An essay on the prevailing, or yellow-fever, of 1817 : together with preliminary observations, and an enquiry into the causes which produced it; also, a brief view of the effect of certain poisons on the animal economy, compared with those of the specific gaseous poison of the yellow-fever / By J.L.E.W. Shecut.

AN ESSAY ON THE

Prevailing, or Yellow-Fever,

of 1817;

TOGETHER WITH

PRELIMINARY OBSERVATIONS,

AND

AN ENQUIRY INTO THE CAUSES WHICH PRODUCED IT;

ALSO,

A BRIEF VIEW OF THE EFFECT OF CERTAIN POISONS ON THE ANIMAL ECONOMY, COMPARED WITH THOSE OF THE SPECIFIC GASEOUS POISON OF THE YELLOW-FEVER.

BY J. L. E. W. SHECUT,

PRACTITIONER OF PHYSIC, AND MEMBER OF THE LITERARY AND PHILOSOPHICAL SOCIETY OF SOUTH-CAROLINA.

☞ Let it be remembered, that the Yellow-Fever, which is the subject of this Essay, is that which is the proper Endemic of the City of Charleston.

CHARLESTON:

PRINTED BY A. E. MILLER, 99, QUEEN-STREET.

Nov. 1817.

DEDICATION.

TO THE PROFESSORS,

SAMUEL L. MITCHILL, DAVID HOSACK, WILLIAM HAMERSLY, VALENTINE MOTT & J. M'NEVIN, *of the University and College of Physicians and Surgeons of New-York.*

MY ESTEEMED FRIENDS!

IN offering to your acceptance the following *Essay on the Cause, Character and Cure of the Yellow Fever*, as it has generally occurred in Charleston, I am aware that I have said little or nothing new to you on this subject, unless it be with regard to the account of it, as it has appeared in the present year. But, however feeble my efforts have been, to trace to their origin the causes which have invariably produced this modification of disease among us, I have the supreme satisfaction of knowing, that feeble and imperfect as they are, they are sure of your cordial approbation; since they have been urged in the cause of humanity, and in compliance with the request of my esteemed friend, Professor MITCHILL.

You will, therefore, receive it as a mark of my high respect for you, jointly and individually; and as a testimony of grateful remembrance, for your polite attention to me, while on a visit to your city and University, at its session in 1815—and with it, the assurance of the esteem and regard of

Gentlemen,

Your obliged and obedient servant,

J. L. E. W. SHECUT.

Charleston, Nov. 1817.

THE Author's best thanks are tendered to the President and Members of the *Medical Society of Charleston*, for their polite permission to procure a transcript of the Weather, &c. from their valuable Journals; and regrets that his friend has not been able to avail himself of the privilege, in time for this Publication. He also tenders his thanks to Drs. TUCKER HARRIS and JAMES MOULTRIE, sen. as also to Col. DANIEL STEVENS, Chairman of the Commissioners of the Board of Health, for the means which have enabled him to complete the First Chapter of this Essay.

AN ESSAY

ON YELLOW FEVER;

Together with Observations and an Enquiry into its Causes, &c.

PRELIMINARY REMARKS.

"FEVERS" says the immortal RAMSAY, "are the proper endemics of Carolina, and occur oftener than any, probably than all other diseases. These are the effects of its warm, moist climate; of its low grounds and stagnant waters. In their mildest season, they assume the type of intermittents; in their next grade they are bilious remittents, and under particular circumstances, in their highest grade, constitute Yellow Fever."—*(Hist. S. C. vol. 2, p. 97.)*

This last or highest grade, constituting the *typhus icterodes* of Dr. CULLEN, is the subject of this Essay—and admits of the following propositions, as preliminary to the consideration of the disease itself:

1. What are the peculiar (specific) predisposing causes of this modification of disease?

2. What are the effects produced by those causes? and in what do they differ from the effects produced in the animal economy, when particular poisons are received into the stomach?

3. What are the characteristic marks which especially distinguish the Yellow Fever from the common bilious remittent?

4. What are the general and special indications of cure in Yellow Fever, as it has generally appeared in Charleston?

I proceed to consider these propositions under their appropriate heads, as follows, observing previously, that I have purposely avoided the long contested points of the *contagious* or *non-contagious* nature of this Fever; and briefly say on this subject, that from its first appearance in this city to the present day, it has never been found to be contagious; as has been sufficiently testified by almost all the Faculty of Physic of the former and present period, with the exception of one writer.

CHAPTER I.

Of the Causes of Yellow Fever.

Proposition 1.—What are the peculiar (specific) predisposing causes of this modification of disease?

Answer 1.—A peculiar derangement of the atmospherical air, by being deprived of a due proportion of the electric fluid; either from excessive hot and dry, or hot and moist summers; in consequence of which its vital influence, is either in greater or less degree diminished, and a *specific gaseous poison* is generated therein; which, being inhaled by persons peculiarly predisposed, produces, according to the degree of predisposition, either a common bilious remittent fever as it is termed, or Yellow Fever.

2.—A peculiar state or *diathesis* in the animal economy, particularly predisposing it to disease, and which is speedily called into action by the morbid effects of the noxious exciting power, or *gaseous poison* of the atmospherical air thus deranged.

SECT. 1.

First Cause of Yellow Fever.

That hot and dry and hot and moist summers are alike equally productive of Yellow Fever, is a fact almost coeval with the first settlements of this city:—That as these have occurred with greater or less excess of heat or moisture, so also has the Yellow Fever prevailed with greater or less violence, in the same ratio, is another fact arising from the first, and is particularly remarked in the Medical History of So. Carolina, from its commencement as a colony to the present period.

And that heat and moisture, either alone or combined, are inimical to the healthy state of the atmosphere, has been abundantly proven by their influence on electrical operations. In excessive hot and dry, or excessive hot and moist weather, the electric fluid in the atmosphere, being blunted, absorbed or almost totally dispersed, it almost invariably happens, that in proportion to the greater or less degree of its dispersion from the atmosphere and face of the earth, so in like proportion is its influence felt in electrical operations; in which seasons, it is almost impossible to elicit a spark, and when elicited, the effect produced is so feeble as scarcely to be felt.

