics, or purgatives, or both, &c. The last of these physicians had recourse to the lancet where there was obvious proof of very violent local affection.

“The times, however, are changed, and by far the more popular plan of late years has consisted in active, profuse and repeated venesections, &c. Dr. Rush, regarding the inflammatory impetus as the sole cause of danger, boldly resolved to lay prostrate, if possible, the morbid Hercules at its birth, by bleeding, according to the state of the pulse, two or three times a day during the first two days, and by following the same plan as long as a single germ of an inflammatory diathesis should continue to be manifest. ‘I paid no regard,’ says he, ‘to the dissolved state of the blood, when it appeared on the first or second day of the disorder, but repeated the bleedings afterwards, in every case, when the pulse continued to indicate it.’ This plan he often pursued through the fifth, and even the seventh day, in the course of which period, from a hundred to a hundred and twenty ounces of blood were frequently taken away by six or eight applications of the lancet.

“Blood, instead of being taken away gradually and successively on the principle of a gradual depletion, in conformity to the practice of Dr. Rush, has by many, and especially by Dr. Jackson, who seems to have introduced the practice, been drawn off, on the accession of the disease, to thirty or forty ounces at once, with the view of making a decisive impression upon the system; the same bold use of the lancet being repeated, if such impression be not effected.

“Where there is not much impetuosity in the onset, no great derangement or prognostic of inflammatory congestion in the larger viscera, where the remissions are regular, and the epidemy is pretty uniform in its character, large and repeated bleedings, as a general rule, must be mischievous. They will not shorten the career of the disease, but they will convert the remittent into a continued fever; and we shall in the latter stage of its course stand wofully in need of that strength which we shall have squandered away at first, if we have commenced with profuse venesection.

“Dr. Hunter, in a tone still more generally proscriptive, and which will meet with few defenders at present, thought himself justified in affirming respecting venesection, that even ‘in such cases as seemed most to require it—for example, where the patient was young, strong, of a full habit, and lately arrived from Europe—when the pulse was quick and full, the face flushed, with great heat and headache—and all these at the beginning of the fever—bleeding did no good!’”

The following is Dr. Good’s remark on Dr. Pinkard’s case:—“Here a freer use of the lancet would have been of no avail, and, had not the author most judiciously forbade its further employment, in all probability he never would have been the historian of his own case.” \*

*Diaphoretics.*—As in other fevers, profuse perspiration may, undoubtedly, be efficacious in moderating the febrile excitations occasioned by the “cause” of the epidemic, and, provided they continue, may alone

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\* See Good’s Study of Medicine, Boston, Vol. II. p. 186.

lead to a favorable result. No authority occurs to my mind in confirmation of this position; unless the following case may be admitted as such.

At a former period, when the navigation of the place, in which I then resided, was engaged principally in the West India trade, it was customary for seamen, among other things, to lay in for the voyage a quantity of herbs. A relative of mine, having shipped on board of a vessel bound to the West Indies, had not been improvident in this respect. At the time the vessel arrived at the place of its destination the yellow fever prevailed, and soon made its appearance on board of the vessel to which he belonged. One day being indisposed, and apprehensive he had an attack, he made a large quantity of tea of *all* the herbs he had in his possession, went into his berth, covered himself up in blankets, drank freely of the infusion, soon fell into a profuse sweat, and continued to perspire freely for three days, when he became convalescent, and in a short time was restored to health.

I was requested, *en passant*, to visit a young man, who was laboring under the yellow fever: he was in a high state of perspiration; large drops of sweat, transparent and volatile, covered the surface; his countenance placid; pulse rather tranquil; and his tongue not much coated. I inquired what physician attended him. His wife replied, "none;" but said, "she had heard me transiently say, that one mode of cure was, were the patient thrown into a profuse sweat, and continued in that condition, he would probably recover." \* She asked what I thought of him.

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\* This incident has induced me to introduce the preceding narrative.

I replied, "Having no experience in this remedy, I have no confidence in predicting what would be the result; but from present appearances, provided he perspired with the same freedom the usual time for the fever to run its course, his chance of recovery was favorable; if from any cause, however, the perspiration should be suddenly checked, his case would be attended with imminent hazard; and in such an event, an ounce of castor oil must be given immediately." The young man was carried to Hospital Island; but the result never came to my knowledge. Copious draughts of the warm infusion of balm were the means resorted to, to induce the perspiration; the thermometer being at 80° F., no adventitious aid was required to give efficacy to the diluent; he lay on the outside of the bed with his limbs, face and bosom bathed in a copious perspiration. In no one case, that came under my cognizance in 1798 or in 1819, except the one just recorded, was perspiration a remarkable feature, either as a symptom or as an evidence of an approaching crisis.

Dr. Hossack, of the city of New York, placed his chief dependence on exciting perspiration, and continuing it by warm infusions; but does not cite any particular instance in which this mode of treatment was successful.

"From time immemorial," says Dr. Hossack,\* "the salutary effects of perspiration in removing fever, and in diverting the actions of poison from the vital organs of the body, had been acknowledged.

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\* Essays on Various Subjects of Medical Science. By David Hossack, M. D., F. R. S., L. and E. &c.

“The practice I have found most effectual corresponds with these principles: When called to a patient in the commencement of the disease, my first object is to empty the bowels by the use of the mildest remedies;\* and to induce a free discharge by perspiration. In some instances, this salutary discharge takes place before or immediately after the bowels are emptied, and is readily continued by the use of warm drinks; but for the most part, it becomes necessary to have recourse to other means of inducing perspiration; for this purpose, catmint, (*nepeta cataria*) sage and snakeroot, aided by the spirits of *Mindererus*, † are usually sufficient; at the same time, to retain an uniform temperature, it is necessary to cover the body with a blanket, as, with a lighter covering, the perspiration can rarely be continued such a length of time as is necessary to procure a solution of the fever. I have also, with the same view, found great benefit by introducing under the bedclothes, bricks, heated, and enclosed in flannel cloths, wet with vinegar; the steam thus emitted has sometimes a wonderful effect in softening the skin, and exciting sweat. In some instances I have kept the lower extremities immersed in a vessel of warm vinegar and water, for half an hour or upwards; at the same time supplying my patient with warm drinks, until the surface of the body becomes relaxed.

“Another circumstance of great importance in this mode of treatment, is to continue the perspiration without the least intermission until the fever is removed; for the least check that is given to this discharge, is

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\* Neutral salts and castor oil.

† The late John Fleet, M. D., in conversation, observed he had cured a patient by the spirits of *Mindererus* alone.

very apt to produce irritation of the stomach, which, if not speedily removed by the use of blisters, &c., is followed by that distressing, and, for the most part, fatal symptom, the black vomit.

“Speaking of herb teas, I am inclined to place great confidence in one lately introduced into this city, and the neighboring country. It is the infusion of the stems and leaves of the ‘*Eupatorium perfoliatum*’ of Linn., vulgarly called boneset. If I was disposed to believe in the existence of a specific for this formidable disease, I should consider the boneset as possessing all those virtues; its sensible qualities are those of a stimulant and bitter; it belongs to a family of plants much esteemed and cultivated as antidotes to poison.”

*Saline Treatment, by Dr. Stevens.*—That the treatment of yellow fever, by neutral salts in purgative or non-purgative doses, is beneficial, I am well persuaded by my own experience, and by the testimony of others. I have prescribed them chiefly for the twofold property they possess of removing the contents of the bowels, and allaying febrile irritation; others have administered them for the same purpose; while some have relied on them, not as purgatives, but as a febrifuge; especially the liquor ammoniæ acetatis. The experiment of Dr. Hewson shows, that so far from its being in a dissolved state, the blood retains its constituent parts in due proportion. That the introduction of the muriate of soda or nitrate of potass into the stomach, and thence through the medium of the radicles of the portal system or the lacteals into the current of the blood, is necessary to preserve this fluid in a sound state, is not

in conformity with the fact, that the tribes of savages of North America before its discovery, though destitute for six or nine months of the year of every species of salts, were a healthy and hardy people.

There is undoubtedly an error in the supposition, that therapeutics can act exclusively on the fluids or solids. All the constituent parts of the body constitute but one system, and are alike subject to the laws of the animal nature; so that the character of the fluids cannot be changed without producing a corresponding effect on the solids; and so *vice versâ*. Hence, it may be inferred, that it is not in consonance with the laws of the animal economy, that it is requisite neutral salts, or any other therapeutic agent, should go the round of the circulation in order to communicate their appropriate stimulating property to the solids, and to produce a change in the crisis of the blood.

#### ANATOMICAL CHARACTER.

No opportunity has ever been afforded me of testing the validity of my pathological views of the yellow fever by autopsy; hence it is particularly gratifying to me, and fortunate for the profession, that the powerfully discriminating mind of Baron Louis, and that of M. Trousseau, had been, for thirty-three days, exclusively devoted to the investigation of its anatomical character, by having made "as many autopsies as circumstances and the advanced period of the epidemic" yellow fever, which prevailed in Gibraltar in 1828, permitted.

Allowing "two epidemics of the same disease to differ more or less from each other," there is a remarkable coincidence in the symptoms, progress, and termi-

nation of the yellow fever which prevailed in Gibraltar in 1828, with those of the epidemic of 1798. To my knowledge no autopsy of the epidemic of 1819 was made; but in 1798, there were three, by JOHN WARREN, M. D., PROFESSOR OF ANATOMY, SURGERY AND PHYSIOLOGY IN HARVARD UNIVERSITY,\* in presence of ISAAC RAND, M. D.; in which the lesions of the viscera were so similar to those found in the disease in 1828 in Gibraltar, there can be no doubt of the identity of the two epidemics.

As the two epidemics, last alluded to, occurred at remote periods, as the autopsies of the first were made by a gentleman under the pressure of a very extensive circle of practice, and those of the second by commissioners appointed for the purpose, under circumstances most favorable for the most thorough examination of the bodies, it may not be uninteresting to insert the former, and by underscoring the lesions which correspond with the latter, show that the diseases are of the same type.

“The first case was of a man, who *died on the sixth † day* from the seizure, and as no application was made to a physician, till the first stage of the disease had nearly expired, the state of the organs may be considered in a great measure as the natural effect of the disease, undisturbed by art.

“In the cavity of the chest, the lungs were remarkably affected; they contained an *uncommon quantity of dark blood*, in their vessels, which rendered them apparently *more dense than usual; the vesicles not*

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\* Father of J. C. Warren, M. D., who now fills the chair of these Professorships with great ability and dignity.

† One of the features of this disease is its brevity. — *Baron Louis.*

*being distended with air, and their substance consequently less compressible than usual. The posterior part of both lobes were extremely livid, and in the cavities of the thorax was contained a large portion of extravasated blood firmly coagulated, to the quantity of eight or ten ounces, as nearly as could be estimated.*

“The pericardium contained as much as two or three ounces of blood. The *heart* was of *the usual size*; but the coronary veins were so distended with blood, as to exhibit the appearance of the most successful injection. In the cavity of the abdomen, the PART MOST CONSPICUOUSLY MORBID WAS THE LIVER. This organ appeared to be much inflamed, both on its convex and concave surfaces; its substance was much indurated, and when cut into, *resembled in color and consistence a boiled liver.* The *gall-bladder* was contracted to a very small size, and *contained not more than a quarter of an ounce of thick, glutinous, and almost inspissated substance, resembling pitch.* There were *no marks of any considerable quantity of the bile having been contained in the sac,* and none of the neighboring parts had the least tinge denoting its presence. On cutting through the ductus choledochus communis, no bile issued from the aperture; *the hepatic duct had also evidently, for some time, ceased to transmit its fluid from the liver.* The stomach exhibited an enormous distension of its veins, especially round the pylorus, and had every mark of great inflammation. The intestines were in the same state with the stomach; the smaller were considerably distended, and the larger contracted. The *spleen was uncommonly turgid, but in other respects in a natural*

*state.* The peritoneum on the under side of the diaphragm, and the pleura on the upper, bore vestiges of inflammation,\* but no other parts of those membranes appeared to have been diseased. The omentum was considerably thickened, and from the turgescence of its bloodvessels, of a color uncommonly dark. There were *no appearances in the thorax, or abdominal viscera, of suppuration*, nor was any degree of fetor perceived to arise from them; *nor was there the mark of even incipient putrefaction in any part of the body.* It may be proper to remark on this case, the discharges from the bowels were of the color and consistence of water gruel, excepting a few *evacuations of a matter similar to what is called the black vomit*; and that *this usually fatal symptom had also preceded the patient's death, on the fourth day of the disease.*

“The second case. [As this case was complicated with a chronic affection of the lungs, I shall content myself with making a few extracts, which correspond with remarks made by Baron Louis.] The subject of this dissection was the body of a person who died on the 12th day from the attack, with symptoms of the mixed kind; a remission of the disease had taken place, at the period usually critical, upon which, on the sixth day, a delirium † ensued, and continued to the moment of fatal termination. . . . *The lungs adhered to the pleura very firmly on the right side*, and appeared posteriorly to have been much inflamed, and *in some parts to be indurated*, in portions about the size of a pigeon's egg. . . . *The stomach was nearly*

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\* Perhaps hyperæmia.

† A Gibraltar delirium took place at various stages of the disease.

*in its natural state, but on the inside, the surface of the villous coat was besmeared with a matter which seemed to be of the same nature with the black vomit, though nothing of this kind had been ejected in the course of the disease.*

“The third case. — In this instance the disease terminated fatally on the 4th day.

