An essay on the analogy of the Asiatic and African plague and the American yellow fever : with a view to prove that they are the same disease varied by climate and other circumstances / by Phineas Jenks.

AN ESSAY

ON THE

ANALOGY

OF THE

ASIATIC AND AFRICAN PLAGUE

AND THE

AMERICAN

YELLOW FEVER,

WITH A VIEW TO PROVE THAT THEY ARE THE SAME DISEASE VARIED BY CLIMATE AND OTHER CIRCUMSTANCES.

BY PHINEAS JENKS, OF PENNSYLVANIA;

HONORARY MEMBER OF THE PHILADELPHIA MEDICAL AND CHEMICAL SOCIETIES.

And though the putrid south
Be shut; though no convulsive agony
Shake, from the deep foundations of the world,
Th' unprisoned plagues; a secret venom oft
Corrupts the air, the water, and the land.

Armstrong.

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1804.

AN INAUGURAL DISSERTATION

FOR

THE DEGREE

OF

DOCTOR OF MEDICINE:

SUBMITTED

TO THE EXAMINATION

OF THE

REVEREND JOHN ANDREWS, D. D. Provost,

(PRO TEMPORE),

AND OF THE

TRUSTEES, AND MEDICAL PROFESSORS

OF THE

UNIVERSITY OF PENNSYLVANIA,

ON THE FIFTH DAY OF JUNE, ONE THOUSAND EIGHT HUNDRED AND FOUR,

TO BENJAMIN RUSH, M. D.

PROFESSOR OF THE INSTITUTES, AND PRACTICE OF MEDICINE, IN THE UNIVERSITY OF PENNSYLVANIA.

I feel peculiar pleasure in dedicating this essay to you, not from a belief that its faults can be shielded by the patronage of your distinguished name; but as a mark of my gratitude for the knowledge I have obtained from your public lectures and private instructions; and for the many acts of friendship I received from you while I had the pleasure of being your domestic pupil. Accept, sir, of the best wishes for your health and happiness of your obliged and affectionate friend,

THE AUTHOR.

TO DOCTOR ISAAC CHAPMAN,

OF BUCKS COUNTY.

It affords me the greatest satisfaction to have an opportunity of thus publickly acknowledging my gratitude to you for the numerous services you have rendered me both in your medical and private capacity. It was under your guidance that I commenced my medical studies, which to me has been the happiest period of my life. It was then that I had an opportunity of witnessing the correctness of your judgment, and medical knowledge, which have so frequently been exercised in the alleviation of human misery. That you may long live to enjoy that health you have in so distinguished a manner restored to others, is the fervent wish of your friend and former pupil,

THE AUTHOR.

PREFACE.

An implicit adoption of the opinions of men celebrated for talents and learning, appears to be the principal cause of the slow advancement of medical science. The systems of Hippocrates and Galen, were alone taught in the schools of medicine for many ages, until fatal experience shewed the fallacy of many of their positions, and the folly of adhering to theories unattended with success in practice. Unfortunately, however, for science and for man, the systems of many of their successors were not formed by rational induction from established facts; but existing in the imaginations only of their authors, were equally fallacious, and are deservedly consigned to oblivion. Such was the Lentor of Boerhaave: such the Spasm of Hoffman.

Sydenham, although he erected an ever-during monument to his own memory, by his doctrine

of epidemics, effectually trammelled the progress of medical science by suggesting the idea of nosology. This arrangement, which afterwards became the favourite nursling of Savage, and of Cullen, has been justly and emphatically styled, the handmaid of Empiricism. The Brunonian system contributed to loosen this shackle, and the late improvements and discoveries which have taken place in the United States, have fully shewn the impropriety of such classification. A new era is commencing in the annals of medicine, when physicians will no longer prescribe for the name of a disease, but will have their attention directed to the pulse, the sensible qualities of the atmosphere, the grade of morbid action, present in the system, and the peculiar laws by which epidemics are governed. When this change takes place, and I trust it shortly will, we shall unanimously view our autumnal fevers, as the effect of natural causes which are in our power to controul; and not a particular judgment from Heaven. We shall no longer hesitate to acknowledge them the offspring of our own climate, fostered in filth, and propagated by noxious exhalations. St. Domingo Packets will no more be the peculiar subjects of execration, nor shall we see contagion through the microscope of terror, fluttering in the sails of foreign vessels. An attention to cleanliness

in our cities will be the consequence, and putrifying masses will no longer be left to assail the senses of our citizens. Quarantines will be abolished, and our energies guided by reason, and philosophy will be properly directed. Then shall we clearly perceive, that our past afflictions were the consequence of physical lethargy; and the united voice of America, and of the world will hail the philosophers who, by their labours awakened our citizens from it, and led them to search for the origin of the fever in domestic causes.

In the following pages it may be presumed that I have too hastily decided upon the non-contagious nature of the plague; and it is but doing myself justice to declare, that when I commenced this inquiry, I was rather inclined to favour an opposite doctrine; but my researches, and the mass of facts I have collected have convinced me that my opinions were erroneous, and that I had fallen into a popular mistake.

I feel considerable diffidence in appearing before the public at this early period of life; and were it not an indispensable task, imposed by an institute of the university, upon every candidate for medical honors, I should not now have obtruded my opinions upon the world. No person can be more sensible than I am, of the imperfections of the following

essay; but I trust that my youth, the short time allowed to prepare an inaugural thesis, and more especially the unfavourable circumstance of an ill state of health, will be a sufficient apology to the candid and scientific who honour this first fruit of my studies with a perusal.

AN ESSAY, &c.