I have also found, that it is invariably the same states of the atmosphere, in which electrical operations are impaired or prevented, that the Yellow Fever prevails either in greater or less extent, in proportion to the greater or less deficiency of the electrical fluid in the atmosphere and its influence on the face of the earth; and from hence I infer, that it is the absence of the necessary proportion of that fluid which gives vitality to the air and to all animated nature, that causes the derangement of the atmospherical air, in such degree as to produce all the modifications of fever which "are the proper endemics of Carolina." And as the derangement of the electrical equilibrium, is

either more or less impaired, in the same ratio will these endemics prevail with more or less violence, and be of longer or shorter duration, according to the longer or shorter absence of this fluid.

That this is no vague conjecture, will be readily perceived, when we discover that the same identical powers which restores the electrical equilibrium in the atmosphere, are the same powers which put a stop to the further ravages of this fever: and these are THUNDER, LIGHTNING, COLD AND FROST! And hence, with the learned BRYDONE, I consider the electric fluid to be the soul of nature, or that great vivifying principle, by which she carries on most of her operations.—It is a *fifth element*, distinct from, and of a superior nature to the other four, which only compose the corporeal parts of matter. But this subtle, active fluid, is akind of soul that pervades and quickens every particle of it.

If we consider the local situation of Carolina, the great body of low grounds to the southwest, as far as the state of Georgia; the vast extent of whose surface is exposed to the inundating floods of excessive wet, and the scorching rays of excessive hot and dry summers: the great mass of putrid vegetables destroyed by the heavy rains, together with their subsequent exposure to an excess of heat, after the waters have subsided, added to the generally prevailing winds of the season; something like a data is afforded us, from which to establish, at least, the primary causes of the derangement of the atmospherical air; as also the predisposing causes that produce those modifications of disease among us.

It has been on all sides admitted, that the most dangerous grades of fever, are produced by a close constitution of the air, with long rainy or foggy weather; and that they most generally occur after great inundations of rain, especially in low marshy countries, and particularly when these have been preceded or are followed by a hot and sultry season. And this ap-

pears to be invariably the case, in all tropical climates; from the variable constitution of whose atmosphere, together with other secondary causes, the three modifications of fever abovementioned, arise.

It will further appear, from a close investigation of the causes, that each of these modifications of fever, may be traced to their specific origin; which, added to the remote and proximate causes in the animal economy, gives us the following correct distinctions:

1. *Marsh miasmata*, or vegetable putrefaction, unconnected with animal putrefaction, is *capable only* of producing fever of the intermittent kind. And hence, we find it to exist almost annually in the middle country of Carolina, which is marked by its surrounding swamps, bays, ponds, and other stagnant waters; but are yet free from human effluvia or animal putrefaction, in consequence of the thin and scattered settlements throughout.

2. *Marsh miasmata*, combined with *animal putrefaction*, generates in the air a *specific gaseous poison*, capable of producing the highest grades of fever, and in the following obvious manner.

In the animal economy there exists, generally, two causes of disease—the *remote* and the *proximate*. The remote cause consists in an excess or deficiency of any of the enjoyments of life; or of the passions or emotions of the mind predisposing to disease. The proximate cause consists of the predisposition just noticed, combined with the noxious exciting power that modifies the disease. And thus we find, from a long and painful experience, that although the first or remote cause may equally exist in natives as well as strangers; the modification of the disease, notwithstanding, essentially differs in the former from that of the latter. In the first, it is a common bilious remittent, as it is called, while in the latter it assumes its highest grade, and is in them Yellow Fever. The obvious reasons of this difference in the grade of fever, between the natives and strangers, will be pointed out hereafter, when I come to treat of the effects of this poison, &c. Concluding from the facts before us, that

the opinion long since established, "that *marsh miasmata* and *human effluvia* combined, are the direct causes of the highest grade of this fever in all parts of the world," is certainly among the most correct.

And this will also account in some measure, for the difference in their modification in cities, villages, and country places; for the latter have little else to contend with, than the *miasmata* of putrid vegetables—while the two former, from the immense number of their sinks and drains, as secondary causes; and from the great abundance of animal putrefaction in all populous cities and villages, an excess of animal effluvia is produced; which, combining itself with the *miasmata* floating in the air, is thence productive of those higher grades of fever which we have already specified.

Another incontestible proof that this *gaseous poison* is produced by a combination of *marsh miasmata*, and animal effluvia, is, that the fever which it generates in the system, is confined to its own limits, and has never extended to half a mile beyond the limits of the city or village in which it originated.

We have further to remark on this, that those persons who have taken the disease, and have travelled with it, or removed to a purer air of the country, although they have died with the fever, its influence has always ended with them; and in no one instance, that has come to my knowledge, has the fever ever been communicated to another. And this particular character of the fever of Charleston, I have observed from the year 1794, to this time.

Further to confirm the doctrine advanced in the preceding pages, it will be necessary to trace the seasons of those years in which the fever has prevailed. Unfortunately, however, no correct account was kept of the state of the weather and the existing diseases of the city, with the number of deaths in each season, until the establishment of the Medical Society, and subsequently a Board of Health, except such as have been recorded by Doctors Hewatt, Lining and

CHALMERS, and Dr. DAVID RAMSAY, in his history of South-Carolina.

For an account of the first appearance of this fever in Charleston, we must be indebted to those attentive and experienced writers. The first of whom gives an account of a distemper which he calls infectious, having made its appearance as early as the years 1699—1700, and in 1703; and again in 1728, it made its appearance with uncommon fatality, and in an uncommonly hot and dry summer; and in which he observes, that "the face of the earth was entirely parched up; pools of standing water were dried, and a dreadful and most destructive hurricane occurred towards the end of August, and an infectious and pestilential distemper commonly called Yellow Fever broke out in town, which swept off great numbers; and that the Physicians knew not how to treat the disease."

