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MEDICAL & PHYSICAL

M E M O I R S.

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Medical & Physical

M E M O I R S,

CONTAINING,

AMONG OTHER SUBJECTS,

A PARTICULAR ENQUIRY

INTO THE ORIGIN AND NATURE OF THE LATE

*Pestilential Epidemics*

OF THE

UNITED STATES.

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BY CHARLES CALDWELL, M. D.

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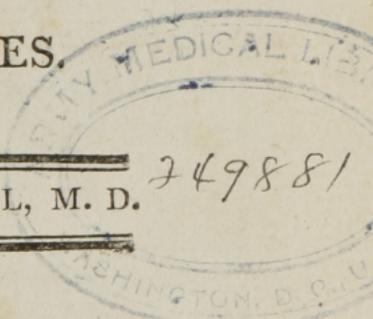
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1801.





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# DEDICATION

TO THE

Students of Medicine,

IN THE

UNIVERSITY OF PENNSYLVANIA,

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GENTLEMEN,

*FROM a conviction that the prejudices of age are frequently inimical to the advancement of science, and that truths, tending to the subversion of old errors, will ever find their most firm and faithful advocates in the liberal minds of youth, your patronage is solicited to this publication.*

*WHEN you recollect, that but a few years have elapsed since I was one of yourselves, and that the following Memoirs relate to subjects of difficult investigation, I am persuaded you will peruse them with sentiments of indulgence, rather than with those of severity, in criticism.*

DEDICATION.

*WITH the solicitude of an elder brother  
for your professional attainments, and with  
sincere wishes for your individual happiness,  
I have the honor to be*

*Your obedient, and*

*Very humble Servant,*

THE AUTHOR.

PHILADELPHIA, }  
FEBRUARY 18th, 1801. }

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## P R E F A C E.

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**T**O answer its original intention, a preface should serve as a mirror to the work which it ushers to the public eye. It should exhibit a concise view, if not of its origin, at least of its nature, objects, and ends. On no other principle can it be rendered so appropriate, nor convey such useful information to the reader. Perhaps I might add, on no other principle can it be considered in any other light, than as a supernumerary and unmeaning appendage. Under the influence of these sentiments, I shall offer a few prefatory remarks.

THE first of the following memoirs is to be considered in the light of a basis for the second. To be able to decide justly, respecting the origin of an epidemic disease, it is necessary to be acquainted with the climate, situation, nature, and general relations of the place where it prevails. Without this knowledge it is impossible to determine whether the disease be indigenous or of foreign extraction. For, in order to judge of the relationship between a cause and an effect, we must first enquire into the nature and powers of the former, and then into the character and affinities of the latter. It was from a conviction of the truth of this, that I was induced to turn my attention to a collection and arrangement of materials for a physical sketch of the city of Philadelphia.

As an apology for the style and manner of the second memoir, I beg leave to inform the reader, that the first eight numbers of it (having since received corrections and additions) appeared in the autumn of ninety nine, in one of the public prints of the city. As it was addressed to my fellow-citizens at large, it was thought most adviseable that it should make its appearance in a popular garb. For the sake of uniformity,

## P R E F A C E.

something of the same manner has been preserved in the two last numbers, which are now before the public for the first time. A want of leisure is my best and only reason, for not having made more and greater alterations in the style, which I acknowledge to be, in several places, too declamatory to serve as the proper vehicle of science.

THE principal points I have endeavoured to establish in this memoir, are,

I. THAT the late epidemic of Philadelphia, and other parts of the United States, was not a contagious disease.

II. THAT consequently it was not an imported disease.

III. THAT it was only a modification or higher grade of the common bilious fever of our country.

IV. THAT it was essentially different from the typhus mitior, or jail fever.

IN pursuing this subject it became necessary for me to examine and endeavour to refute an account, given by Dr. Chisholm, of the supposed introduction of a contagious disease into the Island of Grenada, in the spring of ninety three. In doing this, I hope I have preserved that spirit of moderation and candour, which it would be unpardonable to violate in philosophical discussions.

THE object of my third memoir is, to contribute something to the elucidation of an interesting and long contested point, in the philosophy of natural history. I have there detailed all the evidence I could collect, in opposition to the winter submersion of swallows, and in favour of their migration to a warm climate. Part of this evidence consists in experiments and observations of my own, and part is taken from the reports of others; but, a considerable proportion of it is derived from the nature, powers, and apparent destination or uses of these birds.