THE origin of the Plague has long been a contested point. The ancient Egyptians ascribed it to infection brought by flying serpents, and they worshipped the bird Ibis for destroying them, and, as they supposed, thereby averting the disease.* More modern nations have attributed it to an obscure, and still more distant origin, and sanguinely presumed to say, that it has had an existence ever since, being constantly kept up by contagion..... But, at this enlightened era, when science pervades every philosophic inquiry, and when induction from facts and ocular demonstration are alone admissible, it is no ways astonishing that such vague and unmeaning conjectures should be overthrown and superseded by theories which have at least a probability to recommend them to the world. To ascribe the Plague to a supernatural origin,

* See Webster, vol. 2. p. 197.

would be to cast a reflection upon one of the attributes of the Deity. We shall therefore content ourselves in humbly attempting to make it appear, that it is the natural effect of physical causes; or, in other words, the effect of the decomposition of vegetable and animal matters.

We infer that miasma, and those noxious gasses eliminated in the process of putrefaction, are the causes of the plague, from its appearing only where they exist. At Rosetta, which is one of the filthiest cities in the world, the plague prevails with uncommon violence. The streets are extremely narrow and dirty, and there are large quantities of swampy, boggy ground, with numerous ditches, and canals, which contain stagnant water, around the town. That these are the causes of the Plague is proved by its sudden and almost instantaneous disappearance in hot weather. The theory of the action of heat in destroying the plague, shall be given in the sequel: suffice it here to suggest, the improbability of heat destroying a contagious disease so immediately. An assertion of this kind ought to be cautiously made, more especially when there are neither facts nor analogy to support it: for who ever heard of small pox, or measles, or any other disease that is generally admitted to be contagious disappearing so suddenly?

The Plague always makes its appearance in Egypt about the time the Nile begins to fall. For when it recedes, the large quantities of slime and vegetable matter left behind, quickly undergo the putrefactive fermentation from the excessive heat of the climate. And although this may, of itself, be sufficient to generate the Plague, yet, unfortunately for the Egyptians, the large quantities of fish which are likewise deposited on the surface of the earth are an additional source of pestilence. To these two obvious sources, a third may be added which contributes its share in the work of destruction. The waters of the Nile, notwithstanding they are said to be incapable of putrefaction when left behind stagnating in ditches and ponds, yet we presume the observation is not correct, as their component parts are the same as all other waters, and the climate particularly favourable for that process.

That these are the causes of the plague, there can be no doubt: first, from its always commencing in the neighbourhood of the Nile when its waters begin to recede; and secondly, from its always disappearing when the sources of exhalation are destroyed by the heat of the sun.

Near Jaffa there is a lake, the stagnant waters of which, in the opinion of Assalini, are the cause of

the Plague: as a proof of this opinion, he observes, "that those divisions of the French army, which were encamped near it, first suffered by the disease."

That miasma is the remote cause of the Plague is further proved by the following fact: that whenever the English army in Egypt was on its march, the Plague did not prevail amongst them; but if they encamped for any length of time, exposed to morass exhalations, it invariably made its appearance.

The canal that passes through Grand Cairo, from the filth thrown into it from adjoining houses, and from the number of privies that enter into it, emits so great a stench for several months in the year, that the gold and silver in the neighbouring houses are tarnished by it.* I wish it to be remembered, that in the vicinity of this canal, the Plague sometimes rages with violence.

I could recite many more facts to prove that the causes of the Plague are miasma, and other gasses eliminated in the process of putrefaction; but as it is my intention to be as concise as the nature of the subject will admit, I shall be excused for omitting them.

I shall now take a cursory view of the origin of the Yellow Fever, and must here observe, that, like the Plague, it is unknown in cleanly situations.

* See Antes, Observations on Egypt, p. 38.

He who views with attention the progress of our autumnal fevers, must soon be convinced that they are nearly allied to each other, and have one common origin. The miasmata, and poisonous vapours that generate them, will produce an intermittent, a bilious remittent, or a bilious yellow fever, agreeably to the degree of predisposing debility, and the force of the miasma eliminated. Hence we observe, that in situations where intermittents were once prevalent, they are now unknown, and remittents are the autumnal epidemic. This change would appear to depend upon the greater surface of ground exposed to the action of the sun, by the clearing of land, and upon the cutting down groves of trees which arrested the progress of miasmata: for it is a fact, now well established, that swamps, or bogs, defended from the action of the sun by our forests, are perfectly inoffensive. From these causes, and from the particular constitution of the atmosphere, it is that our mild autumnal remittents, which has been so long familiar to our citizens, has yielded up its reign to the Yellow Fever.

I need hardly add in this place, that the sources of autumnal diseases are far more copious than heretofore. Those forests which once surrounded our cities and prevented the sun's action upon the

earth, are now hewn down; and as our population has increased, the vegetable and animal matters annually brought to our cities far exceeds what took place formerly. The offals of those matters, notwithstanding it has been believed to the contrary, are too frequently left in the more obscure parts of our cities to putrify: add to this, the numerous ponds of stagnant water in our environs.* Even our common sewers, climinate effluvia, which are a source of disease to those who are unaccustomed to them. And we have high authority for declaring, that bilge water has frequently been the remote cause of Yellow Fever, whilst numerous melancholy instances have shewn that the confined air in the holds of ships has also produced the same disease. Our wharves from the decay of the timbers of which they are constructed, and our docks and privies are all copious sources of autumnal fevers. The limits of this essay will not admit of my reciting further proofs of the origin of those diseases: nor have I an inclination to pursue the subject further than will answer my present purpose; I must therefore beg leave to refer the reader to the works of Doctors Rush and Caldwell, where he will obtain ample information.