“Upon opening the thorax, the lungs discovered marks of inflammation, anteriorly, and were *extremely gorged with blood in the posterior part of their respective lobes.*

“The liver exhibited marks of inflammation, especially on its concave surface and posterior part; *its texture was ALTERED, and of a very dense consistence.* The gall-bladder was completely obliterated, its coats having coalesced with the contiguous parts, so as to form with them one compressed membranous substance. The stomach was externally to appearance in a natural state, but *its inner coat was covered with black colored fluid, denominated the black vomit.*”

The French government appointed in the year 1828 a commission, composed of Drs. Chervin, Trousseau, and Baron Louis, to go to Gibraltar, to collect such documents as might throw light on the origin and mode of propagation of the epidemic yellow fever, which prevailed there in 1828.

“In the midst of universal desolation,” says Baron Louis, “our observations were taken with great care. We had time enough, and our professional brethren afforded us every facility for a thorough examination of the bodies, being present at the autopsies. And we, that is M. Trousseau and myself, were fully aware of the importance of a study of the pathology of

the disease, even supposing the necessary information on the origin and mode of propagation of the epidemic to be obtained in the documents collected by the commission. We felt that, independently of the task which our government had imposed on us, we owed it to our profession, to study the disease before us, and this, too, more carefully, if not more minutely, than we should have studied an ordinary malady.

“The study and analysis could not be a joint production, as every body must be aware I assumed this task, and devoted myself to it, on my return to Paris, so that the work\* now presented to the public has been completed nine years.”

After enumerating the symptoms in the first part of his work, and giving in detail the pathological anatomy of the viscera that occurred in the three splanchnic cavities, it seems there were ordinarily four kinds of anatomical characters belonging to the epidemic: yellowness of the skin; exudation of black matter, or blood from the mucous membrane of the digestive canal, accompanied with a moderate degree of inflammation of the same membrane, more especially the gastric portion; the liver was found of a yellow or yellowish color. Hence Baron Louis arrived at the conclusion, “that the disease which prevailed at Gibraltar, as an epidemic in 1828, was the yellow fever.”

In his pathological researches, Baron Louis observes

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\* Anatomical, Physiological and Therapeutic Researches on the Yellow Fever of Gibraltar of 1828. By P. Ch. A. Louis. Translated from the French by G. C. Shattuck, Jr., M. D., Member of the Society for Medical Observations at Paris: Fellow of the Massachusetts Medical Society: Boston, 1839.

the liver was the only organ which was found invariably altered; in every case, the liver was tinged with every shade from a pale yellow to an orange color; and contained a diminished quantity of blood. The pale state of the liver was peculiar to this viscus, as every other organ, especially the *lungs* and *stomach*, was supplied with a greater quantity of blood than usual. When there was no black matter in the digestive canal, and there were no lesions denoting the existence of other acute diseases, the yellowness of the liver was sufficient to determine the nature of the disease of which the patient died. [See observation 11th.]

In the autopsies of the bodies of two individuals, supposed to have died of the yellow fever, from the absence of the lesions peculiar to this disease, and the presence of anatomical characters which are always found in those that have died of the typhoid fever, Baron Louis concluded these patients died of the latter; and that during the prevalence of an epidemic, all diseases are not alike. These dissections refute the position of Sydenham, supported by Dr. Rush, that all acute diseases partake of the nature of the prevailing epidemic. An important fact to me; for, influenced by the authority of these celebrated physicians, my diagnosis of a case that will be adverted to in the sequel, may not have been satisfactorily established.

With regard to the yellow fever, though it has never fallen to my lot to be present at a cadaveric autopsy, this loss is amply compensated by the thorough investigation and minute account of its anatomical characters in numerous dissections by Baron Louis.\*

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\* See translation from the manuscript copy of the Anatomical, Pathologi-

*Symptoms.* — As there is no one symptom that, in every instance, becomes a permanent feature of the yellow fever, it will be my province in this section to pass in review, without reference to order, the various morbid phenomena that occurred in the epidemic of 1819. It may be proper to remark, when a practitioner is called to a patient, a correct diagnosis of the disease may be generally formed, by taking into view the aggregation rather than the strict analysis of the symptoms; the knowledge of the existence of the epidemic; and the residence of the sick in an infected district. But we owe it to the sagacity and discriminating powers of Baron Louis, that we may be deceived, as the physician was in the case of Juan Dominiquez.— [See twelfth observation.]

*Chills.* — It was the general belief that they were very slight in the epidemics of 1798 and 1819. Dr. Brown's observations militate with this opinion. He states, that "ague and rigors were the premonitors of disease; and that, during the greatest vascular excitement of heat, *cold chills* would sometimes pervade the system, with the suddenness of an electric aura.

"I had myself," Dr. Brown observes, "an attack of the disease, which lasted twenty-four hours before a complete relief. The distress of the head was great, occasioned by violent pulsations or bounds of the heart; and as often as every two or three minutes. It seemed as though the heart was under a constant and violent struggle to propel a sluggish column of fluid, resisting or pressing too hard upon it; and these

violent leaps of the heart, which gave a severe piercing pain in the head, seemed to be the efforts of a collected force to unburthen itself. Over my face was a suffusion, dark, as if venal [venous], rather than arterial blood; somewhat resembling the appearance in an epileptic paroxysm. I felt these *sudden chills* of cold which I have before mentioned; also a general lassitude, and much reluctance to motion; but had not those severe pains in the stomach and bowels. I took severally two full doses of jalap cathartic, with mercury; used freely *warm diluent* drinks; got into a warmed bed; increased the quantity of clothes, applied sliced onions to the axillas, &c. A profuse perspiration came on; the symptoms subsided, and did not return."

In this important case of Dr. Brown, related by himself, the repetition of chills corresponds in some measure with some of the cases of Baron Louis. But that chills do not occur in all cases, we have the authority of Dr. Samuel Jackson of Philadelphia. This gentleman remarks, "that chills, with few exceptions, occurred at the beginning of the attack, and were frequently distinct rigors; and sometimes amounted only to a sense of coldness or a crawling sensation. In some cases, and those of the greatest violence, *they were entirely absent.*"

Again, the observations of Dr. Robert Jackson, of the British army, respecting chills, are:

"Alternate chills and flushings of heat are not unusual; in some cases they occur at intervals for the first twelve hours; the sensation is unpleasant, but the cold is seldom strong, or amounting to rigor; *in others chills are not perceivable*, the sensation of heat prevailing from the beginning."

Thus, the existence and repetition of chills, as in the intermitent, do not form a distinguishing character of the epidemic.

HEAT, — is generally admitted to be variable in different temperaments, and at different stages of the epidemic.

PERSPIRATION, — was by no means a conspicuous character of the yellow fever in 1798, or in 1819. Dr. Brown's is the only case that has come to my knowledge, in which a crisis has been produced, and a cure effected, by diaphoresis.

HEADACHE, — in 1819 was not a very formidable complaint, with one exception. "On the 18th of September, I was desired to visit the sister of J. W., a married lady, who labored under the most excruciating pain in the head that I ever witnessed. It was evident, the most energetic measures must be promptly taken to subdue the violence of the disease. Accordingly, I was proceeding to administer suitable remedies, but was prevented by a most injudicious interference on the part of her mother. This lady remonstrated against her taking the medicine I had prepared, as she said, on account of her conviction that she did not require medical aid. This, however, was only the ostensible reason, for, I afterwards learned, that the pill I intended to give was the cause of the opposition, from the supposition that it was composed of mercury. She also told me, with much sang froid, 'she would take her daughter under her own charge; and, if she were not better the next day, she would deliver her up to me.' Notwithstanding I represented to her that the case was extremely urgent; there was not a moment's time to be lost; and, unless the patient were placed

under my care immediately, I should positively decline attending her at all; she persisted in her resolution, and the daughter acquiesced in the decision of her mother. The former, however, desired me to leave the potion I had ordered, to which, after much impotunity, I consented. She in the course of the night took the medicine, without receiving any permanent benefit; but the auxiliary remedies, which essentially contribute to the cure of diseases of this kind, were neglected altogether. The next morning, I unexpectedly found the mother in the room with her son, whom I was attending at the time, and was requested by her to prescribe for her daughter, which, under existing circumstances, I had not the resolution to refuse. She died on the fourth day.

“Among the usual symptoms, the complaint in the head was the usual affection, during the whole course of the disease. The brain soon discovered signs of torpor, which continued to grow worse, until coma supervened. The abdomen became tumid, and a livid suffusion occupied the whole body. The respiration was hurried and difficult, which, in this disease, is always an infallible sign of a speedy dissolution. She, at an early period, lost the power of deglutition, and external applications were the only means of producing a salutary excitement. These were extensively employed, particularly affusions of cold water to the head and chest, without any other result than a temporary reaction.”

Distress in the head is very satisfactorily illustrated in Dr. Brown's own case; this distress in the head, which was very great, the doctor,—in the best pathological description of the yellow fever extant,—attributes

to the impulse of blood on the brain, made by the strong efforts of the heart to relieve itself from a surcharge of the vital fluid. In some instances, however, as in the case of the sister of J. W.,\* it may amount to an insupportable agony.

In the epidemic of 1820, in Philadelphia, Dr. Jackson divides the cases into three classes; and the only remark that he makes on headache is in the third, or mild class, as follows: "Chills, pains in the extremities, spine and forehead, but not so extensive as in the other classes, were the commencing symptoms."

It may not be malapropos to digress so far as to introduce the following remarks:

To ascertain numerically the value of each symptom—a method for which we are indebted to the discriminating mind of Baron Louis—recourse has been had to the records of various epidemics. The research has led me to the conclusion, that the existence and severity of many of the symptoms, in a great measure, are dependent on the constitution, the temperature and the exciting causes. In the fever of Gibraltar in 1828, the temperature being moderate, in the malignant form of the epidemic chills occurred in every instance. Whereas Dr. Jackson of Philadelphia, and Dr. Jackson of the British army, remark they were sometimes *absent*, or not *not perceivable*. It is probable the headache would more frequently happen in the climate where persons are more liable to the coup de soleil. In the epidemic of 1828 at Gibraltar,

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\* Mrs. Badger, also, whom I visited, in consultation with Dr. Bartlett, of Charlestown, among others, and whose case was of the malignant type, suffered from an intense headache.

this affection was absent in two cases; in 1819 in Boston, and in Philadelphia in 1820, it was not a prominent symptom; and so with regard to heat and perspiration. In these places, the stroke of the sun is of rare occurrence. Persons residing in a tropical climate, when the atmosphere is contaminated with the miasmata of the yellow fever, after an evening carousal and exposure to the midnight air, will frequently die of the black vomit within twenty-four or forty-eight hours; the stomach being more especially the organ on which apparently the exciting cause exerts its influence.

A person, after being exposed in the day to the heat of a tropical sun, and at night lying on the deck of a vessel, on the incursion of the fever, together with chills, will be seized with the headache, and pains in the back and limbs; these parts having been particularly subjected to the alternation of heat and cold.

In the autopsies made by him, Baron Louis, not finding lesions of sufficient magnitude to produce dissolution, infers, death is attributable to the *cause* of the disease. For every instance there is a diversity of the symptoms; and from the history of various epidemics, it appears there is no unerring guide to direct us in forming the diagnosis of the yellow fever; so that its true type frequently is not entertained, until after the fatal termination of several of the first cases. To assist us in making a just estimate of the nature of the disease, we must retain in mind, that, beside the symptoms usually enumerated, there is always in the aspect of the patient, a certain something indefinable, or a peculiar *malaise*.\*

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\* "Sentiment de gêne ou de mauvaise disposition du corps."

The malaise\* is the manifestation of the activity of the cause of the fever; and while this phenomenon lasts, the prognosis must be extremely guarded; for though, as is often the case, there may be a very great melioration of the symptoms, and a very flattering prospect of a successful issue, the *cause* of the fever disappoints our hopes, and death closes the scene. But to resume:

INJECTION AND SUFFUSION OF THE EYES. — In the case of Mr. McFarland, who called on me two days previous to the attack, the arteries of the tunica conjunctiva were injected. This symptom, together with his having been exposed to the influence of the miasmata, was in my mind, as it turned out, the prelude to an invasion of the prevailing epidemic. But in the case of E. Shattuck, redness of the eyes did not appear at the commencement, nor in the course of the disease.

HEART, PULSE, BLOOD. — It has been placed beyond all possibility of doubt, by the indefatigable researches of Baron Louis, that yellow fever is distinguished from all other acute disease by the lesion of the liver.

The liver is a large gland, composed of smaller ones called acini biliarii, or penicelli. In each of the acini is involved one of the penicelli of the *venæ portæ hepaticæ*, by which the material for forming bile is furnished; one, of the *pori biliarii* for conveying the bile to the hepatic duct; an arteriola of the hepatic artery for supplying the tissues with the materials for nutriment; a radicle of the *venæ cavæ hepaticæ* to return the blood into the current of the circulation; and, perhaps, a nerve by which a sympathy between

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\* Has not every acute disease its peculiar malaise, which, superadded to the symptoms, enable us to form with more certainty a correct judgment of its nature and probable termination?

the gland and the brain may be maintained. Provided the inflammation of the pori biliarii constitute the type of the yellow fever, we can easily conceive, that the circulatory organs of this viscus may be disordered. In such an event, the harmony of the functions of the vessels appertaining to the acini would be disturbed, the hepatic artery inordinately excited, the flow of blood in the apparatus accelerated, and the flow of blood by the venæ cavæ hepaticæ more rapid, and consequently in greater quantity. This pathological explanation receives partial confirmation from the post mortem observations of Dr. John Warren of Boston, Baron Louis, and Dr. Jackson of Philadelphia, who found the portal veins were much distended. Dr. Jackson says, "The veins of the omentum, mesentery, and, in fact, the whole system of the venæ porta, were always distended with blood."