The year 1752, is recorded by Dr. CHALMERS as excessively hot and dry; "that many cattle perished for want of water; that the plants were shrunk and withered, and the distress of men and beasts was indescribable. When the Mercury rose to the 97 and 98 degrees of the Thermometer, in the shade, the atmosphere seemed in a glow. At bed time, it was not possible to lie long still; some of the inhabitants were compelled to lay abroad on the pavements," and an old and invaluable citizen, informed me lately, that he was eye witness to the fact; and that on the Bay, many had their beds made in their their balconies.—"Bodies that died, putrefied in five hours; and a candle that was blown out at this season, and set in a chimney at ten o'clock at night, the wick continued to burn clearly till next morning, and was likely to do so for many hours longer. When this violently hot weather began to break up (about the 21st July) every shower was accompanied with most dreadful *Thunder* and *Lightning*;" and the Doctor adds, "neither *was ever a more healthy summer known than this*, so long as the weather continued steadily warm and fair. True it is, indeed, that those who happened to sicken

during these intensely hot months, might be said to have escaped through the fire when they recovered, which few in truth did, who were seized with fevers." This year was also pre-eminent for the great hurricane which happened on the 15th September, and is particularly mentioned in Dr. RAMSAY's *History of So. Carolina.*

The years most conspicuous for this fever are proved to be those in which there has been an excessive hot and dry, or hot and moist summer, with little thunder and lightning, which I presume was the case in 1732, 1739, 1745 and 1748; in which years, the fever was considered epidemic. The very heavy thunder and lightning of 1752, together with the hurricane which followed it, and which was the greatest ever known in Carolina, seems to have produced a change favourable to the health of the city; since it appears, that for a period of forty-four years, that is from 1748 to 1792, there was no epidemic attack of the disease; but when it did occur it was merely sporadic.

In the year 1792, a new era of the fever commenced according to Dr. RAMSAY, which has continued to this time, varying only as to the state of the seasons, &c.

It is a fact, that for the last sixty years, there has been but one or two instances of heat equal to that mentioned by Dr. HEWATT, in 1728, and CHALMERS, in 1752. The greatest elevation of the mercury when shaded, has been 96 degrees of Farenheit's thermometer, which was in the month of June, 1812; and the hottest day was Tuesday the 20th July of the same year; the thermometer was at 93. Citizens, as well those in retirement as those at labor, suffered greatly from the heat, and were in constant and profuse perspiration. After this an uncommon fall of rain took place, which continued to the 10th August; soon after which, the fever made its appearance, but with no great fatality. The month of December was the coldest, and may rank with the cold of the winters of 1766, 1779, 1786 and 1796. In this year also, we had frost as early as the 14th November; while in the year preceding, it did not occur until the first of December.

The greatest number of deaths that have been recorded to have happened in the city, from Yellow Fever, from the year 1748 to the present year 1817, a period of sixty-nine years, are those of the present year; which have amounted to 268, to the week ending on the 16th November. In the year 1799, there were 239 deaths—in 1800, 184; in 1804, 148; and in 1807, 162; and in this latter year also, the Influenza or *Catarrhus contagiosa*, prevailed with universal influence and great fatality throughout the state.

In the years 1801, 2, 3, 5 and 6, and again in 1808, 10, 11, 13, 14, 15, 16, the cases were very few; and in the four last, not at all.

In October 1800, in September 1804, in September 1810, and also in September 1811, we had our usual autumnal gales; the last, which was on the 10th September, 1811, was accompanied with a dreadful tornado, at about 12 o'clock, which blew down many houses and chimnies; large pieces of scantling, tiles, slates and shingles, were carried some hundreds of yards in the air; and several lives were lost by the sudden overthrow of the houses. The last storm in Charleston, was on the 27th August, 1813.

It will be also remarked, that in those years in which the fever has been uncommonly fatal and extensive, that there has been a great deal of rain, either preceding or succeeding a very hot season. Thus, in the year 1799, there was a fall of $83\frac{1}{4}$ inches of rain; a greater quantity than had fallen in any one year for many years preceding; as, at an average, the quantity is generally from 48 to 49 inches per annum, in Charleston. Hence the year 1799 and the present year 1817, have been nearly alike, as to the heat and moisture, and extensive fatality of the fever. In this year, after a very dry spring, the rainy season set in on the 27th June, and continued for about six weeks, with little intermission, and without any or very little thunder and lightning. Innumerable insects infested our city and houses; even the Pride of India trees, (*Melia azedarach*) which shade our walks, and have

been considered deleterious to animal life, have been literally covered with spiders and their webs; and it is believed, that in no former year, has there ever been a greater accumulation of spiders, musquetoes and bed-bugs, than has infested our houses in the present. In four months, viz. July, August, September and October, 31¾ inches of rain had fallen; and on the 27th July, exactly one month after the commencement of the rainy season, the fever made its appearance with great violence, increasing to the 28th September, when it was at its highest; at which time it began to rain, with slight thunder and lightning, and the fever to decline, as will be hereafter shown. Another circumstance derived from the foregoing statements, and worthy of particular attention, is the period at which the rainy season sets in. It appears generally, that those years, in which the wet season begins as early as June or July, the fever is more extensively fatal, than in those in which it begins as late as September or October. And that the period which marks the commencement of our rainy season may be considered as that which predisposes the atmosphere to generate; while that which marks the period of frost, as that which most certainly puts a stop, not only to its further progress, but also to the causes which invariably produce the disease among us. It is believed also, that the fever generally commences its action in low, damp and crowded situations. In this year it commenced at the Southeast section of the city, at or near Lynch's lane, and progressed Northwardly and partly N. Westwardly, to the market, and along the lower end of Church-street; of which places, it is to be remarked, and particularly of the two former, that they are on made lands, having been formerly creeks, which intersected the city.

By the middle of August, its extention and fatality were greatly increased; and in the latter end of the month, it infested most parts of the city, except the N. W. The Bill of Mortality continued increasing to the 28th September, at which period, 71 deaths were reported for the week, ending on that day.

The prevailing winds during the summer, were the Southwest, West and Northeast; and on Wednesday, the 24th September, a heavy rain commenced, and was accompanied with a slight degree of thunder and lightning. The thunder was, however, very distant, and the lightning but slightly vivid. This feeble effort of nature, to restore the electrical equilibrium, was however, attended with happy effects. The air became more cool and pure, and an evident abatement of the disease was manifest from this partial concussion of the atmosphere.

The type of the disease, was in many instances changed to catarrhal; and in several, the symptoms were so blended as to produce a doubt, which of the types predominated. On the 30th Sept. there was rain, with slight thunder and lightning. In the beginning of October, very few cases occurred in the lower parts of the city; but the fever had extended itself to the Northernmost parts thereof, where it continued with great violence and fatality.