WHAT first directed my attention to the composition of this memoir, was a request made by a friend at a distance,

## P R E F A C E.

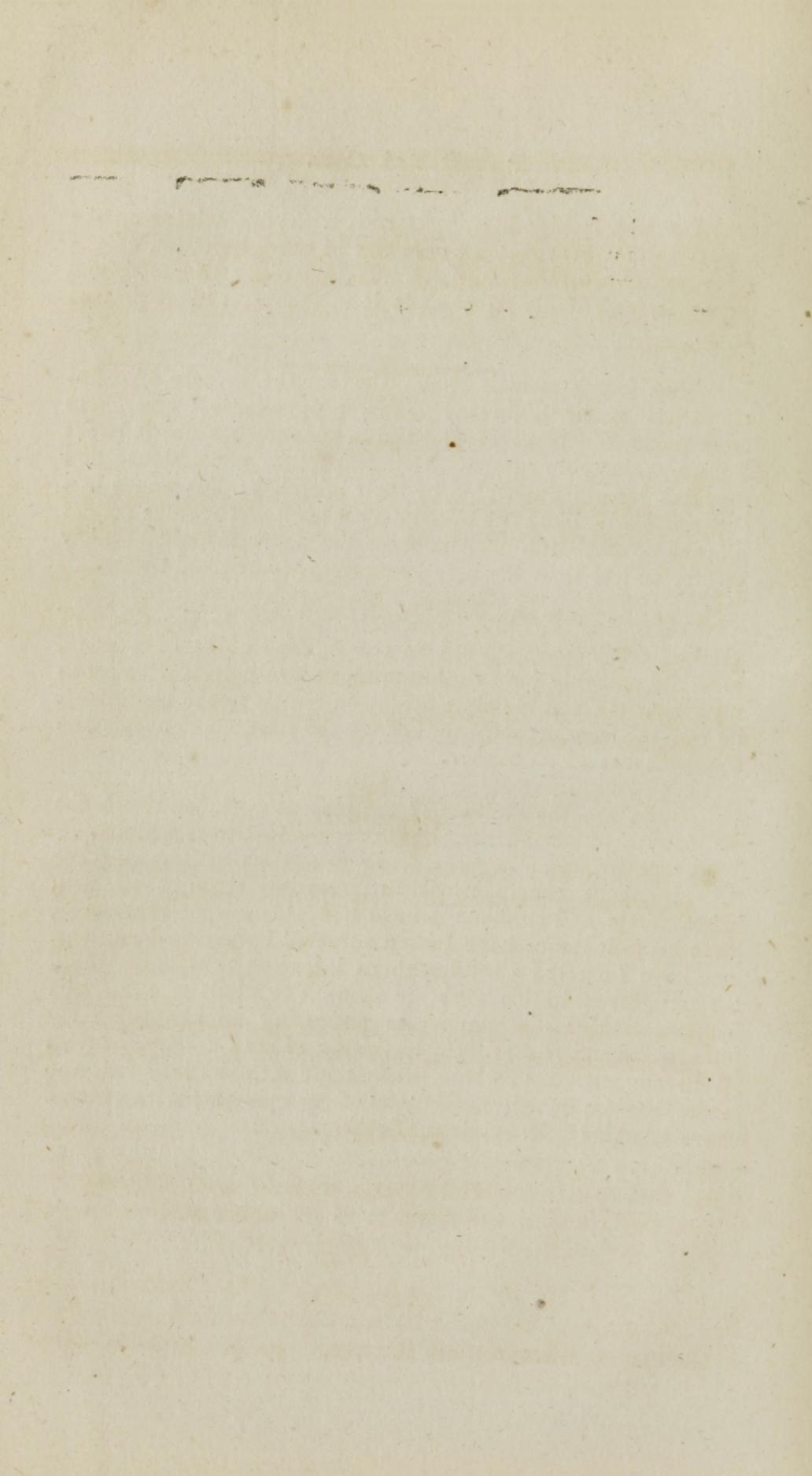
that I would furnish him, by letter, with my opinion on the winter retreat of swallows. It was at the solicitation of the same gentleman, that I afterwards undertook to revise and digest it, and finally to commit it to the press in its present form.

THE fourth memoir is published for the purpose of counteracting, as far as in my power, a pathological error, the more likely to become popular and to mislead, because it issues from a respectable source. Common minds move alone, and mankind remain unaffected by their mistakes; but minds of a superior order, like stars of primary magnitude, revolve amidst a croud of satellites, which reflect the phantom-light of their errors, no less than the permanent radiance of their truths.

HAD Dr. Barton's hypothesis, relative to the cause of Goitre, originated with one in the inferior walks of science, it would probably have sunk unnoticed into oblivion. For, in my view, its claim to public attention results not so much from its own inherent probability, as from the talents and uncommon acquirements of its author.

SUCH are the outlines of the present work, and such the views with which the memoirs that compose it were written.

I cannot conclude without assuring those gentlemen, whose facts and opinions I have had occasion to controvert, that in no instance have I been actuated by personal motives, nor have I uttered a word with an intention to offend. Should any expression in this work, be thought to admit of a different construction, I disclaim it, as possessing no affinity to my disposition and wishes. In testimony of my sincerity, I invite from any one, into whose hands these memoirs may fall, the same freedom in the examination of my opinions, with which I have examined the opinions of others.



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*E R R A T A.*

- PAGE 9, *line* 13, from the top of the page, for "county,"  
*read* country.
- 12, — 3 & 4, for "everberating," — reverberating.
- 14, — 12, for "condersation," — condensation.
- 47, — 21, for "convering," — covering.
- 69, — 10, for "exist," — exists.
- 70, — 13 & 14, for "of wise," — of a wise.
- 128, bottom line, for "Polmyra," — Palmyra.
- 270, line 18, for "the are obliged," — they are  
obliged.

MEMORANDUM

1. The first part of the report is devoted to a general description of the project and its objectives. It also includes a brief review of the literature in the field.