At the confluence of the venæ cavæ hepaticæ and the venæ cavæ inferior, the hepatic blood is blended with the venous, and flows into the auricle with augmented velocity, and, consequently, in greater quantity, as has been before observed, with the exception of frequent interceptions by the repeated repulses from the contractions of the auricle. These two sets of vessels are differently affected by the regurgitation, the venæ cavæ being a flexible tube, yields to the pressure of the blood, by which a pulsation is communicated to its walls; but the venæ cavæ hepaticæ, being surrounded by the substance of the liver, are unyielding, so that, as in a rigid tube, a pulsation is not communicated to their walls but to their radicles. This struggle between the transmission and repulsion of the blood may be added to the mass of deranged

actions which constitute the peculiar character of this epidemic.

In order to understand the pathological condition of the circulation in this disease, it will be my endeavor to explain the phenomena that attend the propulsive action of the right auricle and ventricle alone; on the presumption, that what may be said relative to the actions of these organs, may be applied without much variation to those of the left auricle and ventricle. In the normal condition of the heart, while the right ventricle is in its systole, the blood is flowing in two currents from the venæ cavæ ascendens and descendens into the cavity of the auricle, which is in its diastole; and when the ventricular contraction is completed, the office of the tricuspid valve is suspended: at this moment the ventricle, by an inherent property, dilates at once, creating a vacuum, which is instantly replaced by auricular blood. During this process a quantity of blood is abstracted from the auricle, which, however, is soon replenished, and, becoming replete with blood, its contraction ceases. The interim between the time of the ventricular systole and the recurrence of the ventricular impulse, is denominated its "rest" or "repose."\* At this time — but perhaps not consequently — the systole of the ventricle is renewed, the tricuspid valve becomes closed, the blood is thrown into the pulmonary artery, and the auricle is again in its diastole. Thus this series of actions is incessantly reiterated. When the auricle contracts, the blood is im-

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\* Report of Experiments upon the Action of the Heart. By C. W. PENNOCK, M. D., Physician to the Philadelphia Hospital; and E. M. MORE, M. D., late Resident Physician to the Frankfort Asylum. — See *Medical Examiner*. Philadelphia.

pelled in every direction; as the tricuspid valve, at this time, is inoperative, a portion of it is thrown into the ventricle; and as there is no provision to prevent its reflow into the venæ cavæ, a check or repulse is given to the flow of blood contained in these vessels. This interception, in the normal condition of the circulation, is attended with no other result than a partial distension and pulsation of a portion of the venæ cavæ ascendens and descendens by the recurrent undulation; but when the blood is forced into the auricle and ventricle faster than these organs can disgorge it, the struggle of the auricle to free itself, on the one hand, will with varying force repel it upwards towards the heart,\* and downwards towards the iliac veins; on the other hand, the lungs will be subject to morbid alterations by a preternatural quantity of blood thrown into them by the violent, but irregular, contractions of the over-gorged ventricle. On these phenomena, which do not occur in other acute diseases, depend the peculiarly irregular pulse in the yellow fever.†

James Read, who was reported to have recovered, some time after the communication in Mr. P. P. F. Degrand's Report, was attacked with an abscess of enormous magnitude in the thigh, complicated with a severe affection of the chest, which ultimately terminated in his death. Autopsy; the abscess had contained a large quantity of pus, which surrounded the whole body of the femur, leaving the bone denuded and softened. On opening the pericardium, the serous membrane which lines it, as well as that which surrounds the heart, was covered with a thick coat of

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\* See the case of Dr. Brown.

† See Appendix.

coagulated lymph, the free surface of which was rough and cellular. He passed through all the variety of changes usually attendant on the various stages of inflammation. Among the symptoms, the pulse attracted my attention; it being one of the several kinds described by Dr. Rush, as peculiar to the yellow fever, which he denominated the split pulse; giving to the sense of feeling the impression of a column of blood propelled through a split quill.

Though Mr. Read resided in an infected district, and was taken suddenly unwell while at work, which he was obliged to leave; and though the injected blood-vessels of the eyes, headache, slight chills, rapid pulse, and expression of "malaise"—whether arising from fatigue, rather than the action of febrile virus is now, in my mind, quite problematical—were present; it was not certain that these symptoms could be ascribed to the cause of the prevailing epidemic. My doubt arises from the unusually sudden mitigation of these symptoms, produced by the early \* evacuation of the bowels by the administration of a dose of castor oil, † followed by an infusion of senna and balm for his constant drink; to the fact demonstrated by Baron Louis, that "all diseases are not alike when a fatal epidemic is raging;" and to the progress and result of the disease. The recession of the disease, however, did not continue many days before, as it was then supposed a relapse took place, accompanied with symptoms which became exceedingly obstinate; but by persisting in combating them as they arose, they gradually yielded, and to all

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\* I saw him almost immediately after he quit work.

† Two ounces.

appearance convalescence was established. The probable cause of the supposed relapse did not come to my knowledge for some time after. The patient lodged in a bed-room on the lower floor of a five story building, and having been deserted by the inmates of the house, who retired to the uppermost chambers and fastened themselves in, he arose in the night and ascended the several flights of stairs, and not being able to arouse any one, descended to the lower staircase, where he remained in almost a state of nudity until the next morning. Having learned these facts, I was able to account for many of the phenomena that subsequently occurred. Whether this or some new exposure was the remote cause of the affection of which he died, was not ascertained. Hence, as the split pulse is not generally acknowledged to be a distinguishing characteristic of yellow fever, or of abscess, and as, in this case, it was undoubtedly an indication of pericarditis, accompanied with effusion of coagulable lymph, we arrive at the two-fold conclusion that Dr. Rush was led into an erroneous diagnosis by his mind being deeply impressed with the aphorism of Sydenham, that all acute diseases partake of the nature of the prevailing epidemic; and the result of the researches of Baron Louis, "that all diseases are not alike while a fatal epidemic is raging."

On the subject of the state of the blood in the yellow fever, the following passage is contained in Dr. Jackson's account of this disease as it occurred in the city of Philadelphia in 1820 :

"It was at first supposed, that the blood thus\* being

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\* Referring to the whole system of the venæ portæ, which was distended with fluid blood.

fluid, was in the dissolved state, so often mentioned by writers. But Dr. Hewson,\* wishing to make some experiments, collected some portions of it in cups. In the course of ten or fifteen minutes, it was firmly coagulated, and this was found in subsequent observations invariably to occur. The notion, therefore, of the blood being dissolved in this disease, frequently described by writers as obsered in their dissections, is not correct.”

In reference to the crasis of the blood, the discrepancy of writers may, perhaps, be attributed to the state of the heart previous to the attack: if this organ be sound, the blood will maintain its normal character; but in the hypertrophy of the left ventricle, or in diseases in which it acts with unwonted vigor, it abounds with fibrin, denoting the predominance of an inflammatory diathesis; or, on the contrary, if the fibres of this viscus be lax and flabby, it degenerates into a dissolved or putrid state, indicating a deficiency or absence of fibrin. Under these circumstances, the yellow fever will either partake of the nature of *causus*, or assume the type of *adynamic fever*, and their concomitants are an active † or passive ‡ hemorrhage.

It may here be remarked, that in acute disease in individual cases, there may occur anomalous phenomena which it would be difficult to account for, unless it be on the supposition of the previous existence of a

\* A distinguished and scientific physician of Philadelphia.

† The epistaxis in the case of E. Shattuck was of this kind.

‡ The only instance of passive hemorrhage I met with was in 1798. This patient before I saw her had been treated with calomel.

morbid alteration in the structure of some organ essential to the welfare of the animal economy.\*

In 1798, the therapeutic agents upon which I placed the greatest reliance were venesection; cathartics of jalap and calomel; or compound pills of colocynth and calomel; or calomel *per se*; neutral salts; milder cathartics, injections or vesicatories were interposed as the circumstances of the case seemed to require; affusion of cold water to the chest. This mode of depletion was very generally employed in Boston and in other places in the United States. A similar routine of practice has since been pursued, not only in our country, but by the English practitioners in Gibraltar, and in other British colonies. The result of the plan of treatment I adopted in 1819, and the various methods of practice in the Antilles, having been amply detailed in the text, it will be unnecessary to advert to them again.

In 1820, the depleting plan, as recommended by Dr. Rush was again had recourse to by Dr. Jackson of Philadelphia, whose disappointment at the result was as signal, as his confidence of success had been enthusiastic. "The tone of confidence," the Doctor says, † "in which Dr. Rush speaks of the medicable nature of the yellow fever, of its easy and speedy subjugation by the aid of rapid, early and powerful depletion; the certainty that Chisholm ascribes to the mercurial

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\* Applicable to this remark, was a recent fatal case of pneumonia complicated with the ossification of the mitral valves. The organic disease had such an effect on the circulation, that before the incursion of the pneumonia, the pulse was scarcely perceptible, and for several days before he died, it had ceased entirely. Dr. Bowditch visited the patient with me in consultation.

† See his account of the malignant fever which occurred in 1820.

treatment; and the late testimony of Dr. James Johnson of the curative wonders of the lancet and calomel, are calculated to inspire the most perfect reliance on their efficacy. Such was the impression which had been conveyed to my mind, that I felt a strong assurance, that, should my path be crossed by this most formidable of diseases, it would only be to witness the most successful efforts, and the most splendid triumphs of the science of medicine. Never was disappointment more complete, or professional pride more humbled."

"The ill success," the same writer says, "that attended what was considered the regular and established practice in malignant fever, gave rise to a desire to seek for some more powerful auxiliary than was then at command. It was conceived that an irritation excited in the stomach might establish a new action, different from that produced by the poison, that occasions malignant fever. On this principle the free and liberal exhibition of the *Ol. Terebinth.* in conjunction with some other essential oil, was commenced at the City Hospital. The practice was not entirely novel. In 1805, it was tried in the City Hospital by Dr. Parrish. Turpentine was administered in a number of cases, in considerable doses, and was also exhibited in injections. The beneficial effects were not so decidedly pronounced, as to require for it a high degree of confidence."

"Thirty drops of a mixture, consisting of *Ol. Terebinth.*  $\zeta$ vij; *Ol. Ment.*  $\zeta$ i., were given every hour." In one case, "A teaspoonful of the mixture was given every hour."

"In the hospital there were thirteen cases of fever, in which the exhibition was early commenced, and in

which a fair trial of the practice was given. Of those cases eight recovered and five died.”

“The acetat. plumbi, recommended in strong terms by Dr. Irvine, of Charleston, was brought forward after the regretted failures of the usual modes of treatment.”

“From the foregoing general sketch of the different plans of treatment, that were adopted in the disease of last summer and autumn, it is evident that no one can claim, from its greater success, a preëminence over the others.”

I am induced to make the following extracts from a very singular production ON the NATURE, CAUSES, AND CURE OF THE YELLOW FEVER. By Thomas Ruston, Philadelphia. The extracts are taken from an answer to a note addressed to the doctor from the City Hospital, dated August 12th, 1798.

“The slow pulse,” says Dr. Ruston, “which occurs about the fourth day, I suspect to be the effect of the stagnation of acid bile in the gall-bladder, on its close adherence to the upper bowels.

“The effect of bile in a much less morbid state in jaundice, in reducing the pulse, is well known. Mr. John Hunter says, he once met with an instance in which it fell to thirty-two strokes in a minute in that disease. Revolving these facts in my mind, I resolved to try to remove this bile, by exciting an *artificial cholera morbus* about the fourth day of the fever.

“The medicine I use for *shaking* the gall-bladder and *discharging* the contents, are tartar emetic, gamboge, jalap and calomel combined, or given separately, and in small doses, according to circumstances.

“In one case I gave four grains of *tartar emetic*, with *twenty of calomel*. It operated freely upwards

and downwards, and brought away a large quantity of green and black bile, but without exciting the least cramp or pain in the stomach or bowels. I have not lost a single patient to whom I have given this powerful remedy.

“Vomits are old remedies in the yellow fever of the West Indies” I gave them on the first day of the disease in the year 1793, and always without success. They uniformly did harm when given in the beginning of the fever in its worst grade in 1797.

“The cure of the fever should not rest upon a single dose of medicine; I have given two doses a day in several cases, and have given it in one case, every day for three successive days.”

*Intellectual Faculties*, — were deranged in various ways: there is often, especially towards the close of the disease, a nonchalance, a great want of interest, both as to themselves, and to what is going on around them, as in the case of Mr. McFarland; monomania, as in the case of E. Shattuck; a great disturbance of the mental faculties, which soon ended in torpor, coma, and death, as in the case of the sister of J. W.; and, in general, a deficiency in the mental activity.

*Jactitation*. — There were two sorts of jactitation: in one, the patients — the sister of J. W., and Mrs. Badger — tossed themselves about with violent and sudden efforts, as if the movements were the result of painful spasms. In these, the respiration was short and hurried. In the other, in two cases, in 1798, the motions of the patient were equable; each movement appeared to be effected without motive or design, and without manifesting the least expression of pain or distress. In these cases, towards the period

of dissolution, the respiration was "deep," or of the kind which might arise from an infarcted state of the lungs, occasioned by a slight alteration in their organization, or a slight spasm of the bronchia.

*Epigastrium, Upogastrium.* — In 1819, the epigastrium was swollen, tense, and very tender to the touch in three patients alluded to in the text; and when the swelling, tension and tenderness were subdued, they were soon succeeded by a soft inflation in the hypogastric region. Neither spontaneous vomiting nor diarrhœa took place in any case that recovered. In 1798, the affection in the region of the stomach was particularly noticed by Isaac Rand, sen., M. D., for which, he thought, the application of a blister to the part was an efficacious remedy.