On the evening of the 14th October, there was a great fall of rain, accompanied with several powerful concussions of thunder and lightning; which produced a very sensible and immediate change in the atmospherical air; and on the 16th of the same month, the electrical machine operated with great effect; yielding strong sparks and very vivid, which it had not done for some months, nor during the excessive prevalence of the disease.

By the 16th October, the fever changed its type altogether, or rather formed or blended itself along with most other types of fever, of which the *bilious*, *catarrhal*, *intermitting*, *nervous* and *worm fevers* were most conspicuous; as also that type of it, which has been termed country fever, to distinguish it from the city or town fever; for, by the 19th of the month, the deaths from Yellow Fever, were 8, and from the other types, 13; which evidently proves its decline. To the 25th of the month, there was but one solitary case of death by this fever. On the 30th, a great change took place in the weather; which became extremely

cool; and it is believed, that as the causes which produced this modification of disease, have been entirely removed by the frost which took place on the 18th November, there can now be no fear of a return, at least until next season.

By the Bill of Mortality, for the year ending on the first October, 1817, the deaths have been in the proportion of every 22d person. In Beaufort it has been more fatal, and was in the proportion of every 6th person.

TABLE

Of the increase and declension of the fever, from the 27th July to the 16th November.

AUGUST.		SEPTEMBER.		OCTOBER.		NOVEMBER.	
27 July to 3d Aug.	3	31 Aug. to 7 Sep.	26	28 Sept. to 5 Oct.	23	2d to 9th Nov.	3
3d Aug. to 10,	16	7 Sept. to 14,	36	5 Oct. to 12,	9	9th to 16th,	1
10 " to 17,	9	14 " to 21,	35	12 " to 19,	8		—
17 " to 24,	22	21 " to 28,	43	19 " to 26.	1		4
24 " to 31,	32		—	26 " to 2 Nov.	1		
	—		140		—		
	82				42		

Total number of deaths from Yellow Fever, this season, 268.

From a retrospective view of the foregoing pages, and the visible changes made upon the character of this fever, by thunder and lightning, I am confirmced in the opinion, that the proximate and immediate cause is to be traced to the effect first produced on the atmosphere, by combinations of *marsh miasmata*, with human effluvia, thus generating a *specific gaseous poison* in, the atmosphere; whose noxious powers are bounded by certain limits which it cannot exceed.—And that the remote and predisposing causes are such as are to be found in the following section.

SECTION 2.

The second or remote and predisposing Causes of Fever.

2. The second or remote and predisposing causes of Yellow Fever, consists in a peculiar state or *diathesis* in the animal economy, which renders it especially liable to the morbid action of the *specific gaseous poison* pervading the atmosphere and face of the earth. And this peculiar diathesis consists more im-

mediately in that want of assimilation and naturalization to the various modifications of our climate in the degree common to the natives. And

3. Other remote causes consist in excesses of any or all the labors, pleasures, or enjoyments of life; or, in the excessive passions of the mind, particularly fear and grief. These properly constitute, in their degree, a predisposition to contract the disease.

We have seen, that unusually dry and hot, and unusually hot and moist summers equally favored the generation of this poison and the existence of the disease, in its present modification. It appears, however, that its prevalence is much more frequent after excessive hot and moist, than after hot and dry summers, in the proportion of four to three; as has occurred in the years 1794, 1799 and 1817; contrasted with the year 1728, and one year between 1794 and 1799, the particulars of which I have forgotten.

The natives of this and all other warm climates, particularly those near the tropics, are from their birth, gradually assimilated to the sudden and dangerous transitions of the weather, and also to the frequent recurrence of the effects of this noxious exciting power or *gaseous poison*, which produces this fever. And those native children, that arrive to the age of nine years, are thence considered as naturalized to the climate: but, until this, they stand equally exposed to the disease with strangers or foreigners.

Hence, in the natives, the effect of this *gaseous poison* is not as violent as it is in children and in strangers; producing in the former nothing more than a remittent fever; in many instances ephemeral, and in some only slight predisposition, such as head-ache, listlessness, gaping, yawning, stretching, hot flushes, &c. while in the two latter, the effect is more violent, and hence more fatal, since the noxious exciting power is acting upon an excitability altogether new and unaccustomed to its influence. For, as the Turk accustoms himself to his opium, the tobacco chewer to his quid, and the toper to his ardent spirits, so are the

from a gradual assimilation and annual exposure to the local or endemical diseases, more accustomed to the influence of their powers; and invariably experience from them, effects less noxious and deleterious, and hence less fatal than children and strangers: for the same reasons, that opium, tobacco and spirits, do not produce the same sudden and fatal effect, from use, that they do in persons not accustomed thereto.

Strangers and children are therefore, for the foregoing reasons, under all circumstances, especially liable to its attack. And according to the previous state of the system, some in greater degrees of violence than others. Yet in many, even strangers newly arrived in the city and children under three years, from a previous good habit, its attack has been so mild as to have produced in them no other modification of disease than that to which the long established natives were themselves subject; I mean a mild bilious remittent.

I attended many blacks from different sections of the state, and some Africans, not yet sufficiently naturalized, who were laboring under the disease, though not to the same degree of violence with the white children and strangers; and where they have had proper nursing and attendance, were more readily cured than the whites.

I am not from my own experience, qualified to say of this disease as of most others, that the intemperate and the irregular were most liable to its attack.—A painful and melancholy experience has proved, that the most delicate, temperate and regular of both sexes have been equally, with those of the opposite character, the subjects of its destructive influence and fatality.

Persons most liable to its attack, appeared to be of the following descriptions: Strangers in full health, of the age of thirty years and under, constituted the first and most numerous class: secondly, from thirty to forty years and upwards; and children under six years were among the most numerous of the natives: next, those from six to nine or twelve years, consti-

With regard to the time necessary for strangers to become naturalized to the climate we can fix no positive limits from actual experience, since it has in some instance varied very materially. It is presumed, however, notwithstanding there has been some in the present year, that fell victims to it, after having resided among us twelve or thirteen years, that a period of nine years constant residence, will, in general, produce an assimilation sufficient to secure the subject from the disease in its highest grade.