2. The second part of the report describes the methods used in the study. This includes a detailed description of the experimental design, the subjects, and the procedures used to collect and analyze the data.

3. The third part of the report presents the results of the study. This includes a description of the data, a summary of the findings, and a discussion of the implications of the results.

4. The final part of the report is a conclusion. This includes a summary of the main findings, a discussion of the limitations of the study, and suggestions for future research.

Very truly yours,  
[Signature]

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# MEDICAL

A N D

## *PHYSICAL MEMOIRS.*

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### MEMOIR I.



A PHYSICAL SCETCH OF THE CITY OF PHILADELPHIA,  
INTERSPERSED WITH GENERAL REMARKS APPLI-  
CABLE TO ALL LARGE AND POPULOUS CITIES.

**P**ERHAPS, there is no question, connected with the science of medicine, which has furnished ground for so much popular controversy, as that which relates to the origin of pestilential diseases.

As far as medical records inform us of the transactions of other times, and distant places, this subject appears to have constituted a theme of discussion in almost every country, and every age. Nor is it, in the estimation of many, nearer to a decisive

issue now, than it was some hundred years ago. Each side of the question has still numerous and respectable advocates, who persevere in the controversy with equal zeal, and apparently with equal hopes of success.

How far the matter is calculated to engage the public mind, and to what extent it can interest the human passions, our own country, and the present time, afford the most striking and memorable evidence.

For the ultimate decision of this question, in which science and humanity are alike interested, the two following desiderata appear to be necessary.

FIRST, *A knowledge of that constitution of atmosphere, under which pestilential epidemics always occur.*

SECONDLY, *A minute acquaintance with the topography of those places, which they generally select as the theatre of their ravages.*

I say nothing at present respecting either the season, when, or the kind of weather, under which, pestilential diseases commonly

prevail, as these points will be more properly considered in one of the numbers of my second Memoir.

FROM an adequate knowledge of the two former particulars, the medical philosopher would derive much aid toward developing the origin of the evils in question.

BUT, it is to be lamented, that notwithstanding the extent, to which pneumatic researches have been lately carried, our acquaintance with the fluid which we breathe is still too limited, to enable us to advance any thing satisfactory on the first of these heads.

THOSE properties or states of our atmosphere, that are peculiarly instrumental in the production and propagation of pestilence, are among the secrets, which nature has hitherto concealed from the eye of philosophy. We are able to trace and discern them only in their effects. The discovery and elucidation of their nature and causes, are reserved to immortalize some future enquirer, and to constitute a new era in physical science.

WITH regard to the second head the case is different. The objects which it embraces, though numerous and diversified,

are much more within the sphere of observation. Such is the nature of most of them, that they need only be examined in order to be understood.

NOTWITHSTANDING this, there is perhaps no subject, on which medical records are so completely barren, as on that of the topography of large cities; yet these places are known to be peculiarly, though not exclusively, subject to the ravages of pestilence.

WE have valuable topographical accounts of several of the West-India Islands, as well as of many country situations, in America, Europe, Africa, and the East, which are occasionally visited by malignant epidemics. But, neither of Rome, Carthage, London, Paris, Amsterdam, Lisbon, Ocza-kow, Constantinople, nor indeed of any large and populous city, in either quarter of the globe, have we, as far as my enquiries have extended, any accounts, exhibiting detailed statements of such local objects and circumstances, as are calculated to have a particular influence on health.

IN some measure to remedy this defect, with regard to our own city, and, by pointing out to its inhabitants certain physical evils

connected with it, to endeavour to have them corrected or removed, constitute the object and end of the present memoir.

As the attempt is somewhat arduous, in consequence of its novelty, (<sup>1</sup>) I flatter myself I shall experience, in the execution of it, a due degree of indulgence, from the liberality of my readers.

It is necessary to observe, that the present memoir is not offered to the public as a complete historical picture of the city of Philadelphia, exhibiting a view of every thing

(<sup>1</sup>) Doctor Rush, in his excellent "Account of the climate of Pennsylvania," published in the first volume of his "Medical inquiries and observations," has but very transiently touched on the topography of Philadelphia. His object being the whole state, it was impossible, and perhaps, improper for him to be minute and circumstantial on particular parts of it.

I cannot help remarking, that in one point relative to Philadelphia, the Dr. appears to have been mistaken in his observations.

"THE air (says he) at the north is much purer than, at the south end of the city; hence lamps exhibit a fainter flame in its southern than its northern parts."

I will not contend with Dr. Rush, respecting the comparative purity of the atmosphere, at the two extremes of the city. I am inclined to believe, with him, that in this respect, the north end has the advantage. The more common and general prevalence of disease, at the south end, furnishes but too strong testimony in favour of such a belief.

I am disposed, however, to doubt the existence of the fact which Dr. Rush has adduced in evidence of his opinion. If the lamps, in the southern extreme, be furnished with wicks and oil equally good, and with glasses equally transparent, I

that might be interesting to a traveller. It is meant only as a physical sketch of it, and will, as already intimated, be confined chiefly to such prominent objects, as appear to be connected with the health of its inhabitants.