*Black Vomit, Dejections of the Color, Consistence, and Tenacity of Tar,* — not occurring in any case, in 1819, where my prescriptions and directions were observed, has induced me to believe they were prevented by the free use of the infusion of senna. In 1798 these phenomena were of frequent occurrence in cases where depletion by venesection and the administration of calomel, with the view of emptying the bowels, or of procuring ptyalism. In 1799, there were a few sporadic cases of yellow fever. I attended a person, who, I thought, was attacked with the symptoms of the disease. His wife being an excellent and faithful nurse, and confident that every direction I gave would be attended to punctually, I ventured to trust for my principal remedy to the administration of the warm infusion of senna and balm for his constant drink, and oatmeal gruel for nourishment. By persistence in the use of this therapeutic agent, the disease terminated

fortunately. Not long after a case occurred which I requested Samuel Danforth, M. D., to visit with me in consultation. An opportunity was offered, at the time we made the visit, to inspect the black vomit that had been ejected into a white bowl, which held a pint, and was more than three quarters full. It having remained standing sufficiently long to settle, it separated into three parts: flocculi, resembling flakes of soot, floated on the surface, of a dirty grey or bistre colored liquid. On decanting the fluid portion, there remained a sediment that looked like coffee grounds. Neither the liquid, nor the sides of the vessel, nor the matter that was ejected on the floor, manifested the slightest shade of red. This is mentioned as a fact, and not with the intention of impugning the views of Baron Louis with regard to the source from which black vomit is derived. That blood may be exhaled or extravasated from the gastro-intestinal mucous membrane, I have no doubt, from a case that came under my cognizance. I was called to a man about three weeks before he died. He had been annoyed at times with dejections of blood, accompanied with pain. He had no evacuation of blood after I saw him. He was pale and emaciated, and appeared to be sinking from mere exhaustion. At the post-mortem examination, the mucous membrane of the digestive canal throughout its whole extent was sound, with the exception of four spots, ranging from the size of a crown to that of a nine-penny piece at the commencement of the jejunum. The blood, in my opinion, was exhaled or extravasated from these lesions, which were superficial, the mucous membrane being neither thickened

nor abraded. The rest of the abdominal viscera were in a normal condition.

“The opinions,” says Dr. Jackson,\* “that were held in respect to the nature of black vomit, were various and loose, until the examination instituted by Dr. Physick, in 1798 and 1799. It was then demonstrated very satisfactorily, that it proceeded solely from the stomach; that it did not partake in the slightest degree of the nature of bile, which had been the commonly received doctrine; and in fact, that the liver had no share in its production. Dr. Physick considers black vomit to be a diseased secretion † from the vessels of the stomach. This opinion is entitled to great attention, and is rendered very probable by the arguments and experiments with which it is supported. But from the great turgescence of the whole portal system, always found distended with blood, I am disposed to believe that the inflammation of the stomach, and other abdominal viscera, in this disease, is venous and not arterial; arises from engorgement of the veins, extending to their minutest division and first origin. Should this view be correct, black vomit, it is not unlikely, may arise from a sanguineous effusion ‡ from the capillary extremities of the veins. The matter of

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\* An Account of the Yellow or Malignant Fever, as it occurred in the City of Philadelphia in 1820. By Samuel Jackson, M. D.

† Denominated by Baron Louis *exhalation*, by Dr. Vogel extravasation. That Dr. Physick, Dr. Jackson, and Baron Louis, gentlemen whose intellectual endowments and attainments in medical science are of the first order, and who lived and made their remarks at periods so distant from each other, should arrive at the same conclusion with regard to the origin of black vomit, is a remarkable coincidence.

‡ Perhaps, secretion and effusion in the sense they are here used, and the exhalation, as employed by Baron Louis, may be considered as convertible terms.

black vomit does not maintain invariably the same characters, but recedes more or less from, or approaches to, an appearance of blood. I have seen several cases in which the discharge, towards the termination, became nearly sanguineous, and a similar fluid was found in the intestines."

"Dr. Rhees," says the doctor, "the resident physician at the City Hospital, instituted a series of observations on the black vomit, with a solar microscope. Innumerable quantities of animalculæ were found to exist in it. A single drop contained many thousands, being apparently a congeries of them. The black mucus of the intestines exhibited the same phenomena. When the matter, fresh thrown from the stomach, was examined, the animalculæ were alive, and in constant motion; but taken from the dead subject, or inspected after some time, they were always dead and quiescent. Comparative examinations were made of the discharges from the stomachs of patients, ill with autumnal, bilious and remittent fevers, but no similar appearances were discovered."

**BLACK VOMIT.** — Baron Louis favors the opinion that black vomit is derived from the blood, and that it is exhaled from the mucous membrane of the stomach. The celebrated Dr. Physick, by his post-mortem examinations and by his experiments, has very satisfactorily proved, that the gastric mucous membrane is the organ which secretes the matter of black vomit; and that the bile in its sensible properties is essentially different from this product of the yellow fever. The result of his investigations is contained in the New York Medical Repository, entitled, "Some Observations on the Black Vomit, communicated by P. S. Physick, of

Philadelphia, to Dr. Millar." As there has been much discrepancy of opinion respecting the source whence black vomit is derived, and as the remarks of his discriminating mind have been made with the view of ascertaining this point, I have made some extracts from the above communication, presuming they will not be unacceptable to the reader.

"The common opinion was, and, for anything I know to the contrary, is at the present time, that this black matter is poured out by the liver. The dark-colored appearance of the bile in its accumulated state, more approaching to the color of black vomit than any other secreted fluid, would very readily induce a person to conclude that they were the same, if he did not compare and examine them carefully, and likewise attend to other circumstances.

First.—If the darkest colored bile be spread over a whole surface, such as the skin, it loses the color it had in its accumulated state, and appears of a yellowish-green color; but if the black vomit be treated in the same way, it retains its black or dark-brown appearance.

Secondly.—The bile in the gall-bladder has its common bitter taste, but the black vomit is insipid or nearly so.

Thirdly.—The black vomit differs very much from any mixture that can be made of the dark-colored bile with any of the fluids found in the stomach or intestines.

Fourthly.—The stomach has been found full of black vomit, when, in the same subject, the fluid in the gall-bladder and biliary ducts was very different from it in its color and appearance.

Fifthly.—The pylorus, in several instances, has been found closely contracted, and yet the stomach contained black matter.

The above observations have appeared to me to overthrow the idea of the black vomit being secreted by the liver. The question, however, still remains,—from whence is it derived? I believe it to be a secretion from the inflamed vessels of the stomach and intestines; and for the following reasons:

First.—It is found in these viscera, when it cannot be detected in any other organ or cavity connected with them.

Secondly.—It is often found of so thick a consistence that it does not mix with the fluids of the stomach; in such cases it adheres to its inside, forming a black coat of considerable thickness; and when it is once scratched off, it cannot be made to adhere again in the same manner.

Thirdly.—I have, in one instance, observed this black substance in two almost circular patches, each about two inches in diameter, adhering to the stomach, all the other parts being free from it. In this case, there was no black matter loose in the cavity of the stomach or intestines.

Fourthly.—I have seen the inside of the inflamed stomach as black as the black vomit, resembling it in color exactly. In most of these cases no black matter was found in the cavity of the stomach. The vessels only, which were inflamed, were distended with it. This color differs very much from the dark purple of a part in a state of gangrene; and I never observed any putridity attending it."

*Skin.*—The color of the cutaneous surface varied

from a light straw color to a mahogany tinge. Mrs. Badger was of the latter hue. I was desired by Dr. Bean to visit with him two patients in the last stage of the yellow fever. When we arrived at the house, I was ushered into a large kitchen, from which had been parted off a bed-room, in which was exhibited to our view the horrid spectacle of a mother and child lying dead on the bare floor; and from the blackish fluid adhering to their mouths and bosoms, and their soiled garments, (for it appears they had not been undressed,) it seemed as if they had been weltering in a mass of black vomit, which they had ejected from their stomach before dissolution. There was present neither nurse, nor acquaintance, nor friend, nor relative, to smooth their pillows, or to console them in the hour of distress; all was desolate, gloomy, and comfortless. The cutaneous surface of the bodies were almost black.—In the case of E. Shattuck, yellowness did not manifest itself until convalescence began to take place.

*Muscular Strength*,—was not generally much prostrated in the epidemics of 1798 and 1819. In the latter, Mr. McFarland arose and seated himself in a chair and conversed with me, only three hours before he died. All that recovered were capable of using the night-cabinet without assistance; a circumstance not usual in other acute diseases.

## APPENDIX.

The first part of the history is a general account of the  
 state of the world at the beginning of the world. It  
 describes the creation of the world and the first  
 generations of men. It also describes the fall of  
 man from grace and the beginning of sin. The  
 second part of the history is a particular account  
 of the history of the Jews. It describes the  
 life of Moses and the giving of the law. It  
 also describes the life of Jesus Christ and the  
 establishment of the Christian church. The third  
 part of the history is a general account of the  
 history of the world from the beginning of the  
 Christian era to the present time. It describes  
 the life of the apostles and the early church.  
 It also describes the life of the emperors and  
 the popes. The fourth part of the history is a  
 general account of the history of the world from  
 the beginning of the modern era to the present  
 time. It describes the life of the kings and  
 the emperors. It also describes the life of the  
 popes and the great events of the modern  
 world.

## APPENDIX.

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HOMŒOPATHY. — As yellow fever has been subjected to homœopathic treatment, and as no curative process has received the sanction of the profession; it may not, perhaps, be inadmissible to give a description of the properties of the therapeutic agents employed by homœopathists in this formidable epidemic. In Ruoff's Repertory of Homœopathic Medicine, we find cantharides, arnica and crotalus are prescribed by the disciples of Hahnemann.

CANTHARIS. — In the United States Dispensatory, among its various medical properties which correspond with some of those enumerated in Jahr's New Manual of Homœopathic Practice, cantharis is said to produce "Vomitings and bloody stools; hurried respiration; frequent pulse; dissection reveals inflammation in the intestinal canal; delirium," — symptoms that may and do occur in the yellow fever, and consequently may act, on the Hahnemannic principle, *similia similibus curantur*.

In Jahr's New Manual, the following parallel of the effects of cantharis, and of the symptoms of yellow fever, may be traced: "Violent pains; sleeplessness; coldness and shivering; agitation, which forces one to keep in constant motion; headache; beating in

the brain and heart, mounting to the head; yellowish color of the eyes; yellowish color of the face; anorexia; vomiting of bilious matter or blood; great sensibility of the præcordial region; inflammation of the stomach; inflammation of the liver; inflammation of the intestines; catamenia premature and too copious, with black blood and pains during the flow."\*

Dr. Ruston, in a work alluded to above, in criticising with no little severity on a production on the method of cure of the malignant fever, by some writer whose name is not mentioned, makes the following detached quotation: "Cantharides, he, the writer, says, have been used in the first stage of the disease with great advantage."

ARNICA. — The parallel between the known virtues of medicine and the symptoms of the yellow fever is very meagre.

In the United States Dispensatory, the only medical properties of this article that bears the least resemblance to the symptoms of the disease are contained in the following passages. "Leopard's bane is a stimulant, directed with peculiar energy to the brain and whole nervous system, as manifested by the headache, — difficulty of respiration. It acts as an incitant to the stomach, often producing an emetic effect."

Hooper's Medical Dictionary, by Dr. Atherly, under the head of Arnica, contains the ensuing sentence. "Much caution is necessary in regulating the dose, as it is a medicine very apt to produce vomiting and much uneasiness in the stomach."

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\* In 1798, one case of catamenia, attended with these symptoms, came under my care. The patient died

In Jahr's New Manual, are found the following symptoms: "Unsettled pains in the diseased parts, which cause one to move himself constantly; comatose skin, with delirium; shivering; great agitation and anguish, with groans; unfitness for exertion, and indifference to business; dartings and shootings in the head, and inflamed eyes; want of appetite, with tongue loaded with white or yellowish coating; vomiting dark coagulated blood; respiration short; respiration frequently slow and deep."

My knowledge of the medicinal virtues of arnica is limited to its use in mechanical injuries; and in homœopathic formulæ, both externally and internally. In Jahr's Manual, it is said to be useful in concussion of the brain or spinal marrow; which corresponds with the remarks relative to its medical properties contained in the United States Dispensatory.

How far arnica may be productive of benefit in the yellow fever is to me problematical; in concussion arising from mechanical injuries, if it be not a specific, it is a very efficacious remedy. That there subsists an intimate connection between the spinal marrow and the splanchnic organs to which its nerves are distributed, we have the testimony of Professor Revere, in his excellent lectures on "Spinitis," published in the New York Lancet: "You will then bear in mind," says the Professor, "that most of the organs contained in the great cavities of the trunk, derive their nervous energy not only from the great sympathetic, but have also nerves of motion and sensation. And thus it happens, that although in their normal state these organs appear devoid of sensation, — you may, for instance, tear portions of the alimentary canal in a

healthy state without producing pain, — yet when diseased, and especially when affected with inflammation, those parts become endowed with the most exalted sensibility, and manifestly resulting from the circumstance, that though the nerves of sensation are not numerous, yet they are distributed every where along with the filaments of the great sympathetic nerve. And in the same way these parts, when diseased, are liable to violent and spasmodic motion, dependent on the same circumstances.\*

As, therefore, the filaments of the nerves of motion are interwoven with those of the sympathetic, and are distributed to the organs contained in the great cavities of the trunk, by which a communication is maintained between the viscera of the thoracic and abdominal cavities and the spine — notwithstanding the preponderating authority of Baron Louis, that there was no appreciable lesion of the medulla spinalis in the bodies dead of the yellow fever that had been subjected to autopsy — the active principle of therapeutic agents may primarily exert its influence on the spinal marrow, and secondarily through the intervention of its nerves upon the organs situated in the thorax and abdomen, without the anatomical character of the spine being in the slightest degree altered. Hence, as “Leopard’s bane is a stimulant, directed with peculiar energy to the brain and whole nervous system;”† and as “the nerves of sensation are distributed everywhere along with the filaments of the great sympathetic nerve;”‡ there is some ground for the belief,

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\* See New York Lancet, No. 5.