* This, agreeably to Doctor Seaman, was one of the sources of the Yellow Fever of seventeen hundred and ninety-five, in New-York.

We find that an analogy exists in the *exciting* causes of those diseases. These are fatigue of body, or mind, excess in eating or drinking, heat, immoderate evacuations, cold, grief, fear, &c. All those officers, attached to the British army in Egypt, who laboured under great apprehensions for their own safety, fell victims to the Plague. This, and the other sedative passions, are exciting causes only as they abstract stimuli, thereby accumulating the excitability, which is acted upon by other stimuli with greater force: for I hold it to be a fact that all direct exciting causes are of a stimulating nature. That these are the exciting causes, is evident, since those who evade them escape the disease. The Europeans in Egypt know, from experience, that by confining themselves in their houses, they are secured from the ravages of the Plague; but upon what principle they are ignorant: they are not aware that it is by evading the exciting causes: this, however, shall be explained more fully hereafter.

I shall now proceed to shew, that the *symptoms* of those diseases are generally analogous, and explain the reasons why they sometimes vary.

First....The Plague frequently comes on suddenly and without a chill: so does the Yellow

Fever. The force of the causes that induce them suddenly prostrates the system below the point of reaction, and hence those instances of sudden death which sometimes occur in both diseases.

Secondly....We sometimes see both Plague and Yellow Fever come on with chills, and all the ordinary symptoms of mild autumnal fevers, where the remote cause, and the predisposing debility has not been great: for it is a fact, I presume that will not be denied, that the force of a disease is always in the ratio of the force of the causes that induce it. Hence, the judicious physician, by ascertaining the strength of those causes, and the space of time they were applied, can, with some certainty, predict the duration of the disease, and its final issue.

Thirdly....Are sickness at stomach, and vomitting large quantities of bile, attendant symptoms of the Plague? So are they of the Yellow Fever: and the stomach is frequently so irritable that one of the chances of saving the lives of our patients is lost by their throwing up the medicines they had taken.

Fourthly....I infer the similarity of these diseases from hæmorrhages, particularly from the nose and uterus. These occurred in the Plague at Aleppo,

but they are a more common symptom in the Yellow Fever.

Fifthly....From abortions. Russel observes that these were universal in the Plague; which it is presumable were owing to preternatural determination to the uterus induced by a local debility of the part; but they are not so common in the Yellow fever, and their less frequent occurrence may, perhaps, be attributed to the liberal use of the lancet.

Sixthly....A great prostration of strength from the force of the remote causes is observable in both diseases.

Seventhly....The pulse frequently intermits, in some instances it is preternaturally quick, in others preternaturally slow, according to the force of stimuli acting upon the heart and arteries.

Eighthly....A natural tongue is sometimes met with; also a white and furred tongue, which is afterwards changed to a yellow or black colour in both diseases.

Ninthly....We sometimes see an absence of thirst altogether; at other times the patient is exces-

sively thirsty, and drinks with avidity every thing that is offered him in both diseases.

Tenthly....We observe their analogy in their being attended with diarrhœa, or obstinate costiveness; also

Eleventhly....In syncope or fainting. Doctor P. Russel expresses his surprise at seeing patients faint in the first attacks of the Plague, for he had been accustomed to that symptom only in the last stages of disease from direct debility. It, however, takes place in the first stage of Plague and Yellow Fever, from the pressure of excitement, or indirect debility, as is proved by its being cured by blood-letting.

Twelfthly....Loss of speech, faultering, tremors of the tongue, deafness, a muddy or red eye, are symptoms common both to the Plague and Yellow Fever.

The Plague ends generally on the third day; but it is sometimes protracted to the eleventh day, and even longer in some instances. The crisis is mostly brought on by a sweat, such as was observ-

ed in the Yellow Fever of 1803. This is one of nature's indications, and shews a tendency in the disease to go off by the enunctories of the skin.

In accounting for the greater fatality, and shorter duration of the Plague than Yellow Fever, I am necessitated to call in the effects of climate, and some other circumstances. The Turks are an indolent, and enervated people, depressed both in body and mind by the tyranny of their rulers. Although they are inhabitants of one of the most fertile portions of the globe, yet this fertility depends upon casual circumstances, and when those occur, they are, in a physical light, the bane of thousands: subject to the nod of their pachas, their lives are in perpetual jeopardy: they are strangers to those noble and energetic sensations which characterise the inhabitants of enlightened governments, and that contributes so largely to health by giving tone to the body and mind. Add to this, the effect of an Asiatic sun acting upon accumulated excitability, and our surprise at the greater mortality of the Plague will cease; more especially when we consider the abundance of filth, the quantity of miasmata daily eliminated, and the force of all those causes which produce it.

Buboes and carbuncles, although they sometimes appear in the Yellow Fever are not so frequent as in the Plague. This difference would seem to arise from the excessive heat of an Asiatic or African climate, which induces a cutaneous debility that determines the disease to those parts in the form of buboes and carbuncles. In proof of this I may observe, that in the year 1760, when the Plague raged at Aleppo, they did not appear as symptoms until the hot months of April and May, after which time they were common.

"But the symptoms of the Plague," says Doctor Russel, "are scarcely in all respects alike in any two persons; and vary extremely in the course of an hour in the same subject. The disease attended in the beginning with symptoms not highly alarming, often ends fatally within a few hours, while the most formidable attacks, by a sudden and unexpected alteration, sometimes terminate happily."*

In like manner patients walk about in the Yellow Fever, and sometimes even transact business but a few hours before their death; whilst in other cases, where the patients are seized violently, they frequently recover.