NOR will it be practicable for me to be minute in my account, even when conducted on this partial scale. My subject is still too copious, to be fully discussed in a few pages. Were it my intention to write a volume, instead of a single paper, I might then hope to do it some shadow of justice.

FOR the sake of order and perspicuity, my memoir will be divided into five sections.

*In the first, will be considered the climate of Philadelphia, with the effects it is likely to produce on the human system.*

*In the second, its situation and extent, with their probable operation in the production of disease.*

am convinced they will exhibit a light no less brilliant than those in any other part of the city.

The eudiometer, a much better test than the brilliancy of flame, for the purity of our atmosphere, shows no difference between the air of the northern and southern extremes of Philadelphia.

In the third, *such of its works of art, as appear to have an influence on health.*

In the fourth, *its population, together with the mode of living, dress, customs, and amusements of its inhabitants.*

While the fifth section *will contain such general inferences and remarks as appear to result most naturally from the other four.*

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SECTION I.

OF THE CLIMATE OF PHILADELPHIA, AND ITS EFFECTS  
ON THE HUMAN SYSTEM.

**T**HE city of Philadelphia is known to stand in the fortieth degree of North latitude, a region remarkable, in this country, for its extensive range and sudden vicissitudes of temperature.

THIS remark is true, not as it relates to Philadelphia, exclusively, but also with respect to the greater part of the United States that lies to the eastward of our chain of mountains.

FROM New Hampshire to the Carolinas, (and how much farther the observation might be extended, it is not my present business to enquire) a liability to great and sudden transitions from heat to cold, and from cold to heat, constitutes a prevailing characteristic of climate. Within this extent of territory, the mercury has been known to vary upwards of forty degrees, in the space of twenty four hours.

RUSSIA alone excepted, (where the diurnal range of the thermometer sometimes amounts to fifty-seven degrees), North America, in general, appears to be more subject to opposite extremes of temperature, than any other inhabited portion of the globe.

IT is a truth familiar to every one, that the inhabitants of the United States suffer, in common, greater heats in summer, and more intense colds in winter, than those who inhabit corresponding latitudes, on the continent of Europe. Such changes cannot fail to be unfriendly to health and life. For, though the constitutions of all living beings, whether vegetable or animal, but more particularly that of man, are capable of accommodating themselves, without injury, to considerable variations of temperature, when gradual in their progress, yet when the

transitions are frequent, sudden, and great, nature must inevitably experience some degree of derangement.

PHILADELPHIA, like every other large and populous city, possesses a factitious climate of its own, different from the climate of the surrounding country. This difference, in summer, is equal to that resulting from a difference of several degrees of latitude. In winter, I believe, (though of this I will not speak confidently, having made but few comparative experiments on the subject), the atmospheres of the city and county are more nearly alike, in point of temperature.

THE summer climate of Philadelphia and of other large cities similarly situated, is an artificial torrid zone, in which the thermometer rises from four to six degrees higher than it does at the distance of a few miles in the country. The causes of this superior degree of warmth, in a city atmosphere, appear to be the following:

I. The heat given out from numerous and crowded fire places.

Each fire in the city communicates its heat to a certain distance around it. Hence,

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the aggregate result of the whole must be considerable.

II. Heat evolved by the process of fermentation in all its stages, the sources of which are much more abundant in the city than in the country.

III. Heat thrown out by animal respiration and perspiration.

THE extent to which these functions go on, in the city, compared to what occurs in an equal space of atmosphere in the country, is, perhaps, in the ratio of a thousand to one.

IV. A less free circulation of air in the city than in the country atmosphere.

THOUGH this is not, in itself, a powerful cause of the actual evolution of heat, yet, by allowing the warmth of our own bodies, as well as that produced by adjacent objects, to be accumulated round and to remain in contact with us, it proves a very fruitful source of the distress we experience from the summer temperature of the city.

BUT farther, as rest is absolutely necessary to every stage of fermentation, there is reason to believe, that air, when stagnated,

is much more favourable to this process, than when in a state of active motion.

V. LESS evaporation from the surface of the ground in cities than what takes place in the country.

A deficiency of moisture in the earth, and a consequent deficiency of aqueous exhalation, are among the most powerful of those causes, which co-operate in producing the extreme heats of the desert of Arabia, and of other sandy regions bordering on the line. But, streets that are paved with flint, and overspread with dry dust, as is the case with the streets of Philadelphia, in the summer season, are equally unfavourable for this cooling process.

IF, on the other hand, the dust were swept away, and the silecious stones exposed without a covering to the rays of the sun, instead of vapour carrying off heat in a latent state; nothing but reflected light accompanied by sensible heat would arise, to the great augmentation of the warmth of our atmosphere.

VI. THE last cause of the high temperature of city atmospheres, which I shall mention, is,

perhaps, more powerful than all the rest. It is the many solid and opake substances in large cities that act on the principle of everberating furnaces, by intercepting and reflecting the rays of the summer sun. Such, in particular, is the operation of the buildings and the pavement of the streets.

IN passing through a clear atmosphere or any other transparent medium, the rays of the sun produce no perceptible degree of heat. The case, however, is different as soon as they fall on an opake body. The surface of the intercepting obstacle becomes immediately heated, and communicates its warmth to the surrounding air.