† United States Dispensatory.

‡ New York Lancet. Professor Revere’s Lecture.

that arnica may be administered in the yellow fever with advantage.

The following complex case affords an additional proof, that there subsists an intimate relation between the spinal marrow and the splanchnic organs of the great cavities of the trunk; and the beneficial effects resulting from the administration of arnica.

On the 30th of September, 1841, came under my care Mrs. F——, aged 64, of a large frame and corpulent; the sanguine temperament predominant. She had been an invalid for four years, during which time she had resided in the country. Symptoms: turgescence of the whole body; complexion a shade darker than natural; sleep unquiet, with confused dreams; look despondent; head at times painful and vertiginous; pulse intermittent and irregular; palpitation of the heart and difficulty of breathing, both greatly increased by motion, especially in ascending a staircase, which she was unable to do without assistance; at night, paroxysms of awaking suddenly, and jumping out of bed, with oppression of the chest and temporary loss of breath; gestation and locomotion irksome and exceedingly distressing; liability of becoming faint; anorexia; pyrosis; tenderness and uneasiness in the præcordial region; at longer or shorter intervals, after comparative repose, the night paroxysms much aggravated, returning without any apparent cause; stools clay colored; flatulency; abdomen prominent; frequent desire of urinating, obliging her to rise several times in the night — quantity not copious.

Mrs. F—— was attended by a physician of the town where she had for some time resided, who, from the best information I could obtain, treated her case with

great judgment. With regard to medicine, his prescriptions appeared to be made with the view of combating the symptoms, which had the effect, in some measure, of alleviating their violence. The dietetic course that was ordered being unobjectionable, I recommended it to be continued. Desirous of witnessing the effect of diet and regimen alone, I prohibited the use of medicine altogether. For a time, the mitigation of the symptoms was such, I began to incline to the opinion, that the practice of homœopathy was indebted for its success entirely to regimen; but this recession of pain and distress was temporary, as at the end of eight days a night paroxysm of unusual severity occurred. This event led to a review of the history of her case. Upon more mature inquiry, it appeared, that four years before she came under my care, she imprudently undertook to split a stick of wood, which, requiring all her strength to accomplish, produced great fatigue and pain in her right upper extremity, which became so far paralyzed, that she could not raise her arm to her head, or grasp any thing with her hand; there was also a considerable projection of the inferior angle of the scapula. But what appeared to throw light on the whole train of her symptoms, was an excessive sensibility of the dorsal spine throughout its whole extent, but more particularly in the region of the three upper vertebræ. Hence there could no longer be any doubt remaining, that the functional derangement of the splanchnic viscera, as well as the paralyzed limb, originated from the disordered spine.

Two methods of cure presented themselves, dry cupping, nervine and laxative medicine; or the administration of arnica. As I had it not in my power to

make the application of the cups at the time, — a remedy on which I usually place my chief dependence;—confiding in the recommendation of the efficacy of arnica “in the disordered condition which succeeds concussion of the brain from falls, or blows, &c. ; and from this circumstance has received the title of *panacea lapsorum* ;” in the United States Dispensatory ; and having found by experience, that the virtue of the medicine was retained in the homœopathic formula ;\* I administered two globules, which had the effect of alleviating the violence of the symptoms, and obtunding the sensibility of the spine. From this time the health of the patient began daily to improve. In about a fortnight after the exhibition of the first dose of arnica, while reaching after something in a closet, she was seized with vertigo, and sallied sideways to the right, and had she not been caught by her daughter, she would have fallen on the floor. The more immediate cause of the attack appeared to be the impression made on her mind by the views of the death of a grandchild and the sickness of its mother. For this affection, I prescribed a homœopathic dose of *nux vomica*, which had the effect of not only allaying the vertigo, but producing copious discharges of dark fæces, and dark and turbid urine. From this attack she slowly recovered, and was enabled to quit her chamber, to which she had been for several weeks confined. Some time after, a night paroxysm having returned, on examination of the lower part of the dorsal spine, it was found to be quite sensitive, for which I prescribed two globules of arnica, which af-

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\* I could not obtain arnica or any of its preparations at the shops.

forded great relief. From this time, the sensibility of the spine gradually disappeared; the arm and hand continued to recover strength; the scapula to resume its natural position; the turgescence of the body, the shortness of the breath, palpitation of the heart to subside, and locomotion to be performed with comparative ease. At length, she so far recovered as to be able to dress and feed herself, to sew, and ascend and descend a long and steep flight of stairs several times a day. The pyrosis, without the exhibition of any particular remedy, gradually declined as the patient recovered her health.

*Crotalus*, — the juice that is collected from the sac that adheres to the teeth of the *crotalus horridus*. As we have no detailed account of this fluid; and presuming that that expressed from the sac of the *trigonocephalus lachesis* has similar properties, and is equally, or perhaps, more active; the latter is substituted for the former. Dr. Quin, in his *Pharmacopœia Homoœpathica*, has described the manner in which this article is procured, and the manner in which it is prepared, as follows:

*Lachesis.*

(*Trigonocephalus Lachesis.*)

*Triginta attenuationis.* (x)

*Dosis: Glob. ij. trigecimæ attenuationis.*

YELLOW FEVER.—“ We possess, as yet, no valuable information respecting these fevers, except one case, which was cured by *crotalus*. The physician who is called upon to prescribe for these fevers, might also direct his attention to: *Arnica*, *ammonia carbonas*, *carbo vegetatilis*; and also to *arsenica*, *bryonia*, and

perhaps also to, Belladonna, china, ipecacuanha, mercurius and nux vomica." \*

From Jahr's Pharmacopœia and Posology, † under the head of *Lachesis*, the following extracts are made: "Snake poison is procured from the poison-bags which are found in the upper jaw of these reptiles. Thus far we only use the poisons of the lachesis and of *crotalus horridus*, the last of which is obtained and prepared in the same way as the other. The poison of these serpents has this in particular, that it may be swallowed without inconvenience."

Dr. Stevens says: ‡ "We have seen that there are certain poisons, both animal and vegetable, which do not produce any obvious effect, so long as they are applied merely to the sentient extremities of the nerves, even upon those surfaces that are most sensible. This is the case with the venom of the rattle-snake. When this poison is applied to the surfaces of the eye, the nose, the tongue, &c., they scarcely produce any effect. It may even be taken into the stomach with the most perfect impunity.

LACHESIS. YELLOW FEVER.—Skin yellow; fever *shiverings*, sometimes only partial; pulse feeble, and frequent or irregular, or scarcely perceptible or tremulous. *Moral Symptoms*.—Great anguish and insupportable anxiety and inquietude; nocturnal delirium, with much talking or with nervousness. Heat; vertigo; cephalgia from the heat of the sun. *Eyes yellow*, or tur-

\* Jahr's New Manual.

† New Homœopathic Pharmacopœia and Posology. Translated by James Kitchen, M. D. Philadelphia and New York.

‡ Observations on the Healthy and Diseased Properties of the Blood. By William Stevens, M. D. London.

bid, dull and dejected; bright, with fixed look; eyes red and inflamed. Face, *leaden* or *earthy*; discolored, yellowish complexion. Tongue, shining, red and cracked; brownish and blackish. Deficiency of appetite or hunger. *Violent and convulsive vomiting of every thing that is taken*, or of a bilious, bitter and greenish matter; vomiting of blood, or of sanguineous mucus; *excessive sensibility of the præcordial region to the slightest touch*; great weakness of the stomach—it can bear neither food nor drink. Cuttings so violent, as to drive one distracted. *Evacuation of fætid matter*, or of soft fæces, of the consistence of pap, or of liquid, slimy, *pitch-like*, or sanguineous mucus; urine turbid and brown, or red or deep yellow. — *Jahr's Manual*.

I have found Lachesis to act with specific energy in restraining hemorrhages, proceeding from “capillary extravasation.” Great care must be taken not to produce an aggravation, lest it be attended with a fatal hemorrhage. It is found that the highest potencies are sufficiently efficacious to resist the most profuse effusions of blood.

THE STRUCTURE, FUNCTIONS AND PATHOLOGY OF THE  
SPLEEN.

BY WILLIAM INGALLS, M. D., BOSTON.

[Communicated for the Boston Medical and Surgical Journal.]

IN a course of Lectures in Brown University, in which institution I was professor of Anatomy, Surgery and Physiology, prior to the year 1820, in treating of the collatitious viscera of digestion, I considered the liver, pancreas and spleen to be biliary organs; that their coöperation is indispensably necessary to the production of bile suitable for the purposes of the animal economy; that this position is founded on the similarity of their structural diseases, demonstrable from cadaveric autopsies in the dissecting room and in private practice; that these viscera are sometimes found enlarged and softened, and sometimes shrunk and somewhat hardened; that we have seen them, at the same time, of a proportionate size and scirrhus, on the one hand; and on the other of enormous magnitude — the spleen extending to the right iliac region as far as the anterior and superior spinous process of the ileum, and the anterior margin of the liver descending several inches below the right cartilaginous border of the false ribs in a patient who had never been exposed to the influence of malaria, and therefore it is presumed their size was not the result of vitiated structure, but of preternatural or morbid growth; that, in these instances, the uniformity of their dimensions and consistence is sufficient to show their functions all tend to the same

issue; that these organic changes are found only in diseases of long standing. I also considered, that the collatitious viscera or biliary organs may be deduced from their functional diseases; that the spleen not only secretes the bitter principle, but is the seat of the intermitten fever; that the liver not only secretes bile, but is the seat of fevers varying in their type according to the tissue affected; that the parenchyma is the seat of bilious fever, and the mucous membrane of the pori biliarii is the part of the digestive apparatus on which the virus of the yellow fever in its most malignant form exerts its baleful influence; that the peritoneal coat of this viscus is the seat of hepatitis; that the bilious fever and the intermitten may be reciprocally modified; that when the bilious fever is violent or of long duration, the function of the spleen becomes disturbed, and reacts upon the liver, whence occurs a mixed fever of the nature of the bilious and remittent, and, finally, losing its original character, it degenerates into the intermitten; that when the intermitten is violent, or of long continuance, it may so disorder the functions of the liver as to produce, in the first place, a bilious remittent, and ultimately a continued bilious fever; that the functions of the liver and pancreas, spleen and stomach, are connected with each other rather through the medium of the circulation, than by the instrumentality of the nerves.

The above positions have received countenance and support from ulterior observations in the anatomy, physiology and pathology of these viscera, as the following quotations will show, particularly with respect to the spleen and liver.

At a recent post-mortem examination, the liver and

spleen were of their usual size, but of a lax texture; their convex surfaces were shriveled, of a leaden hue, and thickly studded with small tubercles. No notice was taken of the pancreas, which is the case in by far the greater number of dissections.

“In the fatty transformation of the liver, this viscus and the spleen were found soft.” HEYFELDER — *Lancet*. Here, assuredly, no reference is made to the pancreas.

Malpighi and Kiël suspected the functions of the spleen had relation to the secretion of bile. — *Dictionnaire des Sciences Médicales*.

“Among other symptoms of inflammation of the spleen, jaunisse [ictère] is mentioned.” — *Ibid*.

“That the spleen is an auxiliary organ of the liver, and destined to prepare a certain quantity of the blood of the vena portæ.” — BICHAT.

*Disease of the Liver and Spleen.* — “The case of diseased liver and spleen occurs in a little girl, eleven years of age, who is said to have been always ill. The first symptoms observed by the friends were jaundice. At present she has merely an aguish tint of skin, but a yellowness is decidedly observable in the eyes. She is rather thin, but not particularly ill, and goes about. The left lobe of the liver can be particularly felt *indurated*, there being a *sharp* horizontal margin in the left hypochondrium. The spleen is likewise *indurated* and also enlarged, and its edge may be felt *sharp* and hard, and a slight fluctuation may, with care, be discovered. I could not discover any external cause of this disease. She is said never to have had ague, nor any particular disease, nor to have lived where malaria is known. Whether

her mother had had ague, I do not know ; but lately I saw a twin infant with a distinctly enlarged and indurated spleen, which had been born in London, but whose mother some time before had suffered from ague in the country. This infant became pale and emaciated and died, and on opening it I found the spleen enlarged, hard and compact, but otherwise of a healthy appearance. At the examination of the body, the mother mentioned that the other twin was beginning to fall off, and on examining the abdomen it was found that its spleen had begun to enlarge and was indurated, and this child will die of precisely the same complaint as the first." ELLIOTSON — *Lancet*.

In the rapid advances that have been made in the various subjects of medical science, the spleen has not been overlooked ; by their investigations modern physiologists have thrown great light on its structure, its functions, its pathology, its connections, its treatment, and its uses.

STRUCTURE.—As the spleen lies deeply ensconced in the left hypochondrium, and is in the vicinity of important organs, the symptoms of its maladies are involved in great obscurity ; and, therefore, it becomes proper to give a more particular description of its situation and connections, as well as form, than otherwise would be necessary.