* Russel's Nat. Hist. of Aleppo, p. 350.

I further infer, the similarity of those diseases from their passing by, and attacking persons of the same occupations in life. Dr. Whitman observes, that he was informed by the merchants of Cairo, that the oil-sellers, water-carriers, and tanners were not subject to the disease. The tanners, in Philadelphia, and those persons who were in the practice of using olive oil, and the warm-bath, escaped the Yellow Fever; but tradesmen who are alternately exposed to the action of heat and cold, are the most susceptible of those diseases. I infer their similarity further from the great mortality that attends them in their commencement; this fatality is owing to their attacking persons who have been much debilitated by hard labour, by dissipation, or by sedentary occupations.

The Plague and Yellow Fever appear in different grades; from a mild intermittent, or remittent where the patients are not confined to their beds, up to the most malignant form of disease. They likewise assume different symptoms in different years. The Plague, sometimes appears with a determination to the skin; in which case it is called sudor anglicanus. It originated in England, and for a long time was entirely confined to Englishmen. This is not the only instance in which persons allied to each other by consan-

guinity, or by habit, have appeared to have a greater susceptibility to disease than others. Deimerbroeck observes, in the Plague at Nimeguen that whole families were attacked by it when they lived in different parts of the same city, and even where they lived in different towns. The Plague occasionally appears in the form of an epidemic colic, as in Spain in the year 1600, where it carried off the patients in three or four days; and in London it was called by the less harsh sounding name of spotted fever. The Yellow Fever of our city, in like manner, is well known to assume a variety of symptoms. It is not uncommon to see it appear with profuse sweats, and in the forms of colic and petichial fever, and the Dysentery is among its most frequent forms.

Those diseases resemble each other in the subjects they attack. Persons who are seventy years of age, says Antes, seldom take the Plague, and very old persons never have it. As life is the effect of stimuli, acting upon the excitability of the system, those miasmata which produce disease in other instances, support and increase life in old people. Hence the propriety of their remaining in the evening of life in marshy or unhealthy situations. Persons of tense fibres and sanguinous temperaments are said to be the most subject to those diseases, and strangers are generally the first victims to their ravages.

This fact can be accounted for only on the principle of one of the laws of stimuli, which is, when stimuli has been applied for a long time, the system loses its susceptibility to be acted upon, and their effects cease unless their force is increased.

In some years the Plague attacks one class of men only, as in the year 1361, when it raged principally among the nobility of England, and in other years those in the humbler walks of life only are affected. It not unfrequently singles out persons from one nation, while others escape, as did the Dutch and Italians when it raged in Swisserland. In like manner the French emigrants universally escaped the Yellow Fever, in Philadelphia, in 1793.

The small-pox and measles, which are truly contagious diseases, cannot be taken a second time; but unfortunately for mankind, the diseases which are the subjects of this essay, may be repeatedly taken. The most violent attack preserves not the sufferer from their future assaults, but renders him still more susceptible of them, by inducing debility. A person in Constantinople died of the twelfth attack of the Plague.* And many of the citizens of Philadelphia can attest the repeated attacks of the Yellow Fever upon themselves.

* See Webster, p. 139.

We find a resemblance in those diseases from their not occurring every year under the *same circumstances* of filth. This may depend, in some degree, upon the heat of the sun in cool summers being insufficient to cause putrefaction and exhalation, but principally upon a coinciding malignant state of the atmosphere.

This malignant constitution of the atmosphere is now generally admitted. The idea was strongly vindicated by Doctor Sydenham. It appears

First....From those diseases never becoming epidemic beyond its confines or limits.

Secondly....It appears from the universality of epidemics in particular years, as the influenza, which not long since spread over every quarter of the globe.

Thirdly....From epidemics not occurring, when their causes obviously exist, and sporadic cases only appear, as in our Yellow Fevers.

Fourthly....From great epidemics, disappearing after having prevailed for a long time, as the Plague which ravaged England, Germany,

France, and Holland, I must here concur with Mr. Webster, in believing those countries are not secured from its future attacks, by their attention to quarantines. When this constitution of the atmosphere again occurs, this disease will renew its acquaintance with them. What this constitution of the atmosphere is, or how such a change has been effected, I am unable to say; but our senses inform us of the fact, although philosophers have been puzzled to account for it. We must admit as truths what our senses recognise as such, or the world would be deprived of some of the most valuable of them that are now known.

Fifthly....The existence of such a state of atmosphere, as above described, is further evinced by a fact taken notice of by Diemerbroeck, and Mr. Webster, viz. that flesh and vegetables putrify much sooner during the prevalence of great epidemics than at any other time. I am aware that this may be ascribed to miasmata, and the other causes of disease; but I am rather disposed to attribute it to a certain malignant change in the atmosphere.

Sixthly....I infer it also from the appearance of new and uncommon insects, and such as live in or are fond of a contaminated atmosphere. The appear-

ance of such insects has often been observed before, or during the prevalence of great epidemics, whilst other species delighting in a different atmosphere, perish during those periods of disease.

I shall now take a view of the diseases that precede, and succeed the Plague and Yellow Fever, and it is presumable, I shall still find the analogy to hold good. It is observable that before the appearance of great epidemics, those diseases that precede them increase in violence; and it is necessary to make use of more powerful remedies to cure them. The physician who is ignorant of this fact, and has not his attention directed to it, will find that his limitted knowledge will be obvious to the world by his want of success.