Although the disease attacked indiscriminately, strangers of all ages and sexes, it more especially attacked such as were in low, moist situations and confined streets and houses, without the means of proper ventilation: also those, who from attachment to their countrymen and friends, spent much time, both night and day, in anxious solicitude about the beds of their sick and dying countrymen; to which may be added, the fatal practice of keeping up the spirits on such occasions, by frequent recourse to ardent spirits while night watching. And lastly, those who suffered themselves to be irregularly costive until it produced disease.

On the other hand it is a fact, that several strangers, who continued to reside in the city, by attending particularly to the state of their stomachs and bowels, escaped the fever in its worst form, although they had several symptoms of its forming state.

From all, then, that has been collected of the history of the disease in the present and former years, we are directed to look for its causes in that impaired state of the atmospherical air, which tends to the generation of that *specific gaseous poison*, which has ever and invariably produced it in our city, as primary. To the state of our innumerable sinks and drains, as secondary and proximate; and to that want of assimilation in the animal economy, which so eminently predisposes to it, as the remote cause.—Strangers should, therefore, calculate to a certainty on the prevalence of this disease, in those years in which there has been, or is, an *excessive hot and dry*

excessive hot and moist summer, and more especially if there has been *little or no thunder and lightning*.—Since the most incontestible proofs can be produced, that in the most powerful prevalence of the fever, in particular years, an immediate stop has been put to its progress by heavy and repeated thunder and lightning; and its influence on the present year has been very sensibly diminished, and its progress plainly arrested by the slight concussions from the same sources: and those who propose emigrating to this city should defer their arrival until a frost, which usually happens in the beginning of November, or at most by the latter end thereof—after which they may rest secure from the fear of fever.

CHAPTER II.

A brief consideration of the effects of the Gaseous Poison on the Animal Economy.

PROPOSITION 2d.—What are the effects produced by those causes detailed in the foregoing sections? and in what do they differ, in their effects, from those produced in the animal economy by particular poisons, when received into the stomach?

ANSWER.—The effects produced by this *gaseous poison*, are obviously *the decomposition of the fluids*, in the first instance; perhaps, primarily the *gastric juice* in the stomach;* and thence descending along with its other contents to the *duodenum*, it there meets with the *bile* returning from the liver, which it also decomposes; and so, in regular succession, to the blood, which, from its active and deleterious stimulus, is excited to excess; and thus is that fever formed, which puts on, in the first instance, the appearance of a sthenic disease; but which is, in reality, a deceitful appearance—since the uniform tendency of this disease is to gangrene and sphacelus, unless speedily prevented.

---

* Some gentlemen with whom I have consulted on this subject, consider the *liver* as the primary seat of the disease; and others, that the *gaseons poison* is conveyed by the lungs directly to the blood, which is first diseased, and then the liver, &c.

SECTION 1.

Of the similarity of effects between the poison of arsenic and the specific gaseous poison, producing the Yellow Fever.

"The effect of arsenic upon the human system when received into the stomach; besides the effect which it has in common with other corrosives is, that it produces a peircing, gnawing and burning sensation, accompanied with an acute pain in the stomach and intestines, which last appear to be violently contorted or twisted—convulsive vomiting, insatiable thirst, the tongue and throat parched and dry—hiccup, palpitation of the heart, a deadly oppression of the whole breast; the matters ejected by the mouth as well as the stools exhibit a black, fœtid and putrid appearance, succeeded by a mortification of the bowels."

Those are the general effects of the poison of arsenic, when received into the stomach in such quantity as to produce death; and it is evident that in a smaller quantity its effects must be also less violent and consequently less fatal;—and it follows, also, that the symptoms above described will be also less predominant, and hence less distressing. From which we may reasonably infer, that *arsenic*, received into the stomach in an equal proportion of strength to the same quantity of this *specific gaseous poison* capable of producing this disease, the symptoms and effects will be nearly or altogether similar; and, consequently, that the "piercing gnawing and burning sensation" felt in and about the stomach, will be only equal to the great "load and anxiety" felt about the *præcordia* in Yellow-Fever—-the "contortions and twisting of the intestines," to the obstinate torpor of them in this disease—the "convulsive vomiting," to the irritability of the stomach; and so of the rest in succession.

It is further obvious, that whenever the gangrenous state of the fever is about to take place, the irritability of the stomach is increased to black-vomit, and that the matters ejected by the mouth, as also those by stool, exhibit the same appearance as those pro-

duced by arsenic; and lastly, that the closing scene in both are the same, or so nearly the same, as has been proved by dissections, as to admit the belief, that their effects on the animal economy differ only in proportion to the quantity of the mineral poison producing more speedy and more fatal effects in less time than that produced by the *specific gaseous poison* of Yellow Fever.

That the Yellow Fever is produced by poison is a doctrine long since admitted by Doctor LIND, in his *Essay on Diseases incidental to Europeans in Hot Climates. (London, 1777.)*—In which he states: "I am informed by a surgeon who lived some years in Senegal, that for several months during the dry season, the country was as healthy and pleasant as any in the world, but soon after the rainy season began a low malignant fever constantly spread itself among the Europeans." [STRANGERS.] "*It seemed to proceed from a poison, as it were, got into the stomach.*"

And that its effects are primarily in that viscus is more than presumable, since the same judicious author tells us, that "the chief objects of attention in all such fevers, are the contents of the stomach and intestines." And under this strong impression and full conviction, that the stomach is the primary seat of the disease, I have founded both my theory and practice. I might, in this place, also produce many valuable remarks from our learned countrymen which go to establish this fact, but they would, were I to quote them all, swell this Essay to uncommon bulk; for which reason I am constrained to dispense with them and proceed to the consideration of the varied effects of those *gaseous poisons* as they exist in Carolina.

SECTION 2.

Of the effect of the Gaseous Poison, in its simple and combined forms.

It appears to me, that the effects of this *gaseous poison* on the animal health, may be reduced to the following forms, as already mentioned in chap. 1st, sect. 1st:

1st.—That the modification of it, termed *marsh miasmata*, which is the produce of vegetable putrefaction, independently of animal putrefaction, peculiar to the "warm, moist climate, the low grounds and stagnant waters" of Carolina, particularly the middle and lower country, is, most commonly, productive only of intermittents, of the first class *pyrexia*, and varies according to the character of the gas, of which it is formed; and as this partakes more or less of a combination of the effluvia arising from animal putrefaction, so are the types or modifications of the disease also varied, as from an intermittent to a remittent, or else a continued fever, &c.