This viscus is of a triangular form ; according to the observations of Prof. Dupuytren and M. Assollant, its average length is four inches and a half, and its thickness two and a half. "It has three faces, three margins, and two extremities." The external face is smooth, and comes in contact with the serous membrane that lines the diaphragm, and is elliptical to

conform to the concavity in which it lies; internally there are two faces, the anterior and posterior, each having two depressions, the former corresponding to the cardiac extremity of the stomach, the latter to the kidney and capsula renalis. It has three margins, an anterior, posterior, and internal; the last is the shortest of the three, in which there is a sulcus perforated with foramina for the transmission of branches of the splenic artery and vein, denominated *the fissure of the spleen*; the two former are sometimes notched, particularly the anterior. It has two extremities, the one posterior and inferior, the other anterior and superior; the former is obtuse and thick, the latter acute and thin. The anterior extremity is directed towards the umbilicus, and in an enlargement of the spleen the apex may be felt emerging from the hypochondrium near the extremity of the tenth rib.

The spleen is invested with two membranes, the serous and fibrous. The serous is formed by a reflection of the peritoneum: the ligament, extending from the stomach to the spleen, by which the two organs are connected together, is composed of a duplicature of the peritoneum, the leaves of which, when it approaches the internal margin, separate and are reflected over the viscus, constituting its external coat. Between the leaves is interposed cellular tissue, and between which passes the splenic artery,\* sending off the vasa brevia to be distributed to the great extremity of the stomach; it is also attached to the diaphragm by a fold of the peritoneum. The external surface of the

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\* The splenic vein and its divisions accompany the artery and its branches.

outer membrane of the viscus, like other serous surfaces, is smooth, and secretes a lubricating fluid to obviate the effects of friction; the internal surface, through the medium of cellular tissue, is adherent to the external surface of the fibrous membrane.

The fibrous membrane has two surfaces, the external and internal. The external is so closely attached to the inner face of the serous coat, it is difficult to separate them; the internal is contiguous to the substance of the spleen. Processes of this membrane enter the foramina of the fissure, forming sheaths through which the branches of the splenic artery and vein, accompanied with cellular tissue, are transmitted to every part of the spleen; fibrous prolongations are also sent in, from its inner surface, which are expanded into cells; these are filled with a bibulous tomentum of the ultimate, or capillary, ramifications of the splenic vein. It is this substance that renders the mass of the spleen soft and spongy.

The spleen is "highly elastic," and it appears from certain morbid enlargements that its distensibility is immense; "Cette distension, dans ce cas, est moins l'effet de l'élasticité que l'effet des propriétés vitales."

This viscus is generally somewhat of the color of blood, varying in intensity in subjects of different ages; it is sometimes of a "deep blue."

From the experiments made by professional gentlemen in whose ability and fidelity we may repose the utmost confidence, the cellular structure of the spleen may be considered as fully established.

If you inflate, says Malpighi, the spleen of a sheep or a calf, and let it dry, and cut it as soon as it is dry, you will find that the whole mass is composed of cells similar to those of the honeycomb.

“ Si vous remplissez de vent, dit Malpighi, un rate de brebis ou de veau, et que vous la laissiez sèche, et qu’ensuite vous la coupiez aussitôt qu’elle sera sèche, vous trouverez que toute la masse est composée de membranes pleines de celles semblable à celles qu’on remarque dans les rayons de miel des abeilles.” — *Dictionnaire des Sciences Medicales.*

*On the Structure and Functions of the Spleen.* By SIR A. COOPER. — “ The following is an extract of Sir A. Cooper’s opinions on the structure and use of the spleen; which were delivered by him to the anatomical class, in a lecture upon that viscus.

“ After a few preparatory observations on the figure and relative situation of the spleen, Sir A. Cooper proceeded to speak of its structure; he said, that in addition to the partial peritoneal coat covering the spleen, it possessed a proper and peculiar covering, or capsule, which, however, did not merely form a coat to the spleen, but processes of this membrane, which he termed septa, or cords, were sent through its substance, by which means the two surfaces of the covering were united. Sir Astley remarked, that this membrane was *highly elastic*, and to this fact he begged particular attention. Proceeding next to speak of the internal structure of the spleen, he said that he considered the opinion of those who contended that the spleen was cellular, was undoubtedly true, and, in confirmation of this, he would appeal to the various preparations of this viscus then before him. The splenic artery, he said, was given off from the cœliac, and after distributing branches to the pancreas, the left side, and cardiac end of the stomach, passes into the substance of the spleen, and divides very minutely;

the artery does not in itself (said Sir Astley) form the cells, but the branches ramify on the cells. The most curious part of the structure of the spleen, he observed, was in the veins, and here Sir A. exhibited to the class the spleen of an ox, and also of a calf, in which the distribution and the commencement of the veins were well seen. He compared the internal structure of these preparations with a dried preparation of a turtle's lung, and said that the similarity was so great, that the lung had been laid upon the table by mistake, for a preparation of the spleen. The cells of the spleen, Sir Astley remarked, were formed in the splenic vein, into which the blood is poured from the minute capillary branches of the splenic artery. In order to illustrate the elasticity of the membrane, or proper capsule of the spleen, Sir Astley introduced a pipe into the splenic vein, and then inflated the spleen; it readily admitted of distention, and its size was much increased, but was immediately emptied by its own elasticity. By means of an ejecting syringe he threw water into the veins of a spleen; upon withdrawing the syringe, and holding the viscus in the hand, it was seen to empty itself and resume its original size. The spleen upon which the experiment was shown appeared very small, but it held twenty-four ounces of fluid. These were my playthings, gentlemen (said the worthy baronet, with a good-natured smile), when I was ill in the country last summer, and I will tell you the results of those investigations, or rather the conclusions I have arrived at respecting the use of the spleen; and it is this; — the spleen is an elastic reservoir and manufactory of venous blood.

“Sir A. said the blood was conveyed into the cells

formed by the splenic vein, and was there retained until a supply of dark venous blood is demanded for the liver, when, by the elasticity of the investing membrane of the spleen, its contents are propelled. The blood in the splenic vein becomes additionally charged with carbon, and forms dark blood, which is necessary to form bile. Sir A. remarked that the difference between the lungs and spleen was this — that in the former the blood was deprived of its carbon, whilst in the latter it received an additional quantity. In the spleen of the reptile class, and also in birds, he observed, there were vessels in lieu of cells, and it is only in quadrupeds that the cells can be ascertained.

“Sir Astley Cooper next alluded to the hypothesis of Dr. Haighton upon the use of the spleen, which was, that when the stomach was full it pressed upon the spleen, and thus impeding the circulation through that viscus, the blood was more copiously propelled to the arteries of the stomach, in order that a larger quantity of gastric juice might be secreted. Sir A. said if such were the use of the spleen to the stomach, it must also serve for a similar purpose to the pancreas; but he admitted that it remained for further investigation to prove what other offices the spleen performed, in addition to that which he conceived to be its principal use.” — *Lancet*.

Another view of the anatomy of the spleen — which in my opinion does not necessarily militate with its cellular structure — is contained in the following extract.

“M. Andral, Jr., a gentleman well known as one of the first pathologists in France, has lately announced a discovery which he has made, concerning

the circulation of the spleen. The splenic artery, at its termination, is perforated with numerous small holes, which pass immediately into the spongy tissue of this organ. A similar structure exists in the veins. These opinions are substantiated by anatomical preparations." — *Ibid.*

FUNCTION. — One of the offices of the spleen is the secretion of the bitter principle, to effect which the structure of the splenic apparatus, having all the requisites of a secreting organ, seems to be peculiarly adapted. The splenic artery takes its rise from the cœliac, and passes along the posterior margin of the pancreas, until it approaches the spleen, when it divides into several branches, to each of which, after it has entered the substance of this viscus, is appended a cluster of ramifications, each cluster having an independent circulation; and while its vessels have a free communication with each other, they do not anastomose with the clusters of the other branches. Each portion of the spleen has likewise its own set of vessels, by which it is supplied with blood, and by which it is exclusively nourished, so that there may be a structural disease of several portions, while the rest are sound.

In the first periods of the formation of the embryo, the rudiment, or rudiments, of the spleen is seen to resemble a clot of blood, which by rubbing between the fingers may be easily crushed, and which gradually acquires consistence until the term of gestation be completed, when traces of organization begin to appear, and in process of time the splenic apparatus is completely formed.\*

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\* Dictionnaire des Sciences Médicales.

Each branch of the splenic artery acting independently, will enable us to account for the existence of a number of spleens; because the branches to which are attached several portions of the spleen, when they do not grow *pari passu*, will not coalesce, but remain disunited and constitute separate spleens; and when they do coalesce, their development may be so far incomplete as to leave notches in the circumference of the spleen.

The splenic vein—a branch of the vena portæ—when it approaches the spleen, is divided into several branches, which are transmitted with those of the artery to every part of this viscus. The ultimate branches of the splenic artery are ramified on the cells, while these are filled with the radicles of the vein in the form of minute granulations.\*

The precise manner in which the circulation is performed, does not appear to be correctly ascertained. perhaps after it has remained in the capillary arteries a sufficient time to have undergone its appropriate changes, the blood exudes through the pores, or, according to the discovery of M. Andral, Jr., “through the holes in the sides of the arteries,” into the cells, to be imbibed by the radicles of the splenic vein. There appears to be no immediate communication of the artery with the vein, as air cannot be forced through the artery into the vein, nor into the cells, nor is it known that it escapes from it; on the other hand, air cannot be forced into the artery by inflating the vein, but, without any unusual effort, the cells are filled with air, and the spleen swells up and is enlarged. By

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\* Ibid.

making a puncture through the integuments into the body of the spleen, and inserting a blowpipe, the whole viscus may be inflated. Hence it may be inferred there is a communication between the extremities of the veins and cells, and between the cells themselves.

We shall here introduce an extract from the lectures of Dr. Grant "On the Secreting Organs of Animals."

"Every lining membrane in contact with a fluid, whether on the surface or in the interior of the body, exhales its own peculiar fluid, and in the lowest tribes of animals all the requisite secretions are furnished, often without the presence of a sanguiferous system. The materials thus transuded through the porous texture of membranes, or the parietes of capillary vessels, are sometimes destined to form a part of the system, sometimes to assist in the assimilation of foreign matter, and sometimes to form excretions to be discharged from the body. These secretions are not mere transudations of materials, unchanged in composition, from the fluids which afforded them; they are generally altered both in their chemical and physical properties by this transmission. \* \* \* The duct of a gland is the gland itself, and it may be a simple undivided follicle, or it may be ramified to infinity, and compose a large conglomerate mass; but this membranous duct, with its vessels and nerves, appears to be alone essential to the secretions." — *Lancet*.

There undoubtedly resides in the blood materials essential to the formation of bile. Changes also occur in the quality of the blood at different periods, until we arrive at maturity. In the early stages of infancy, the blood flowing through the *venæ portæ* is particularly

adapted to the very excitable state of the liver; the bile is bland; the sweet taste being predominant, the consistence watery, and the color less intensely yellow, afford an evidence of the mild character of the portal blood—the source whence its properties are derived. But in the course of time, the excitability of the biliary organ is less, and the structure more complete. In manhood, picromel, which is the essential property of the bile, is in such proportion as to afford a salutary stimulus to the liver.

An injected preparation of an infant, of ten months, was presented to me by Dr. Ramsay, in which the venæ portæ, instead of going to the liver, entered the venæ cavæ near the abdominal surface of the diaphragm: the subject was extremely emaciated. A similar distribution of the venæ portæ in a subject arrived at maturity has not been recorded.

It has been conjectured the secretion of the bile may be performed by the hepatic artery, and the venæ portæ being sometimes found to open into the venæ cavæ, instead of going to the liver, is cited as an example confirmatory of this opinion. That the artery, besides being destined to nourish the liver, may in some measure be subservient to the process of the biliary secretion, is quite possible; but that it is the principal agent in the secretion of the bile, is warranted neither by experiment nor by anatomy. The true source whence pure bile is produced is the portal blood; though this be cut off, bile may be secreted, but of a nature so bland that its influence in promoting digestion is inconsiderable.

The functions of all the organs are proportioned to the requirements of the animal economy—at the dif-

ferent ages. The spleen is not sufficiently developed to secrete its appropriate fluid—from which the stimulating property of the bile is derived—until several months after birth; in the interim, however, the bile, though bland, is very well adapted to assist digestion. When the function of the spleen is established, the system has arrived at the state in which digestion requires bile of a more stimulating quality. If from any cause the flow of blood from the hepatic vein to the liver be obstructed, or diverted from its course, the digestive powers for the want of its proper stimulus become enfeebled; health declines; extreme emaciation ensues; and death terminates existence.

Notwithstanding the trunk of the portal vein does not reach the liver, the branches which are naturally distributed to this viscus must exist; otherwise there would be no secretion of the bile, as upon the agency of these branches the production of the biliary fluid is dependent. The liver is composed of small glands, called penicilli, formed by convolutions of the extreme branches of the *venæ portæ*. When these have performed their office, the superfluous blood enters the radicles of the *venæ cavæ hepaticæ*, to be commingled with the circulatory mass. Admitting, then, the extremities of the *venæ portæ* inosculate with the radicles of the hepatic veins—on the principle that fluids tend to penetrate into parts that give the least obstruction—the venous blood of the hepatic veins finding the least resistance towards the capillaries, enters them, and coming in contact with the membranous surfaces\* of the penicilli—on which the biliary secretion is de-

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\* See Grant's Lectures.

pendent—bile is secerned. But, as we have said above, bile that is destitute of picromel in consequence of the function of the spleen being not yet established, is mild and thus may answer in the first stages of infancy, but in later stages it is inadequate to give a wholesome stimulus to the organs of digestion, or to produce the chemical change in the chyme, by which the chyle is separated from the feces—one of the processes of assimilation essential to nutrition and the continuance of life.