IF, on being reflected from the first, the rays impinge against a second substance, this becomes in like manner an additional source of heat. A third point of reflection becomes a third source, so that the number of such sources, will be in a direct ratio to the number of opake bodies against which the sun-beams strike, either by primary incidence, or subsequent reflection. But, as bodies of this description are, both in dimensions and number, greatly superior in cities to what they are in the country, the heat, from this cause, must

consequently rise in something of a similar proportion.

NOR is the nature of certain reflecting bodies in cities to be passed unnoticed in the present enquiry. Our glass windows, when struck obliquely, by the rays of the sun, act as so many mirrors, by throwing them into the streets in a condensed state.

To the foregoing causes may be added the state or constitution of a city atmosphere itself. Being more highly charged with heterogeneous substances than the atmosphere of the country, it is less transparent, and probably, therefore, by making some resistance to the passage of the rays of the sun, gives rise on this principle to a farther evolution of heat.

PERHAPS, the truth of this observation can be best realised, and its force most readily felt, by taking, in the evening, a distant view of the atmosphere of a large city. In this way, the want of transparency in this body of air, is rendered extremely obvious. The city appears to be enveloped, not indeed, in a real cloud, but in a body of atmosphere so surcharged with smoke and other effluvia, as to be able to reflect a sufficiency of light to render itself visible.

It is no doubt by viewing this phenomenon, in times of pestilence, (periods in which men's minds are unusually awake to observation), that weak and superstitious characters, have been led to imagine large cities overhung, on such occasions, by clouds portentous in aspect, and manifesting the frowns of an offended Deity.

CAN the density of a city atmosphere act, in any measure, the part of a convex lens, and encrease the temperature, by a slight condensation of the rays of light?

SUCH appear to be the leading causes, that combine in subjecting Philadelphia and other large cities in the United States, during three months in the year, to all the fervours of a tropical climate. But from such a duration of tropical temperature, tropical diseases must necessarily result.

HENCE the fevers of our cities are more violent and malignant than similar diseases in the surrounding country, and bear a more striking resemblance to the fevers of the West Indies. And hence many families on

removing from the country into the large cities of the United States, are subject, during the first and second summers, in particular, to a kind of seasoning or assimilating sickness, such as is suffered by those who emigrate from cold to warm climates.

It is well known that the fever of the tropics, is most apt to attack those persons who have lately removed from high latitudes. Something similar to such a removal happens, every summer, to the inhabitants of the large and populous cities of our northern and middle States

HAVING passed the winter and spring, in respiring, and in being otherwise acted on by, pure, cool, and wholesome air, the high susceptibility, imparted to their systems by these causes, is but illy qualified to bear, with impunity, the warm and contaminated atmosphere of the succeeding summer and autumn.

THE change annually produced in the constitutions of our citizens, by the winter and spring, may be compared to that which occurs in the constitutions of those who occasionally emigrate from the West Indies, and reside for a while in Europe or

America. Nor are the former much less liable to an attack of disease, on each return of the autumnal season, than the latter are, on returning to the inclemencies of a tropical sky.

For it matters but little, as to its effect on health, whether the atmosphere which we breathe is changed from a cool and pure to a warm and foul one, by the natural succession of the seasons, or by our removing from one country to another.

HENCE though Europeans, who settle in the West Indies, are subject in general during their constant residence there, to but one serious attack of seasoning sickness, yet, such is the situation of the inhabitants of Philadelphia and other large cities in the United States, that they are liable to such a seasoning every autumn.

It is becoming customary, I am told, with some of the most skillful and respectable of the British surgeons, to subject the troops, sent out on the West-India establishment, to a preparatory course of medicine and diet,

previously to their arrival at their places of destination. This course consists entirely in temperance and moderate evacuations.

FROM the time of their embarkation in Britain, or at least as soon as they begin to enter the warm latitudes, the troops are directed to receive a reduced allowance of animal food and ardent spirits, and to be exercised as little as possible in the sun. In addition to this, cathartic medicines are occasionally administered to them, while venesection is practiced on the most healthful and plethoric.

THIS experiment is said to be found no less salutary in its effects than it is rational in its principles. If something like it were adopted, by the inhabitants of Philadelphia and other large cities in the United States, it would contribute to their exemption from our annual epidemic. I would not be understood as recommending to them the adoption of habitual venesection. Such a practice would itself prove an evil, and become in time productive of many inconveniences. Their object may be attained by more moderate measures.

IF, on the commencement of the warm season, (which generally occurs about the first of May) they could be induced to diminish their customary consumption of animal food, ardent spirits, and wine, and from this period till the month of October, subsist more on vegetables, malt liquors, cider, and lemonade, and if, in addition to this, they would be attentive to the preservation of an open habit of body, (<sup>2</sup>) by an occasional use of medicines moderately laxative, they would not only experience less inconvenience from the summer heats, but would enjoy a greater exemption from summer and autumnal diseases. To act in this manner would be to live in conformity to the principles and rules of reason and philosophy. But, to persevere in our present mode of living, is to leave health to the uncertainty of chance, or rather, too frequently, to sacrifice it at the shrine of habitual intemperance.