2d.—That which is produced by a combination of *marsh miasmata* and animal putrefaction, in seasons that are either preceded, or followed by excessive hot and dry, or hot and moist weather, and in which there is but little or no thunder and lightning, is a *specific gaseous poison*, peculiar to large and populous sea ports, especially near the tropic; and to towns and villages under similar circumstances, this gaseous poison almost invariably produces those modifications of disease that belong to the second class *apyrexia*, particularly that remittent fever which readily assumes the *typhus* type and becomes Yellow Fever.

3d.—Whenever there is superadded to this peculiar combination, a cause productive of malignancy, it then becomes infectious or contagious, according to circumstances. This cause has, however, happily for Carolina, never yet existed among us, although it has in other states of the union.

4th.—Those intermediate combinations, in which one or other of those gasses are predominant, may be considered as the cause of those modifications of disease, which partake of both the *sthenic* and *asthenic* types; and hence the *catarrhus epidemica* assumes the type of the *typhoide pneumonia*. The *synocha* puts on the livery of the *typhus maligna*; and the *Yellow Fever* is sometimes a "*causus*, at others a *typhus*, in some instances a *synochus* and in others a *synocha*; and in

We discover from this, the reasons why the Yellow Fever has been considered as constituting the highest grade of our common autumnal bilious remittent, and hence conclude with the learned Dr. DANCER, of Jamaica, that "it is not uniformly one and the same disease, but is often a compound one, partaking at one time the nature of the malignant fever, at another resembling the bilious remittent," &c.

Although this appears to be the general, and perhaps particular nature of this disease, that of blending itself, or of being blended with the types of diseases that are prevalent at and previous to its existence.—There appears to be, notwithstanding, a specific property attached to the *gaseous poison*, which produces it; and which, almost invariably tends to hurry the disease from one state to another; and if a cure is not readily made out, to gangrene and mortification, in the same manner with arsenic or the bites of venomous serpents.

It appears also, that the effect of all poisons on the animal economy, is that of decomposing the fluids, or depriving them of their *oxygen*, and in an indirect manner producing obstructions in some of the secretory vessels, and more obviously in the liver; whence the suffusion of bile evidenced in the eyes and on the skin, in the advanced stage of the disease, has given rise to the name of Yellow Fever. The same yellow suffusion takes place in the eyes and on the skin from the bite of the Rattle Snake, and one species of Moccasin Snake.

QUERE.—Is it not a subject worthy of the most industrious enquiry. The similarity of effects produced on the animal health, by the different poisons of the animal, vegetable and mineral kingdoms? And that as the cure of the poison from arsenic is by emetics, cathartics and plentiful dilution of the contents of the stomach and intestines; so will the cure of any modification of disease, produced by any other poison received into the stomach, be effected in the same man-

CHAPTER III.

Of the Characteristic Symptoms and Curative Indications of the Fever.

PROPOSITION 3d.—What are the characteristic marks which especially distinguishes the Yellow Fever from the common bilious remittent?

ANSWER.—The most obvious are, those sudden changes that are peculiar to this fever, in greater degree than any other modification of disease with which we are acquainted. Assuming, in the first instance, the type of a high *sthenic*, it rapidly changes to the *asthenic*, with great prostration of strength; an obstinate irritability of the stomach and torpor of the bowels, a black vomit, and a sudden tendency to gangrene and mortification.

It is true, that these symptoms, as such, are not alone peculiar to this state of fever, since there are others which degenerate from *sthenic* to *asthenic*, but whose changes are not so rapid, as is the case with the bilious remittent. The irritability of the stomach in other diseases is not so obstinate; and the *melæna* or black vomit of Yellow Fever is considered as specifically different from the *morbus niger* of the ancients, and the *atrabilis* of BOERHAAVE and VAN SWIETEN, and is the effect of a peculiar morbid action of the stomach, produced by the stimulus of the miasmata or *gaseous poison* acting upon the liver, stomach, bowels, &c.—But, as I have devoted an entire chapter to this subject, in my Elements of Medicine, shortly to be published, I forbear to say more in this place.

SECTION 1.

Of the Characteristic Marks and Symptoms of Yellow Fever.

In addition to the observations immediately preceding, it appears:---1st, That the specific character of the disease consists in its being produced by a *gaseous poison*, blended with atmospherical air, and producing in the system a morbid secretion of the

turning on the stomach, produces that irritability which commonly ends in black-vomit,—and

2d—Its uniform character consists in its attacking, especially strangers and children under the age of nine years, not assimilated or naturalized to its influence.

From what has been said of the state of the atmosphere, previous to, and during the prevalence of this disease, I think it will clearly appear, that it is produced by the deleterious effects of a *gaseous poison*, received directly into the stomach ; and that although it does not immediately give evidence of its existence in that viscus, by any strongly marked symptom of derangement ; but rather, that those symptoms are more readily discovered in the arteries, by their increased action. I am, notwithstanding, disposed to infer, from the intimate connexion of the stomach and brain, that this increased arterial action, which induces a belief of its being primarily a disease of the sthenic excitement, accompanied with symptoms of inflammation, and hence indicating the free use of the lancet and other powerful depleters, is nothing more than a primary disease of the stomach and its fluid—and secondarily, a disease of the fluids generally, of which the blood is the source.

That inflammation is of two kinds, *sthenic* and *asthenic*, is an improvement of medical theory, for which, I am indebted to the immortal JohnBrown,*(Elements Medicine, part 2. ch. vi.)* By which it is proved, that sthenic inflammation almost invariably terminates in resolution or suppuration, but never, unless improperly managed, in *gangrene* and *sphacelus* which the latter or *asthenic* inflammation is invariably disposed to do.

That the inflammation in Yellow Fever is of the *asthenic* kind, admits of but little doubt ; for, notwithstanding it does in the beginning give evidence of an excessive excitement in the arterial system, connected along with those symptoms which occur in sthenic diseases, it is, nevertheless, true, that those very symptoms, and the increased arterial action, are nothing more than an effect of re-action in the system, since they are the immediate forerunners of that direct de-

bility, producing sudden prostration of strength ; and soon after, a secretion of fluids tending to *gangrene* and *sphacelus*, from the dissolved state of the blood, &c.