A distinction is made by Mr. Hunter between the trunk of large branches and their ultimate ramifications; the former are endowed with elasticity, and the latter with muscular power. Though the impetus of the blood by the elasticity of the arteries be felt throughout the vascular system, the circulation in the *minimæ vasculæ* is carried on mainly by muscular power. In proportion to the tortuous course of an artery, its combined force of elasticity and muscular power are greater than a straight one.

The splenic artery is tortuous and muscular; and in proportion to its tortuosity and muscularity is its capacity for action. In a recent post-mortem examination, in a subject aged 73, the splenic artery was ossified, affording an excellent opportunity of seeing its flexures; it was arched and stood off at some distance from the superior margin of the pancreas, along which it proceeded in an undulating course, until it arrived near the spleen, when it described a small, but complete circle. The splenic vein is much larger than the artery; its coats are very thin and capable of great dilatation, and the blood contained in it is deprived of its coagulable property.

The action of the arteries and their larger branches, and even the propelling power of the heart, are subordinate to the capillary system; and this seems to be in conformity to the order of nature, as in the growth of an animal of the class of mammalia the capillary arteries are first formed, next the branches, then the trunks, and finally the heart.\* The capillary system maintains its priority and ascendancy in the actions of the circulatory apparatus and in the various secretory organs in the adult; as is evident from the act of blushing from modesty, or shame, and the changes of the countenance from fear, or terror, or anger, preceding the palpitation of the heart and the trembling of the muscular fibre; and from the effect of topical applications on the parts beneath before an alteration in the action of the branches, and trunks of arteries and the central organ of circulation is produced, or an impression on the nervous system is made.

The excitability of the muscular fibre exists independently of the nerves? In paralysis, when the function of the motive and sensitive nerves is interrupted, and the muscles are no longer supplied with nervous influence, the circulation continues, nutrition proceeds, and involuntary spasmodic contractions occasionally take place. If the pneumogastric nerves, says Magendie, be divided "below the origin of the branches that go to the lungs, food is transformed into chyme, and an abundance of chyle is produced." Hence the functions of the secretory organs are chiefly under the control of the apparatus of circulation. In health, the capillary vessels — being the first to feel impressions — in the

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\* Grant's Lectures.

absence, or presence, of stimuli may remain comparatively quiescent, or brought into action, without the interposition of nerves.

The distensile and contractile power of the stomach is very great. We are informed, when the stomach is empty, it becomes enlarged, and when full it is much contracted; or, as some physiologists suppose, the reverse is the case. These conditions, however, do not contribute much to the explanation of the function of this viscus. When the stomach is empty, the activity of its capillary vessels is greatly diminished, and there is a corresponding inactivity in the splenic artery, and indeed in the branches of the cœliac, and the mesenterica superior and inferior. When food is taken into the stomach, the capillary vessels of the vasa brevia first feel its stimulating property, which is soon propagated through the vasa brevia to the splenic artery, thence to the arteries arising from the anterior part of the aorta, and contained within the cavity of the peritoneum; whence also the flow of blood through the portal veins is accelerated. When the appetite is satiated and hunger appeased, a healthy excitement is imparted to the liver, and the whole system is invigorated. In addition to the acceleration of the blood through the splenic vein and the ventral branch of the venæ portæ, the bitter principle affords a stimulus to the biliary organ, promoting the secretion of bile, and rendering the circulation through its mass more active; whence an increased quantity of blood is discharged through the venæ cavæ hepaticæ into the venæ cavæ, and thence into the right auricle. By this process the activity of the heart is augmented, the blood is propelled through the arterial system with greater velocity,

and the animal temperature more elevated. Though the excitement thus produced may not be inconsistent with perfect health, it has obtained the name of *crapulary fever*.

**PATHOLOGY.**—The following syllabus is taken from *Marshall Hall's Lectures on the Theory and Practice of Medicine*.

“The diseases of the spleen are exceedingly obscure : they may be viewed as only forming a part of a previous disease, as 1. Typhus ; 2. Intermittent ; 3. Purpura, &c. ; or as constituting a primary disease, as, I. INFLAMMATION, including 1. *Changes in volume,\* consis-*

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\* Cases of enlargement of the spleen — vulgarly called “ague cake” — have come under my care, as sequelæ of the intermittent fever. Treatment : for an adult, purgatives of a warm infusion of senna, in the proportion of half an ounce of the leaves of senna to a pint of water ; one half to be taken at first, if it does not operate in three hours take the remainder ; this dose to be taken every third day ; friction night and morning with saponaceous liniment rendered pungent by the addition of cajeput oil ; light, nutritious diet ; abstinence from stimulating drinks and condiments ; warm clothing ; and avoidance of atmospheric vicissitudes.

Three children, of colored parents, successively died, when they had arrived at between two and three years of age, of an enlargement of the spleen, readily distinguished by examination externally. The death of each was preceded by continued fever, loss of appetite and strength. Neither of the children nor their parents had been exposed to the action of marsh miasmata. The family lived in a room in the third story ; in the entry adjoining were pails and tubs filled with the refuse of culinary vegetables macerating in stagnant water ; — a fact, perhaps, that ought not to be omitted.

In May, 1839, I prescribed for a twin female child, between one and two years old, with an enlargement of the spleen : the abdomen was prominent, the apex extended a little below and beyond the umbilicus, pointing, however, towards the superior and anterior spinous process of the ileum ; emaciation and restlessness very great. The remedies employed in the treatment of the ague cake, with the addition of lime water, were recommended. March 23, 1840, the enlargement of the spleen had subsided ; the child was fat and lively ; could stand by holding by the back of a chair. It had the usual marks of rickets. The lime water was advised to be continued.

*tency, color* ; 2. *Suppuration* ; (1.) *Diffused* ; (2.) *Abscess*. II. ORGANIC DISEASE. 1. *Tubercles* ; 2. *Encephalosis* ; 3. *Cysts* ; 4. *Hydatids, &c.*" — (*Lancet*.) To which may be added injuries from *external violence* ; sometimes complicated with rupture of the peritoneum.\*

It is more particularly my object, in this communication, to give my views of the pathological condition of the spleen in the intermittent fever ; and what has been advanced on its structure and function will enable me to effect this object with greater brevity.

The intermittent is an endemic disease, originating from malaria ; and persons very seldom experience an

\* In the course of my practice I have made the post-mortem examination of three cases of the fracture of the spleen ; two of them from blows in the pit of the stomach. The other was occasioned by a fall from the wall of the Tremont House (while it was building) upon a pile of stones. The height from which the man fell was, by admeasurement, ascertained to be twenty-six feet. In all of these cases the posterior cavity of the peritoneum [l'arriere cavité peritoneale : — BICHAT] was filled with *fluid* blood. The two former I examined at the request of the attending physicians. The third case fell under my immediate care, the history of which, entitled "A Case of Fracture of the Spleen and Rupture of the Intestines, occasioned by external violence. By Wm. Ingalls, M. D.," was inserted in the Boston Medical and Surgical Journal of June 24, 1828, from which I have made the following extract.

"There was a tumor in the region of the stomach of a character different from the general inflation of the abdomen, which cannot be explained without admitting that the blood was retained in that situation by being lodged in the sac or cavity belonging to the epigastrium. Hence, in hemorrhages from injuries of the spleen or from ruptured vessels in its vicinity, we may expect to see a well-defined tumor in the epigastric region, affording to the touch a soft yielding, rather than a strong sense of fluctuation. It is possible, however, in profuse hemorrhages, the blood may be discharged into the proper cavity of the peritoneum through the foramen, behind the capsule of Glisson, in which case, the character of the tumor and the source of the hemorrhage would be less easily ascertained."

attack, unless, at some period of their lives, they have resided in a country where it is generated.

Malaria acts both as the remote and as the predisposing cause of the intermittent fever. The exciting cause is usually the effect of exposure to sudden changes from a high temperature to a cold moist state of the atmosphere, or to excessive fatigue. When from a combination of these causes the intermittent is developed, the debilitating influence of malaria renders the spleen—the seat of the intermittent fever—so torpid as temporarily to suspend its function. The ultimate ramifications of the splenic artery and the radicles of the splenic vein, which constitute the great mass of the spleen, are in a correspondingly languid state. The *minimæ vasculæ* of the artery and vein being paralyzed, the splenic vein would become empty and collapsed, were it not for the reflux of blood from the trunk of the *venæ portæ*. In this case, the ventral branch of the *venæ portæ* in supplying the deficiency of fluid in the trunk, occasioned by the reflux of blood into the splenic vein, becomes to a considerable extent exhausted, and thus the quantity conveyed to the liver is diminished.

Blood conveyed by the portal system to the liver, besides being less in quantity, is deprived of the properties which we have considered requisite to furnish the materials for the formation of the bile, and to impart to this viscus a salutary stimulus. From these causes the vascular system of the biliary organ is in a considerable degree rendered inactive; consequently, the current of blood flows in less quantity and with less velocity through the *venæ cavæ hepaticæ*, *venæ cavæ abdominalis*, and the cavities of the heart. This

viscus not feeling the usual stimulus arising from the impulse of the blood against its walls, contracts feebly, and the impetus of the blood derived from its propulsive power, with the additional aid of the elasticity of the trunks and larger divisions of the arteries, is not sufficient to overcome the resistance of the smaller but muscular branches. Thus, the balance between the elastic and muscular portions of the arteries is disturbed; the *vis a tergo* being comparatively weak, the capillary vessels acquire the preponderance, and contract so forcibly as to produce a regurgitation of their contents. Hence the paleness and shrinking of the cutaneous surface. These are without doubt unequivocal signs of the vacuity of the capillary vessels, and the want of plenitude in the larger arteries; but the capillaries of the surface are not exclusively affected, as the same phenomena may exist in the viscera contained in the cranial, thoracic and abdominal cavities, and indeed in every secretory organ. The stomach, the functions of which have been proved by M. Magendie to be performed without the intervention of nerves, may be selected as an example.

The stomach is furnished with vessels from three sources; from the splenic, hepatic and coronary arteries, each being given off from the cœliac; on the left side, arise from the splenic the gastro-epiploica sinistra and vasa brevia, which go to be distributed to the cardiac extremity of this viscus; on the right, from the hepatic, arise also two branches, the gastro-epiploica and pylorica, which go to be distributed to the pyloric extremity; and superiorly, the coronary, which is its proper artery.

We have stated, that the first cause of the succes-

sive and extensive morbid changes in the several portions of the bloodvessels originated from a paralyzed state of the *minimæ vasculæ* of the spleen; in conformity to the law, that the activity of an artery and its branches belonging to a secretory organ is in exact proportion to that of its capillary vessels; that the splenic artery and its branches become proportionably torpid; that the liver did not receive by the *venæ portæ* blood in the usual quantity; that the capillary extremities of the hepatic artery, together with those of the other classes of vessels, were rendered in a great measure inert; and that—on the principle above mentioned—the artery itself and its branches must be in a corresponding condition. It may be added, that from the same cause that produces torpor in the splenic artery and in the hepatic, the *cœliac* is similarly affected, and that consequently the circulation in the coronary is comparatively languid. With regard to the numerous arteries that supply the stomach with blood, the *vis a tergo* is not sufficient to overcome the resistance afforded by the contractile force of its capillary vessels. Thus, the functions of the stomach are impaired, and remain so through the paroxysm of the intermittent fever; and, in like manner, the feeble contractions of the heart and the resistance of the capillary vessels satisfactorily explain the morbid phenomena peculiar to the functions of the viscera contained in the cavities of the thorax and cranium.

During the inactivity of the vascular system the blood slowly accumulates round the heart, until the sensation of cold, “frequent succussions or rigors,” anorexia, embarrassed respiration and disturbance of the functions of the brain, announce the existence of

the cold stage of the fever; stretching, yawning, indisposition to motion and mental exertion, are the precursory symptoms which give warning of its approach.

Efforts of the heart to release itself from the accumulating load are made; and the organs of respiration are thrown into great commotion; the carbon not being exhaled nor the oxygen absorbed in due proportions, the impracticable effort to make a full inspiration brings into strong action the respiratory muscles, manifested by "frequent succussions or rigors," the severity of which are in proportion to the vacuity and collapse of the *minimæ vasculæ* of the lungs. By the increasing action of these organs the cold stage is at length overpowered, and the hot stage is established.

The hot stage is not immediately succeeded by the sweating stage; if it were, a solution of the malady would be the result, the contractions of the heart would propel the blood in a uniform current throughout the whole arterial system, whence perspiration would ensue and continue to flow until the circulation was restored to its healthy condition. But the reverse is the case, by the empty and collapsed state of the *minimæ vasculæ* the cutaneous and pulmonary transpiration and the secretions generally are obstructed. In addition to what has already been advanced, during the first part of the cold stage, while the heart and capillaries remain in almost a quiescent state, an accumulation of excitability takes place, the obvious effect of which is the rendering the pulsations of the former more vigorous, and the resistance of the latter more obstinate. Between these antagonizing powers a contest ensues, in which the heart most usually pre-

vails, the capillaries capitulate, a free evacuation follows, and health is restored.

SEQUELÆ. — These are, 1st. The enlargement of the spleen; 2d. Anasarca. On these subjects the following extract from *Dr. Marshall Hall's Lectures on Intermittent Fever*, it is thought, will be as acceptable to the reader as it has been interesting and instructive to me; especially with regard to the dropsy, either as it arises from disease of the liver or of the spleen.

The doctor, in speaking of the intermittent fever, says: "Perhaps the most extraordinary symptom is the *splenic* pain, tenderness and tumor. These are frequently observed in the beginning of intermittent, and in the cold stage of each paroxysm especially. After a time, this organ is apt to become permanently enlarged.