ON the commencement of cold weather, the citizens might return again in safety to

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(<sup>2</sup>) IF, in consequence of habitual constipation, the fæces be suffered to accumulate and remain too long in the intestinal canal, they would seem to undergo real putrefaction, and to give origin to a gas, in the body, perhaps no less noxious than that resulting from the filth of our streets.

their meats and their wines, which they could not fail to relish the more, in consequence of their abstinence throughout the summer. It is thus that the Greenlander, after having passed through his night of winter, enjoys with redoubled sensibility the return of the spring.

WERE the inhabitants of Philadelphia to consult reason, instead of fashion and habit, they would immediately perceive a summer and winter diet to be no less necessary for them than a summer and winter dress. If it is of importance to preserve a coolness of the skin, it is certainly no less so, to guard against whatever has a tendency to favor inflammation in the alimentary canal.

WERE any female of our acquaintance to accustom herself daily, amid the fervors of July, to walk our streets encumbered with her muff, her tippet, and her cloak, would we not commiserate her, as being subject to an alienation of mind? Yet, such a custom would, to the eye of reason, be no more preposterous in appearance, and would certainly be less injurious to health, than her using, during the same inclement season, highly stimulating aliment and drink!

SUCH appears to be the delicate and precarious tenure, by which the inhabitants of our large cities hold the inestimable blessings of health. Were they constantly favoured with moderate and wholesome air, disease would be but little known to them, except by name; and were they perpetually immersed in a warm and less pure atmosphere, their systems would, in time, (conformably to what occurs in tropical regions) so far accommodate themselves to their situation, as to experience but little injury from the floating poison. The principal source of their danger lies in reiterated changes from the one state of atmosphere to the other. The effect of a constant residence in warm and impure air is strongly exemplified in the exemption of Creoles from our autumnal pestilence.

I am not prepared to mention the greatest extremes of temperature that have been known to occur in the city of Philadelphia.

For nearly four years past, I have myself paid some attention to the subject of meteorology, during which time my thermometer has twice risen to near the ninety-fifth; and as often sunk to the sixth degree on the scale

of Fahrenheit, making a range of about eighty nine degrees. Dr. Rush informs us in his "Account of the climate of Pennsylvania," that the Mercury has occasionally descended in this place, five or six degrees below Zero.

FROM the beginning of June till the close of August, (and the same thing may be said of many days, in the month of May, ) the mercury stands, in general, from noon till four or five o'clock, as high as from the eightieth to the eighty-sixth degree. On various occasions, it remains stationary for nearly the same number of hours in the day, as high as the ninetieth degree.

SUCH an excess of summer heat, (surpassing even that of the West India climate,) accompanied by a state of torpor or stagnation in the atmosphere, cannot fail to produce a languor in the systems of our citizens, which disqualifies them for resisting the influence of febrile poison.

THAT elegant exotic, the *populus dilatata* of Aiton (better known by the name of the Lombardy Poplar), exhibits more beauty and luxuriance of vegetation in Philadelphia,

than in the surrounding country. This phenomenon is attributable to a twofold cause. The plant in question derives, from the factitious atmosphere of the city, more of the stimulus of heat, and of the food of putrid exhalations, than it can receive from the natural and uncontaminated atmosphere of the country. Being therefore a native of a warm climate, and delighting, like most other vegetables of such regions, in an abundance of nutriment, it cannot fail to flourish better in the former than in the latter situation.

I have intentionally passed in silence over the thunderstorms, the rains, the hails, and the snows, of the climate of Philadelphia, being unable to trace the connection of these meteors with disease, except through the medium of the vicissitudes which they occasion in the temperature of our atmosphere.

OUR climate in general is said to have undergone a change, in consequence of the clearing and cultivation of the country. Respecting this fact I have too little knowledge to make it a subject of consideration in the present memoir. I have no doubt however of its truth, as in many parts of Europe a similar effect is known to have been produced by a similar cause.

I shall conclude this section by observing, that the middle latitudes of our globe, where the annual range of temperature is extensive, and its occasional transitions sudden and great, instead of being hostile, as some have imagined, appear, both from facts and principles, to be friendly to the origin and propagation of pestilential diseases.

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## SECTION II.

OF THE SITUATION AND EXTENT OF PHILADELPHIA,  
WITH THEIR PROBABLE OPERATION IN THE PRODUCTION  
OF DISEASE.

**PHILADELPHIA**, (the original soil of which consisted principally of a humid clay) stands on a plain, but little diversified by eminences, and intersected formerly by a few streams of water, which have been arched over, and two of them converted into streets.

Its altitude above the level of the ocean I have been unable to ascertain. I believe the matter has never been examined, either by actual survey or barometrical measurement. Judging however from the length and current of the river on which it stands, taken in con-

nection with the nature and productions of the surrounding country, it would appear to be considerable. The whole plain is subtended by a stratum of granite rock, which lies at the distance of about forty five or fifty feet beneath the surface of the earth.

THE site of the city, though not very low, is evidently, like the whole country east of our great granite ride, of secondary origin. It is washed to the eastward by the Delaware, and to the west by the Shuylkill, and lies about five miles above the confluence of these two rivers. Its elevation above low water mark, ranges from forty five to fifty five feet, the highest spot being the point of the intersection of Chesnut and Broad streets.