The severity and mortality of those diseases which are the forerunners of great epidemics, have been taken notice of by Dr. Sydenham as preceding the Plague of 1665, "Pleurisies, quinsies, and other inflammatory diseases," says he, "usually become epidemic, and I never knew them more common than they were for some weeks preceding the beginning of the late Plague in London."* Such was the violence of the symptoms, that this great man tells us, he could with difficulty distinguish them from the Plague. A malignant pleu-

* Vol. I. p. 172.

risy was the signal of the approach of the Plague in Hungary, Austria, and Turkey. So certainly do malignant diseases precede it, that Ballonius has laid it down as a general rule that spotted fevers, malignant small pox, and measles, become epidemic before the Plague makes its appearance.

If we turn our attention towards the Yellow Fever of our own country, we shall find, that it too is preceded by diseases of high excitement; and this change is not confined to those cities where it prevails, but extends all over our country. Our winter diseases are much more inflammatory than formerly, and the scarlatina anginosa, the measles, and many other diseases, have been observed to prevail with unusual violence. If then our ordinary diseases have become so much more malignant than they formerly were previous to the appearance of our great epidemic, is it not sufficient to convince us, that it is not of foreign origin; but generated by the filth of our cities, and nurtured by a malignant state of our atmosphere. I may here observe, that the diseases which succeed those epidemics, are equally violent with those that precede them. After the Plague begins to decline in Egypt, ophthalmia makes its appearance. This disease, in all probability, depends upon the same causes as the Plague, and although it does not

deprive those who are the subjects of its attack, of life, yet it reduces them to a state more deplorable than death itself. "Nearly every fifth inhabitant," says Sir Robert Wilson, "has lost one eye, and many both." The circumstance of the total blindness of many of the English, and French troops is well known. After the decline of ophthalmia, the dysentery commences its career, which, after continuing sometime, is succeeded by intermittents and remittents.

So also the diseases, that succeed the yellow fever partake in some degree of its violence. Patients labouring under pneumonies, we are informed by Dr. Rush, frequently puked bile, and some of them had a yellowness of the skin, and both measles, and small pox, have been observed to be, uncommonly mortal, when they succeed epidemics. More bilious pleurisies have occurred in Philadelphia, since the appearance of the Yellow Fever in 1793, than there ever had been, in the same number of years before. This violence, in the diseases, that suceed epidemics has been observed by Dr. Cleghorn, in the Island of Minorca.

Have those two diseases any other precursors in which their sameness appears? I answer, they have. Great swarms of locusts, as well as flies and worms of different species, are said to precede the

Plague. The inhabitants of Aleppo believe the appearance of uncommon insects, the desertion of birds, and frogs ceasing to croak, the precursors of an approaching pestilence.

Great numbers of spiders were the precursors of the Plague that raged in Poland, Hungary, and Russia, from the year 1703, to the year 1709. It is a curious fact, that crows, sparrows, and other birds did not appear during this pestilential season.

In the United States it is well known, that insects appear in abundance as the precursors of our Yellow Fever; and within these few years we have several species that are uncommon and new, such as the Meloe Chapmani, or potatoe fly, called by Fabricius the lytta vittata, with more propriety, as it is not a species of Meloe, and the Tipula tritici, or common wheat fly.*

To these may be added the canker worm, which existed in such quantities in the New-England states, as to devour the orchards in 1791, continuing their ravages until just before the appear-

* The credulity of the people had led them to suppose, that this fly was brought here during the revolutionary war, by the Hessians; but naturalists have ascertained that no such fly had ever existed in Europe, nor in any other part of the world that has been yet discovered.

ance of the Yellow Fever at New Haven in 1794, at which time they disappeared.*

Musquitoes, cockroaches, and ants were observed to be uncommonly numerous previous to the appearance of the Yellow Fever in 1797.

It is observable, that animals of different kinds become very sickly before the appearance of great epidemics. This fact has been taken notice of by Doctor Russel, as being observed by the inhabitants of Aleppo, and from the high authority of this author, and the coincidence of others equally respectable, we place full confidence in the observation. Thus we are told, that in the year 1664, previous to the appearance of the Plague in England, there was a great sickness among cattle, and numbers died. And in the year 1682, there was a mortal disease among cattle in Italy, Swisserland, and Germany, called the angina maligna, of which they died in twenty-four hours. At this period the Plague was raging in some parts of Europe.

Doctor Whitman informs us, that at the time the Plague raged at Jaffa, in 1800, a great mortality prevailed amongst cattle and dogs.†

* See Webster, vol. I. p. 302.

† See page 531.

Previously to the appearance of the Yellow Fever in 1797, there was a disease prevailing among the cats in Philadelphia, which destroyed numbers; and I well recollect to have heard the citizens express their apprehensions of what might ensue; and it appeared their timidity was not ill-founded, for their much dreaded dangers were realized.

The farmers through the United States will long recollect the fatality there was among horses, from the losses they incurred by a disease called yellow waters, which appears to be a true bilious remitting fever.*

Since America has been visited by the Yellow Fever, even the inhabitants of the waters have felt the effects of disease. The fish in many of our rivers, are known to be sickly; and have sometimes been seen floating, in numbers, dead, upon the surface of the water. Vegetation, itself, feels a change. The peach and the plumb tree are now withering under the effects of a contaminated atmosphere;† the privy has ceased to flourish throughout

* Dissections of horses that have died with this disease, warrant such a conclusion, as their livers, I believe are invariably found to be much affected.

† The plumb tree, in the eastern states, is diseased by warty excrescences, which were generally supposed to be the consequence of

the United States. And the trees in Philadelphia have been observed in sickly autumns to eliminate a disagreeable effluvia.