"The connection between the paroxysm of intermittent and the state of the spleen, and the effect of cinchona and arsenic, are highly interesting; and it is an equally interesting question, whether the same connection subsists in the cases of ague-like paroxysm from suppuration, stricture, or retention of the urine.

"There is a prevailing notion or suspicion, among the French physiologists, that *the source of intermittent is the spleen*. This organ becomes tender and tumid, especially in the cold stage of each paroxysm, and eventually permanently enlarged, constituting the 'ague cake' in the course of the disease, if this be protracted.

"M. Louis observes, with his wonted reserve, 'If we cannot affirm that intermittents consist in a change, more or less severe, of the spleen, because it preserves its size in the intervals, and because these fevers may

be removed whilst it is undiminished, still this organ deserves great attention from those who investigate the subject of intermittents, since it is evidently affected in the commencement in many cases, and much more frequently than the other organs.' M. Andral asks — 'What is the nature of the change experienced by the spleen in intermittent fever? Is it the cause or effect of the fever?' . . . . Dr. Wells observes — 'Dropsy is another well-known consequence of ague. Whenever I have observed dropsy of the abdomen to arise from this cause, which, however, has not been often, swelling of the lower extremities has always preceded it. Sir John Pringle remarks, that the dropsies which occurred after ague in the Netherlands, generally began at the feet and rose gradually to the belly.' M. Andral observes — 'When dropsy is the result of disease of the liver, ascites almost constantly precedes the anasarca. In the patients affected with intermittent, on the contrary, the anasarca was first observed.' — *Lancet*.

CONNECTIONS. — The spleen is connected with the cardiac extremity of the stomach by a duplicature of the peritoneum (omentum gastro-splenicum); and by a fold of the same membrane with the left pillar or crus of the diaphragm; by the splenic artery with the arterial system generally; with the stomach particularly by its branches — the gastro-epiploica sinistra and the vasa brevia; by the vein with the portal system immediately, and mediately by this vessel with the liver. The spleen with its vessels is situated in the vicinity of the stomach, duodenum, the transverse portion and the right flexure of the colon; and when these viscera, or either of them, are over-distended

with feces or flatus, the spleen and its bloodvessels are compressed, and their functions interrupted. The same may occur in the scirrhus enlargement of the pancreas.

TREATMENT. — In the treatment of intermittent fever, the cinchona rubra is the remedy upon which I have usually placed the greatest reliance; and have administered it according to the directions recommended by Dr. Cullen, and generally with success. The following are cases, however, in which the bark, exhibited in the usual manner, was not attended with the usual effect.

*Case I.* — A gentleman belonging to South Carolina, who had gone through the usual routine of practice for the intermittent fever without benefit, in the course of a journey to the north, undertaken for the recovery of his health, had consulted Drs. Rush and Physick, and followed their prescriptions without deriving from them any perceptible advantage. He was extremely emaciated; his strength much prostrated; the disease very irregular; the cold stage predominated both in severity and frequency; instead of the glow which usually precedes the sweating stage, the surface, as in the typhus, was hot and dry; the intervals between his paroxysms were very short, and of course his opportunities for rest were very precarious, and his sleep unrefreshing. In this state of the disease, he put himself under my care. At my request, he took lodgings in a boarding house near my place of residence, that I might have it in my power more conveniently to visit him repeatedly in the course of the day, with the view of determining whether either of the paroxysms happened uniformly at any particular hour. After a few days' attention, it was satisfactorily ascertained that a

cold fit occurred every day at about half past five o'clock in the evening. Availing myself of the opportunity this circumstance promised of advantageously administering some remedy that hitherto had been serviceable, in this disease, I commenced giving, half an hour before the recurrence of the cold fit, five drops of the liquor potassæ arsenitis; one drop to be added to each successive dose—the dose to be repeated according to circumstances. The night after the first exhibition of the arseniate of potassa he passed more comfortably than he had for a long time previous; the chills became less numerous, and by degrees disappeared altogether; in the course of a few weeks he was so far restored as to render it proper for him to return home. Twenty years after, in passing through the city, he called upon me in fine health, which he had enjoyed ever since he left Boston.

*Case II.*—In a case where the patient, who had suffered from dropsical effusions in the cellular membrane and in the cavity of the peritoneum, and whose countenance was sallow and bloated, and had been attacked several months before with the remittent, which, at the time I saw him, was converted into a bilious remittent fever, none of the remedies used in this disease, given in the usual form and manner, making their customary impression, the following recipe was prescribed—R. Pul. cinchon. rub., ℥i.; rad. smilac sarsaparil., ℥ii.; carb. potass., ℥ss.; vini port dicti, lb.iss. M. A wine-glass of this compound was directed to be given every four hours, without regard to the remissions. This medicine proving beneficial, was continued until a complete cure was attained.

*Case III.*—A patient who had labored under an

intermittent of the tertian type for nine months, had been attended by a number of physicians, without deriving from their prescriptions any permanent advantage. He for months despairing of recovery, desisted altogether from the use of medicine. Bark in powder, given freely during the apyrexia, opium, and the endeavor to anticipate the hot and sweating stages by warmth excited by the conjoint action of the pediluvium, hot stimulating drinks, covering the body with extra bed-clothes and the head with a thick night-cap, were tried in vain. As a dernier resort, when the precursory symptoms of a paroxysm recurred, an ox-bladder, filled two-thirds full of water as hot as could be borne, was applied to the epigastric region with the best results: the paroxysm was suspended, and the bark and the influence of the climate soon restored him to health.

*Case IV.*—Mrs. —, of a sanguine nervous temperament, aged fifty, of middling stature, and who had previously enjoyed good health, is afflicted with severe pain in her left side under the cartilages of the ribs, accompanied with a burning sensation in the stomach; these symptoms recur every day between ten and eleven o'clock in the forenoon, and continue till late in the afternoon, when they cease without any critical evacuation. In addition to these symptoms she has chilly turns; costiveness; appetite somewhat impaired; wandering pains in her chest and back; depression of spirits; the urine turbid, thick with laceritious sediment; catamenia protracted beyond the usual term. The cause of her indisposition is imputed to her exposing herself, in a state of perspiration, alternately to heat and cold, by passing frequently through

a yard to a bakehouse on the afternoon and evening before Thanksgiving, in November last, in preparation of the festivities of the day.

I was desired to visit her on the 7th of March, 1840;—about a month or six weeks previous to this date I had prescribed for her, at my house, with little or no relief;—I found the patient in a room excessively warm from the heat of a stove, in which she remained during the day, and retired to a cold chamber at night. This circumstance was sufficient to account for the want of efficacy in the remedies\* that had been ordered. She was removed to an apartment where an uniform temperature could be preserved. After letting a few ounces of blood as a revulsive, I administered the following medicine.—R. Sulph. quiniæ, gr. iv.; aq., ℥ii. M. Take a table-spoonful in a half tumbler of milk every day, an hour after breakfast. This prescription operated favorably; the paroxysm returned later every day till two o'clock. Its return happening at this hour for several successive days, I directed a table-spoonful of the solution of quinine to be given in a table-spoonful of warm water at half past one; the time of its recurrence was again deferred. The paroxysms are now (March 23) shorter; the violence of the symptoms abated; urine less turbid; depression of spirits alleviated; catamenia returned; the appetite and strength improved. In the course of the exhibition of the quinine many remedies were prescribed; but as they were merely extempora-

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\* An emetic, cathartics, dry cupping, leeches, sinapisms, vesicatories and quinine.

neous, the recital of them would be attended with no practical advantage.\*

From the advantage derived from the use of the bark in periodical diseases, and from the impression that the present complaint might have some remote affinity with the intermittent, I was induced to employ quinine. As like effects arise from like causes, the effect produced by the quinine in this case may lead to the conclusion that this complaint is remotely allied to the intermittent; but it has been observed the spleen is situated in the vicinity of important organs; and, therefore, to render a correct diagnosis of its diseases is sometimes difficult; and in this complaint, as the nature of the urine is materially altered, the condition of the kidneys should be taken into consideration before its seat can be determined with precision. †

USES. — The spleen is generally acknowledged to be a secretory organ; but with regard to the matter secreted, there are various opinions. Some suppose it to be destined to secrete fibrin; others, the coagulating property of the blood; others, the nuclei of the red globules; ‡ others, carbon; others, that it serves for a diverticulum. In my opinion, its chief office is the secretion of the bitter principle.

This organ is considered by many to be useless, or that an animal may “live very well without it;” or the appetite is more voracious when it is removed.

Lisfranc, speaking of an accident, says: — “The spleen does not seem to have been injured; we have

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\* March 31st, the patient is free from paroxysms, and sediment in the urine.

† Hewson.

‡ Ibid.

no pain or tumefaction about that region; and as to functional symptoms, we cannot expect to have any. The spleen, you know, is not a viscus, and though it is in some way connected with digestion, its function is not known; an animal lives very well after the spleen has been removed." — *Lancet*.

On the absurdity of the opinion that the spleen is a useless organ; and that it may be removed without any material derangement of the functions of the system; we shall here introduce an account of two experiments, which *Dr. Bow on the Physiology of the Spleen*, cites from M. Dobson, to confirm his theory that this organ acts "in the capacity of a diverticulum of the nervous influence when digestion is over."

"*Experiment I.* The spleen of a dog was removed. The animal apparently suffered little pain from the operation. On the following day I gave it a quantity of food; it ate voraciously: for three hours afterwards no perceptible alteration was produced; but in *four* hours indications of uneasiness were observed, and the animal became restless, and at last sank into a torpid state; it was often moaning; the pupils were dilated, the heart laboring, there was frequent micturition, the respiration exceedingly laborious, and, in short, there was every mark of plethora, or over-fulness of the vascular system. In the course of two hours from this period the animal began to recover; and in about three hours these symptoms had subsided; considerable languor remained. The animal took a large meal twice or thrice in twenty-four hours, and after each meal precisely similar effects were presented. The animal became more feeble daily. In a month after the operation it died.

“*Experiment II.* I next removed the spleen from another dog, but instead of giving full meals, as in the last experiment, I gave a small quantity of food every one or two hours. The animal ate voraciously; no unpleasant symptoms resulted. This plan was pursued for three weeks, when the animal to all appearance was quite well; in fact, it became fat; the ligature on the splenic artery had come away, and the wound in the abdomen was healed. I then commenced giving full meals twice in twenty-four hours; the same train of symptoms followed each meal, and at the same period, as in the last experiment, though perhaps not so urgent. The animal died in a month from the commencement of this plan of feeding.”

Is the spleen to be considered a useless organ, because an animal of the canine species can live after it has been removed? Are the resources of nature in obviating the effects of diseased organs to be denied to have an existence, because they do not come under the cognizance of our senses, or, in the present state of our knowledge, do not admit of an explanation? Because life can be maintained when the liver is wanting, is it a proof that this organ is of no use in the animal economy? Is the bile not necessary to digestion because its secretion is suspended in abscesses of the liver? There is a period in our existence when not a single organ in the three cavities, nor a blood-vessel, nor a lymphatic, nor a nerve is developed. Hence it may be concluded, by a parity of reason, that every organ, except those that are vital, may cease to perform its function for a considerable length of time without destroying life.

## MALFORMATION OF THE LIVER, GALL-BLADDER, AND BILIARY DUCTS WANTING.

[Communicated for the Boston Medical and Surgical Journal.]

BOSTON, March 28, 1840. I was requested yesterday to visit, in consultation with Dr. Sumner, a male infant of nine weeks, that labored under the jaundice. At birth the child was large and fat; it remained well for the first week, when emaciation began and continued to the last; there was, however, no diminution of appetite — which was voracious and not easily satiated — to the day before its decease; and, though it had an abundant supply of milk, it did not reject it, as infants generally do at that age. The whole surface is suffused with a citron color, and exquisitely sensitive — the slightest touch giving him excruciating pain; after the evacuation of the meconium, the discharges had been of a milk-white color, sometimes curdled, but for the most part fluid, resembling milk unchanged, with the exception of two different periods, when they had a slight cast of green; the pulse was full and hard.

*Treatment.* — Dover's powders and calomel, with, occasionally, laxatives of castor oil or magnesia, were the principal remedies that had been employed. Wine of the tartrate of antimony in repeated doses had been given for two or three hours, with the view of producing vomiting, without any other effect than nausea.

*Cadaveric Autopsy.* — The examination took place at half past 11 o'clock, A. M. The color of the surface the same as yesterday. On opening the body, none of the tissues were tinged with yellow; the

superior surface of the right lobe of the liver was of a dark brown color, speckled with dots of a dark hue; the left lobe a light gray, the under surface of a uniformly light red, the anterior margin of a leaden hue; the substance of the liver compact, tough, and of a dull green. The liver was, as usual, furnished with the hepatic artery and *venæ portæ*, but the biliary ducts, as well as the gall-bladder, were wanting. The spleen was firm and tough, and no trace of a spongy texture discernible — the vein was smaller than the artery. The size of the pancreas did not appear to be in proportion to that of the liver; it was destitute of a duct, and its aspect similar to that of the *capsula renalis*. The pericardium contained fluid blood, the quantity judged to be from a half to an ounce; that it was not much, if any, diluted with the water of the pericardium; that it must have been effused, as there was no communication with the chambers of the heart; the whole of the external surface of the right auricle was roughened, and reddened deeply with hyperemia; the rest of the heart was sound. The *intestinum tenue* was destitute of *valvulæ conniventes*, except at the commencement of the duodenum. Bruner's and Peyer's glands were not perceptible to the naked eye. The contents of the stomach and intestinal canal resembled white paste — not very tenacious, and were entirely devoid of fetor.

WILLIAM INGALLS.