To this elevation, Water and Penn streets, running along the shore of the Delaware, constitute an exception. Leaving the general level by an abrupt descent, they are many feet lower than any other part of the city.

It deserves to be remarked that in these depressed situations, where the air is particularly liable to become motionless and contaminated, our autumnal pestilence has always commenced its epidemic ravages. This disease has appeared twice within a few paces

of the same spot in Penn street, which runs immediately at the foot of a steep eminence that was once most probably the bank of the river.

INDEED both Water and Penn Streets, together with the narrow skirt of land to the eastward of them, appear to have been gained from the water, by the gradual operation of time.

I might extend this remark farther, in the present instance, and observe, that from the numerous breccia and alluvial matters, which lie scattered over our commons, it is evident that the site of our city, like most other parts of our country, is of Neptunian origin.

WITHOUT supposing the fact to have any particular relation to the health of our citizens, I would observe, that the tide, moving at the rate of about four miles an hour, flows at the same time and preserves the same level in the Delaware and Schuylkill. Common or neap tides rise from six to seven, and spring tides from seven and an half to nine feet. The elevation of these tides is materially influenced by the force, direction, and duration of the winds.

THE depth of our wells is different in different parts of the city. It is in general from thirty to thirty five feet. In some places it is forty, and in Penn and Water streets seldom more than ten or twelve. From this it is evident that the subterraneous sources which supply them, have no connection with the Delaware or Schuylkill, as they lie above their line of high water mark, even in spring tides.

THE water of our wells is by no means pure. It is found by analysis, to contain magnesia, calcareous earth, muriate of soda (common salt), and nitrate of pot-ash (common nitre).

THE quantities and proportions of these fossil substances, with which our well water is impregnated, appear to be different in different parts of our city. Nor will I assert that the whole of the above substances, exist in the water of every well. I presume however they do, as it appears to be from the same stratum of earth that the waters always issue.

THE source from whence our subterraneous waters derive these fossil impregnations is a subject interesting to the naturalist and phi-

losopher. Do they wash them from the surface of the ground, where they first fall in the form of rain, hail, snow, and dew? Or do they collect them in their subsequent passage as they percolate through the earth?

SHALL we suppose that these fossil substances which adulterate our waters exist in subterraneous masses or strata coeval with the existence of our globe? Or are they the result of the gradual dissolution of vegetables and animals that have lain on the surface, or been buried in the earth by some convulsion of nature? In either case, their solution by what I shall denominate the terrene waters is equally practicable.

I shall dismiss this subject by observing, that the cause of the above impregnation of our subterraneous waters, is a problem of about equal difficulty with that of the general salinity of the ocean.

THE temperature of our well water ranges from fifty to fifty three, on the scale of Fahrenheit. From my own experiments on the subject, the latter appears to be the most

general standard. I believe, (though I write only from memory) that Doctor Franklin fixed it at fifty-two. This difference of a degree might readily result from a difference of thermometers.

PERHAPS the temperature is, in some measure, influenced by the depth of the well. This however I propose only as a conjecture, having made no comparative experiments to ascertain its truth.

THOUGH it is suspected by some, that the foregoing adulteration of our well water has an unfavourable effect on the health of our citizens, I am unable to trace its connection with any particular description of disease. The impurities contracted by our waters from the contents of necessaries, and other artificial sources of filth, threaten us with consequences much more alarming.

No experiments have been hitherto made, to develop the nature of these impurities. It is probable however that they are the same products of putrefaction, which, when volatilized, and thrown into the atmosphere, give origin to the various descriptions of bilious fevers. If these poisonous matters are so terrible in their effects, when taken

into the system, through the medium of respiration, they cannot be innocent, when swallowed with our drink.

IN sinking many of our wells, certain curious and interesting discoveries have been made, relative to the subterraneous geography of Philadelphia.

AT the depth of from twenty eight to thirty five feet beneath the surface of the ground, our well-diggers have found, in a state of entire preservation, various vegetable relicts, such as hiccory nuts, and acorns, together with the bark, leaves, roots, and branches of trees.

NOR has this been the case in only one part of the city. I am well informed of the same thing having occurred in Penn street, in Dock street near Third, in Seventh street near Arch, in Tenth street near Race, in Kensington, and in the vicinity of the Centre square.

I have now in my possession two specimens of a fossil vegetable, one of the bark and the other of the root of a pine tree, which must have been of a considerable size, that were dug a few years ago out of a well in Tenth street, from the distance of thirty feet beneath

the surface of the ground. Both the smell and texture of these specimens are nearly as complete as if they were just taken from one of the living pines of our forests.

At about the same depth, in Seventh between Arch and Race streets, a well digger found, a few years since, branches of timber not less than four or five inches in diameter.

But these phenomena are by no means confined to the site of Philadelphia. They are frequent throughout the whole extent of our Atlantic states, and have also occurred in several instances to the westward of the granite ridge. Indeed the same thing is true with respect to almost every spot on the surface of the globe, except perhaps some alpine tracts of country, where no fossil vegetables have yet been found.