But why, it may be asked, should we descend to enquire into the diseases of animals, and vegetables, and how will mankind be benefited by such an enquiry? To this I answer, that by ascertaining the precursors of those diseases we shall be warned of their approach, and may not only consult means to prevent their appearance and evade their effects by an early desertion of our cities; but by recording such facts, we further establish the sameness of the two diseases.

In pursuance of my plan, I shall next examine the analogy of the Plague and Yellow Fever in assuming an empire over all other diseases when they are epidemic, and here I am supported by the respectable authorities of Sydenham, Huxham, and Diemerbroeck, each of whom has repeatedly observed the ascendency great epidemics have, after

worms; but Mr. Webster, by the assistance of a microscope has discovered, that the worm is rather the effect of the excrescence which affords to it a nidus, to deposit its ova.

The peach tree, if not immediately, is indirectly affected by the present state of the atmosphere; for, as well as I have been able to inform myself, the worm that has been so destructive to that valuable tree, is of modern date; and may be the offspring of, or at least delight in a contaminated atmosphere, which is favourable to its procreation.

they make their appearance, over all preceding diseases, and either force them to retire entirely, or blend themselves with them, so that the last epidemic increases as the preceding one decreases. But in illustration of this, I will give an example: suppose that the scarletina has prevailed for some time, and that the measles make their appearance during this period, the scarletina, if it be a disease of less force, will yield to the measles, and as it declines, will put on many symptoms in common with them. It is an axiom in medicine, that no two epidemics of unequal force, can ever prevail at the same time. Hence it is, that the Plague, which is a disease of the highest degree of excitement, drives away all other diseases during its reign, as Doctors Sydenham and Hodges observes was the case in London, in the year 1665.

It is a curious fact, that those vanquished diseases will revive again, after the decline of the epidemic with many of its symptoms. It would further appear, that a weaker disease will chase away one of much greater force that has prevailed for sometime, as the small pox, which has been known to assume an ascendency over the Plague. From a knowledge of this fact, we would naturally infer, that a disease which has continued for some time, expends itself, or loses part of its force.

Many of the American physicians have learned, from experience, that our Yellow Fever when it prevails, is the solitary epidemic. All other diseases receding as it approaches, and yield to its superior force. It would then appear, that this doctrine of epidemics is not the mere creature of fancy; but firmly established by the experience of ages, and in a practical point of view, of the utmost consequence, in as much as it will alone direct us to a successful practice.

Those diseases yield to the same remedies when they exist under the same circumstances. Thus the Plague, in certain years, in some parts of Egypt, will not admit of blood-letting, on account of the great prostration of the system from the force of the causes that induce it. Thus too bleeding is sometimes prejudicial in the Yellow Fever of the West Indies from similar causes; but where the heat of the climate is not so excessive, nor exhalation so great as to prostrate the system below the point of reaction, the symptoms do not only admit of bleeding, but call loudly for it. Hence in the Plague at London in the year 1665, the most successful practitioners of that day bled freely, as also did Bottalus, in France. And the singular success of Doctor Dover's practice completely establishes the propriety of blood-letting in this

disease, under certain circumstances. The reader will pardon me for a quotation, of some length, from this author, as the work is not now to be obtained. "When I took by storm the two cities of Guaiaquil, under the line in the South seas, it happened that not long before, the Plague had raged amongst them. For our better security, therefore, and keeping our people together, we lay in their churches, and likewise brought thither the plunder of the cities. We were very much annoyed with the smell of dead bodies. These bodies could hardly be said to be buried, for the Spaniards abroad use no coffins, but throw several dead bodies, one upon another, with only a draw board over them, so that it is no wonder we received the infection.

"In a very few days after we got on board, one of the surgeons came to me, to acquaint me, that several of my men were taken after a violent manner, with that languor of spirits that they were not able to move. I immediately went among them, and, to my great surprise, soon discerned what was the matter. In less then forty-eight hours we had in our several ships one hundred and eighty men in this miserable condition.

"I ordered the surgeons to bleed them in both arms, and to go round to them all, with a command to leave them bleeding till all were blooded, and then

come and tie them up in their turns. Thus they lay bleeding and fainting so long that I could not conceive they could lose less than one hundred ounces each man; they afterwards took spirit of vitriol;" and Doctor Dover informs us, that "out of the one hundred and eighty, but seven or eight died, and these owed their deaths to strong liquors which their mess-mates procured for them."* But those men still retained their European constitutions, and would bear more depletion than the inhabitants of the country. It is somewhat remarkable, that there should be such a contrariety of opinion with respect to the propriety of blood-letting in the Plague; when a reference to climate and season, and to local situation would at once reconcile these different opinions, and convince their advocates of the justness of those two opposite modes of practice.

But in the Yellow Fever of the United States, where the temperature of our climate approaches nearly to that of England, in 1665, the lancet is hailed as the "Magnum Dei Donum," and will be looked upon as such until European refinement, and its concomitant dissipation are more generally admitted amongst us. Then, and not till then, will tonic medicines supersede its use.

* See the Physician's Legacy, p. 100.

I shall next inquire into the contagious nature of those diseases, and attempt to ascertain from a mass of facts whether they can be communicated from one person to another; and here I have to oppose Russel, and many others of high respectability: but as truth is my object I hope to be pardoned for this opposition.

I shall not, because one or two individuals have been exposed to the Plague, and not taken it, infer that the disease is not contagious; because even the small pox itself cannot be taken, unless there is a predisposition, or susceptibility in the system to be acted upon by the variolus poison; and I have seen several such instances, not only in the small pox, but in the measles and kine pox, and have heard of well attested cases in Syphilis; one in particular, which is related by Dr. Barton in his lectures on Materia Medica.