Although, in the forming state of this fever, the symptoms are generally, and for the most part, the same as those of the bilious remittent of the natives, there is along with these symptoms, a peculiar and almost indescribable appearance of the whole physiognomy of the patient, expressive of peculiar anxiety and alternate dejection ; which is seldom experienced in the bilious remittent.

When the disease is completely formed the symptoms are commonly more violent ; thus, the pain in the head and eyes are more intensely acute, insomuch that the latter are complained of, as being ready to start from their orbits ; in some they are watery, and in others dry, red and fiery, from the turgescence of their blood vessels. The tongue is generally white, somewhat furred, with red edges ; the pulse is frequent, full and hard ; the skin hot, dry and husky, leaving on the fingers, after taking the pulse, a sensation peculiar to this state of fever.

The pulse, however, very suddenly sinks and becomes weak and irregular, especially if the patient has been considerably depleted. The strength, which appeared at first to be considerably increased, is also suddenly prostrated ; but of this, the patient does not seem to be fully sensible ;—the acute pain of the head and eyes appear to be removed and translated to the back, loins and knees ; the dull heavy pain and oppression, accompanied with great heat and anxiety about the *præcordia*, and especially the pit of the stomach increase, and are accompanied with an obstinate torpor of the bowels and irritability of the stomach ; which seems to constitute a new state of the disease. The two latter symptoms are, hardly, by any means, to be subdued, or even allayed.

And now, the changes of the disease increase more rapidly, the pulse seems, at times, to be restored to its natural state, and the ardent heat of the body reduced to its healthy temperature ; and except some

slight remains of anguish about the breast and pit of the stomach, the patient, and frequently his attendants, are deceived with the appearance, and consider the disease as having been arrested; and more especially as the exacerbations or remissions of the fever are of the most flattering kind.

In general, however, they are suddenly undeceived, for the irritability of the stomach and torpor of the bowels still remaining, at length, in the midst of the most sanguine hopes of a recovery, another and commonly fatal symptom occurs, which marks another state of the disease:—a quantity of blackish matter, resembling coffee grounds, intermixed with flaky substances that float among the discharges, is ejected by vomit. The stools, if the torpor of the bowels is removed, are at first of a darkish green and brown, extremely fœtid and offensive; it soon changes to a mud colour, and in some instances as black and thick as tar.

About this period too, sometimes earlier or later, the eyes become yellow, as also the neck and face; and is here and there marked with blue and livid streaks, inclining to a brownish black; in some cases the whole body assumes a yellowish hue; and, from this circumstance, the disease has obtained the name of the Yellow Fever; though improperly, since in many instances, this symptom does not occur at all, or at least not until after death.

The next formidable symptoms in this disease, and which seem to indicate the sudden dissolution of the patient, are indeed, not alone peculiar to this fever, since they happen in most low states of malignant fevers. These are a bleeding at the mouth and nose, a hurried and perturbed state of the mind, a desire to be removed from one room to another, or from one part of the same room to some other part; considerable restlessness and anxiety, great weakness of the sight and hearing, a delerium, hiccuping, convulsions, and at last, a total insensibility; all which appear to mark the malignant state of the disease, and the patient passing every thing involuntarily under him, is soon relieved from his sufferings by death.

Although the general and particular symptoms that accompany this modification of disease, have been thus particularly described, they are not to be considered as altogether constituting the characteristic marks thereof. These, as we have before observed, seem to consist principally in that morbid secretion which produces a torpor of the bowels and an irritability of the stomach, which usually terminates in a black vomit, peculiar to it; and by strangers and children being especially subject to its attack; while the natives, if attacked by it, have it only in that form which constitutes the common autumnal remittent and does not degenerate into this type, unless there are certain exciting causes superadded to the general cause; such as change of air, from the city to the country, and *vice versa.*

SECTION 2.

Of the Curative Indications in Yellow Fever.

The practice which I have adopted, with some variations, may be found in *Lind's Essay on the Diseases, &c. of Hot Climates; Sir John Pringle's History of the Diseases of the Army, &c.* and in *Dancer's Jamaica Practice*, and is adapted to the following intentions, viz:

1st. To withdraw as much as possible, the poison that has been received into the stomach.

2d. To dilute and lessen its virulent action in the system, and especially in the alimentary canal.

3d. To provide against the debilitating effects of this noxious power, and the depleting remedies necessarily administered in the cure. And

4th. To counteract the irritability of the stomach, as also black vomit and the tendency to gangrene, which almost always exists in this disease.

The first intention, of withdrawing as much as possible the poison that has been received into the stomach, is speedily and effectually answered by EMETICS combined with CATHARTICS. *But this bold and necessary practice should, if possible, be attended to in the beginning or forming state of the fever.* It requires

also, some judgment to ascertain that there is nothing which positively contraindicates their use; and if there is not, I give the following:

Rochelle or Epsom Salts, 2 ounces.
Tartar Emetic, 3 or 4 grains—mix—

Dissolve them in half a pint of warm water, and give a wine glass every 15 or 20 minutes, until it operates freely, three or four times, by vomit. I then interpose copious draughts of strained gruel, saturated with salt; and if the first prescription does not operate downwards, so as to produce from five to ten motions, according to the strength and constitution of the patient, the following is ordered:

Jalap, half a drachm.
Calomel, ten grains—mix and divide into five papers:

One to be taken every hour in molasses, until the requisite number of stools are produced. "Those vomits that are also productive of stools, (says Sir JOHN PRINGLE) are the most useful; but especially if they are powerful enough to procure a plentiful discharge, upwards or downwards, of the corrupted bile. By this means, they sometimes effect a cure without further medicines." And this I have frequently found to be the case in the present season. After this, and especially if the skin be hot and dry, the patient is either placed in a tepid bath, or is sponged all over with cold water, or cold vinegar and water, for the space of five or ten minutes, or until the skin assumes the appearance of a goose skin; then put between flannel or cotton coverlits; in which situation, a free and plentiful perspiration is solicited and encouraged by warm drinks of barley water, warm lemonade, balm, sage, rosemary or life-everlasting teas *(gnaphalium.)*—And thus ends the first twenty-four hours.