But if I can recite proofs of armies marching through towns, where hundreds of the inhabitants are daily swept off by the Plague, and the disease not being in a single instance communicated to the soldiery, provided they do not halt in those towns, but for a few days; a space of time insufficient to take the disease from exhalation or miasmata.

Or if I can record, from undeniable authorities, numerous instances of the removal of the sick from

a pestilential to a healthy village, with their beds and bedding and yet the disease not be communicated in the latter.

If from the perusal of the most respectable authors, I am enabled to transcribe the fact, shewing that the Plague has been known to prevail, in the filthy half of a populous city, sweeping off two thirds of the inhabitants, and yet not communicated to the cleanlier parts, notwithstanding there has been a constant intercourse with the infected, I shall be excused, for not implicitly adopting the opinions of my predecessors, and for declaring my disbelief, in the Doctrine of the contagious nature of that disease.

I wish it here to be understood, that it is not my intention to aver, that those diseases are never cummunicated from one person to another; for under certain circumstances, I conceive they may, from what has been happily called the contagion of excretion.* But the dysentery, and the autumnal bilious remittent, may be communicated in the same manner. And are we to esteem a disease contagious, that is created by the filth around the patient, from the indolence, or inattention of the attendants, in not removing the excretions of the sick, or not affording them a proper change of linen, and sufficiently ventilating their rooms? Of each of those errors are the Turks

* By Dr. Rush.

guilty, and it is more than probable, that the Doctrine of contagion, has received its chief support, from those circumstances, and from limited observation.

But there is nothing specific in those excretions; and a disease arising from them, would be as apt to become a Yellow Fever, or a Typhus Fever, as the Plague.

When the Plague raged at Aleppo, in the year 1761, many of the inhabitants, who were labouring under the disease, came to Tripoli, with their bedding, &c. yet there was no instance of its being communicated to any person in that city.* Facts like these, are esteemed curious, by those who favour the Doctrine of contagion, and they are unable to account for them; but with my ideas of the disease, I find it by no means difficult; for I could as easily conceive, that fire could be generated by compressing water, as that the Plague or Yellow Fever, could spread in an atmosphere, incapable of originating them. If those diseases are contagious, surely it is a contagion, sui generis, for who ever heard of the small pox, or measles, not spreading under such circumstances?

When the Plague was at Limsol, in the year 1751, many of the inhabitants fled to Larnica, a Town not far distant, with the disease, and the pestilential sores upon them, some of whom died; yet there was not

* See Russel on the Plague, Page 12.

a single instance of its being communicated from one to another; is it then possible, that a disease as contagious, as the Plague is said to be, should be imported into a city like Larnica, under the above circumstances, without being propagated among the citizens? The disease however appears to have raged there, the very next season with considerable violence.*

Assalini asserts that, "he found by observation in the French army, that if a battalion infected, left its cantonement for another, the distemper not only ceased in that corps, but that no one having communication was exposed to the smallest danger: nor did the phenomena terminate here, for even if the battalion quitted the place in ten days, the slighest symptom of the disease never appeared amongst them."

If my ideas, of this quotation be correct, it would appear, that Assalini supposed the causes of the Plague, existed in the neighbourhood of those cantonements; and that by removing the troops, those causes were evaded; and indeed, from this author supporting the doctrine of non-contagion as he has done, I am certain this is his meaning, but his language is not sufficiently explicit.

The British army, in their march to Cairo, says Sir Robert Wilson, passed through numerous villages, where the Plague raged, without taking any precau-

* Russel, Page 4.

tions; and the Turkish soldiers, even took up the dead with impunity; the disease not being communicated to any of the army, whilst it made terrible havock with those troops that were stationed at Aboukir.

The villages in Egypt, are within a quarter, or half a mile of each other; and it is no uncommon thing to see the Plague raging violently in some, and not in others; the inhabitants of the healthy, having free communication with the pestilential villages, without taking the disease, or being under any apprehension of it: nor were the English army more cautious; they were not biased by preconceived opinions; and observation had taught them, that the Doctrine of contagion was not well founded. Thus how frequently do we see error perpetuated by great authorities, and how falacious are popular opinions!

The Plague, sometimes spreads desolation over one half of grand Cairo, while the other half escapes its ravages. That part of the city, where the disease prevails, is extremely filthy; and the Turks have constant intercourse with the infected, without being under apprehensions for their own safety—for they have an idea, that if they are to have the disease, they will have it, whether they avoid the sick or not. Yet notwithstanding this intercourse, the disease, is not carried to the healthy parts of that city.

The Plague raged at Maraash, in 1765, and there was a constant intercourse kept up between that city, and Aleppo; yet the disease was not introduced into the latter place. Evagrius describes a Plague, which raged about the year 594, in Antioch, which never could be carried from one city to another.

We have upon record, numerous accounts of nurses, who have attended the sick, for whole seasons, without experiencing the least indisposition; and of children sucking the breast of their dying mothers with impunity.

It would be no difficult matter, to multiply proofs of the non-contagious nature of the Plague; but as it is my wish to be as concise as possible, and my object, to support the doctrine no further than is requisite to establish the analogy between the Plague and Yellow Fever, I shall proceed to make a few observations, on the non-contagious nature of the latter disease.

In the year 1793, when the disease first made its appearance, it was universally believed to be contagious; but later experience has taught many of our physicians, that their observations were too hastily made, and their opinions prematurely formed; there is yet however, a respectable number, who still adhere to this doctrine; and their liberality will lead them to pardon me for this feeble, though honest op-

position to their opinions, when they reflect upon the magnitude of the subject, and the difficulty of properly investigating it.

There are few subjects, upon which there is not a difference in sentiment; and it is no wonder there should be upon this, which involves many difficulties unfavourable to accurate investigation.

The contagious nature of the Yellow Fever has been infered from the great number of physicians that died in 1793, but we do not think that this militates in the least against our doctrine, for those physicians were debilitated by their previous labours, and consequently, were constantly predisposed to the disease. They were also in the habits of frequently visiting parts of the city, where its causes obviously existed in the most concentrated state. But there are many physicians who have never had the disease, notwithstanding they were constantly exposed to it. And indeed since 1797, a very few, in proportion to the number there are in the city, have had it.

But if we take a view of the city Hospital, established for the reception of Yellow Fever patients, we shall there find that the apothecaries, or nurses, were in no instance affected, notwithstanding their constant, and laborious attendance upon the sick. If this disease had been marked by contagion, the Hospital was a favourable place to propagate it; for

tmust be admitted, that the daily fatigues of the attendance upon the sick, would render those persons peculiarly susceptible of it.

It appears that the disease is not more contagious when it is carried into the country. I never have heard of but one well attested instance where the least suspicion could have been entertained of the disease being taken from the sick, and that doubtless arose from the contagion of excretion, as the room of the patient was kept remarkably close.

But even those who are disposed to favour the doctrine of contagion, now admit that the disease when carried into the country will not spread, and the reason assigned for it is, that the atmosphere is too pure. If then it requires a foul atmosphere, or, in other words, a situation where putrefaction and exhalation exist, (for without something of the kind no atmosphere can be contaminated) why may not those causes alone *produce* the disease?

How many instances are there of nurses in private families who are constantly employed in attending upon the sick, and who, notwithstanding, enjoy perfect health? Chisholm himself, who appears uncommonly solicitous to support the doctrine of contagion, after wandering over the West-India islands in search of matter, has been able to relate only a few solitary cases of it.

It is a common practice at Aleppo, Grand Cairo, and other places, for all the Europeans to shut themselves up in their houses, during the prevalence of the Plague in those cities, under the idea that the disease is contagious, and that they will thereby evade it. They, at the same time, receive their food from without, and will frequently stand within four or five feet of persons who have the Plague, and enter into conversation with them, without being infected. The practice of shutting up, is laudable, and cannot be too highly commended. When great epidemics prevail, every person has the seeds of disease floating in his system, and wants only an exciting cause to bring it into action. If those same Europeans, instead of shutting themselves up in their houses, had resorted to a healthy situation, exposed to the fatigues of a journey, numbers of them, would, no doubt, have fallen victims to the Plague. The truth of this observation is established by the citizens of Philadelphia, who during the prevalence of the Yellow Fever, after having been exposed to its remote causes, fly from the city in order to evade it; when they arrive in the country, unconscious of danger, and attracted by its beauties, they resort, for amusement, to walking, riding, fishing, gunning, &c. and frequently pay for this indulgence by the forfeit of their lives.

Those who shut themselves up in their houses during our Yellow Fever, and never went out but to procure provisions, also evaded the disease.*

We may here observe, that those diseases yield to the same destructive causes which act by destroying the sources of exhalation. Extreme heat invariably checks them in as much as it deprives vegetable substances of their moisture and natural juices, thereby preventing fermentation and putrefaction.

Heavy rains have also the same effect for a limited time, but it is only while the waters are descending, and diluting the filth of our cities, so as to cut off the agents in putrefaction, and thus to destroy that process. This temporary respite from pestilence, tends only to lull into a security, which sometimes proves fatal to thousands.

I must here digress somewhat from my subject, and avail myself of this opportunityto enumerate some of the disadvantages that arise from the doctrine of contagion. Many diseases may be cured in their forming state, when at an advanced period, they bid defiance to our art. Such is the nature of those of which I have been treating; and the physician who is acquainted with the usefulness of his profession, and knows what is in his power to accomplish, can vouch for the justness of this remark.

* See Doctor Rush's Works, vol. 3. p. 101.

During the prevalence of epidemics, physicians are in great demand, and those who believe in the doctrine of contagion must constantly labour under apprehensions for their own safety whenever they enter the rooms of their patients. The consequence of which must be, that they can obtain but an imperfect knowledge of the situation of the sick.

This doctrine further supposes the necessity of the continuance of quarantines, which are calculated only to retard our efforts in preserving our cities from disease: they moreover divert our attention from its proper focus, and direct them to lazarettoes: by placing a confidence in which, they lead to the neclect of the filth which causes it; and until this be removed, in vain will our citizens look for the return of healthy autumns; besides, if there be any truth in the doctrine I have supported, quarantines will be found totally insufficient to prevent the appearance of the disease.

Conclusion....I have now traced the analogy of the Plague and Yellow Fever through their causes, symptoms and duration, and cure; and it must appear very obvious that they are one and the same disease, differing only in the degrees of force from the excess of their causes. To contend, therefore, that they are different and specific diseases, would be as absurd as

to declare, that a Yellow Fever could not exist without a black vomit, or that an inflammation of the lungs was not a peripneumony, because their was an absence of pain.*.

Having brought the subject of this essay to a close, it remains now for me to return my thanks to you, Illustrious Professors, for the friendly attention and valuable instruction that I have received from each of you, during my residence in this university. To merit a continuance of your friendship shall be my endeavour. To Doctor Wister I am particularly indebted, and I beg him to receive my sincere thanks, for the friendship he has evinced for me, which will always be held in grateful remembrance.

* The black vomit is not an infallible pathognomonic symptom of Yellow Fever, and the lungs are often prostrated below the point of pain.

THE END.