The second intention begins with the second twenty-four hours; and the remaining poison is still further diluted by the same drinks, along with the following:

Seneka Snake Root, half an ounce—
Boil it in three half pints of water, to the consumption of one third; strain and divide the decoction into two equal parts. In one of the parts of the decoction, 2 ounces of Glauber, Epsom or Rochelle

Of this, the patient takes a small wine glass every half hour, until it operates freely by perspiration and stool; the number of which are proportioned to the strength of the patient and the violence of the symptoms.—When these are sufficient, this portion is laid by, and that without the salts is given—a wine glass every hour.

If the stomach seems to be unsettled and rejects this formula, the jalap and calomel powders are given in its place, as before directed; or jalap with the sulphate of pot-ash, and a vesicatory applied to the *scrobiculus cordis*, or pit of the stomach. The bathing or sponging is also continued as before; and the following mixture is sometimes resorted to, where there it a lowness of spirits:

Spirits Lavender, compound.
Spirits Nitre, dulc:—Of each half an ounce.

A teaspoonful to be occasionally taken along with the patient's ordinary drink.

The third intention is answered by critical and generous portions of wine, wine whey and other cordial drinks; alternated with the cathartic medicine. If the torpor of the bowels, with irritability of the stomach and rejection of the medicine continues, the following is directed:

Dissolve half a drachm of the salt of tartar, in four ounces of water. A table spoonful of the solution, to be taken every hour or two, in a small glass of lemonade, while in a state of effervescence. Stimulating clysters are also administered every hour or two; prepared by adding to the common clyster a quantity of soap-suds, or the smoke of tobacco, where there are spasmodic affections of the bowels.

If there appears to be an *atony* of the intestinal canal, clysters prepared of strained gruel or chamomile tea, with the yolk of an egg beat up with a small spoonful of the spirits of turpentine, is administered and repeated *pro re nata*.

The fourth and last intention, is answered by a critical attention to the changes of the disease, as follows: At that critical period, when the inflammatory stage

of the disease is passing to the gangrenous, and the irritability of the stomach gives evidence of the approach of *black vomit*, the following graduated practice is pursued, and alternated as circumstances may require.

1st. Two table spoonsful of lime water in a glass of milk, is given every half hour or hour,—or

2d. Two table spoonsful of fresh yeast, in a cup of lukewarm water, every hour or two,—and

3d. Infusions of hops *(humulus lupuli)* in easy draughts, or if the stomach will bear it, good old porter. Good wine is seldom rejected, and sits easy on the stomach.

4th. If the pulse sinks or flags, a tea spoonful of the tincture of camphor, in brandy, is given in a small glass of water, every two hours; or is taken in a glass of the infusion or decoction of bark and columbo. I have found beneficial effects from the tincture of small snake root *(aristolo chiaserpentaria)* in doses of a table spoonful every four hours, in a cup of the patient's ordinary drink; and, where the bark has been objected to, I have prescribed with advantage, equal quantities of charcoal powder, *(carbo ligni)* with magnesia, in doses of two scruples to a drachm, every two hours, in syrup or molasses.

5th. The inflammatory symptoms having disappeared, and the irritability of the stomach remaining still obstinate, the following has never failed with me, but in one single instance.

16 grains of Cayenne Pepper, (*Capsicum Annuum*) may be rubbed up with an equal quantity of Calomel, to which may be added as much Crumb of Bread, moistened with Camphorated Spirits, as will form a mass, of which eight pills are to be made.

One of these to be given every hour; and clysters of bark to be given repeatedly, to which may be added also, one or two drachms powdered charcoal.

The patient is indulged with wine, wine whey, and even brandy and water; and, while it remains on the stomach, infusions or decoctions of bark, acidulated with aromatic spirit or elixir of vitriol, or with the mu-

The yeast is ordered to be continued so long as the least propensity to vomit remains. I have found beneficial effects to result from sponging the patient with brandy, or with lime juice and salt, especially the head and trunk.

SECTION 3.

A brief recapitulation of the Reasons of the foregoing Practice, in this Disease.

The primary objects in this disease, are to withdraw or reduce the action of the noxious power or *gaseous poison*, which has excited it; and, at the same time, to guard against that rapid and sudden prostration of strength which almost inevitably follows copious depletion.

With this in view, I have, as it regards this disease, long since *sheathed my lancet;* indeed, I do not recollect to have used it, during the last thirteen years that I have practiced in Charleston, except in those cases that have been blended with *Pnuemonia:* and my reasons have been founded on principles that are justifiable from the nature of the climate, and the rapid changes of the disease, as well as on the authority of those distinguished Writers and Practitioners, who have treated of the diseases incidental to warm climates; and in which they have asserted, that if bleeding is at all used in this fever, it must be with great caution, and the repetition of it with still greater, in those climates.--(*vide Lind on the Diseases of Hot Climates, p.* 257.)

And Dr. DANCER, in the Addenda to his *Jamaica Practice*, observes, "*Venesection*, or blood-letting, as advised by HILARY, MOSELY, RUSH, JACKSON and others, though apparently indicated, and according to report, very successful in America" (i.e. Philadelphia) "and in San Domingo, has not been found so by the generality of Practitioners in this Island, and has few advocates left, even among those who are inimical to

Along with the lancet I have rejected mercury, except as an auxiliary ingredient, to a limited extent.—*Because, I have determined never to tremble for the consequences, resulting from its excessive use.* I know from fatal experience, that it is at best, a dangerous remedy; that it is not a certain one in this fever, many can testify.

The practice which I have pursued in most modifications of fever, at this season of the year, since my return to Charleston, has been that which forms the second section of the present chapter. And I have abundant reason to be truly thankful to God, that in this season of affliction and dread calamity, among the strangers and children, that by His divine blessing, it has been made effectual to the cure of eighty-two out of eighty-six patients.

It is however, to be remembered, that it is not my intention to insinuate, that all those cases were *Yellow Fever.* I would be understood to mean, that in all of them, the persons were fit subjects for contracting that fever, being strangers from various parts of Europe and America, and children of the age of from three to twelve years. These had all the forming symptoms of the prevailing disease; many had the irritability of the stomach, and a few black vomit. And in all that have recovered, I think I can with confidence assert that the disease has been arrested in its first stage, by the practice laid down in this Work, and consequently did not arrive at that, which constitutes the perfectly formed Yellow Fever.