THE limits of this memoir will not allow me to enter on the consideration of general geogeny. I will be indulged however in observing, that the level of the earth's surface, between the Delaware and Schuylkill, is very different now from what it has been at some distant period of time. Of the truth of this the foregoing subterraneous phenomena afford indisputable evidence. They cannot fail,

I think, to produce a conviction, that the stratum in which these fossil vegetables are now found embedded, constituted formerly the surface of the earth. For we are acquainted with no process of nature, by which these vegetable relicts could have been sunk, through solid earth, to the depth at which they lie.

It would appear then, that at a distant and unrecorded period of time, the surface of that part of the globe which we inhabit, has suffered the stroke of some stupendous revolution which prostrated the vegetable kingdom, and overwhelmed it by a ponderous covering of earth. Whether this earthy incrustation was slowly deposited by the waters of a retreating deluge, or thrown where it now lies by the commotions of an earth-quake, are questions which I leave to the solution of philosophical geologists.

I am farther informed, and believe it to be true, that fragments of earthen ware have been dug out of a well in Philadelphia, and also out of another, at the distance of about fifteen miles in the country. In the former instance, these relicts of art were found at the depth of thirty, and in the latter, of forty feet beneath the surface of the earth.

ARE not these facts calculated to inspire a belief, not only that our country had formerly a surface different from its present one, but that this surface was peopled by human inhabitants, who perished in the shock, by which the vegetable kingdom was inhumed?

A particular description of the original nature of the soil, on which Philadelphia stands, would be of little importance in giving an account of its present state. By draining, paving, the influence of necessaries, graveyards, and the admixture of other foreign materials, it is so completely changed as to retain at present scarcely one of its former qualities. Where it was once humid, it is now perhaps dry; where it was formerly nothing but a mixture of clay and sand, it is now a collection of rank and offensive materials. Where the oak and the poplar once rose in their strength, and drew sustenance from a sweet and cleanly mould, the willow spreads around its feeble branches, fed by the festering contents of the grave!

IN a word, the present soil of our city is no less the production of art, than the pavement of its streets, or the buildings which it contains. It is but reasonable therefore to in-

fer, that the exhalations to which it gives origin now, must be different from those it emitted when in a state of nature.

THESE considerations impel me to a farther review of the striking revolution which the site of Philadelphia has undergone, in little more than the space of a century. They bear me, in the spirit of retrospect, back to the time when the very place where this celebrated city now stands, with all its concourse of civilized and polished inhabitants, constituted a part of a continent of wilderness! They carry me to the period, (nor is that period of ancient date) when the Aborigines of our country pursued their game over the same track, that is at present the haunt of the sons of commerce!

ON the ground, where the private dwelling, or the public edifice, now rises in the majesty of art, I behold, in imagination, the cabbin of the savage! On the very spot <sup>(3)</sup> immortalized by that band of patriots, whose wisdom planned, and whose intrepidity de-

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(3) THE Congress, of '76, were in Session in the State-House in Philadelphia, when they declared the United States "free and independent."

clared the independence of our country, I see the Sachems assembled deliberating on blood! On yonder stream <sup>(4)</sup>, where now the vessel towers in her pride, armed with the thunders of a mighty people, or richly fraught from the climates of the east, I behold the untutored Indian embarquing in his canoe, to angle for the precarious subsistence of a day! And, hark! to the ear of fancy, that harbinger of death the war-whoop, resounds from the place where the eloquence of our nation is heard! <sup>(5)</sup> Such has been the triumph of industry directed by wisdom, and urged by a spirit of enterprize, over the rudeness of uncultivated nature! But to return from this digression.

PHILADELPHIA, situated in a champaign country about midway between the Atlantic and the Apellachian ridge, is deprived of both the sea and the mountain breezes. For it is a truth, that mountains, equally with the ocean, contribute to a free and uniform ventilation.

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(4) THE Delaware.

(5) THIS memoir was written, in March 1800, when the National Legislature was in session in Philadelphia.

GREAT and abrupt elevations of land, no less than extensive bodies of water, prevent the existence of an equilibrium in the superincumbent air, and thus preserve the atmosphere in perpetual motion. Cold air descends from the tops of mountains, to displace the rarified atmosphere of neighbouring vallies and plains, on the same principle which impels the air of the ocean toward the land, constituting what is denominated the sea breeze.

To these unfavourable particulars in the situation of Philadelphia, are we indebted in some measure for our summer heats, and no doubt in part for our autumnal epidemics. Hence, (other circumstances being alike), large cities having a maritime exposure, are not only more cool, but enjoy a fairer prospect of exemption from pestilential diseases, than such as stand in inland situations. And hence these wasteful maladies but seldom attack the inhabitants of mountainous countries, fanned by the breezes that descend from their hills.

To some it may perhaps appear extraordinary, that mountains, which are the most elevated, and the ocean, which is the most depressed portion of the globe, should be

productive of similar commotions in the atmosphere. Such however is the fact, and, as already observed, they seem to operate on the same principle.

IN either case ventilation is the result of local circumstances, while agents more extensive and powerful are necessary to put in motion the body of air, incumbent on an extent of champaign country.

THE causes of ventilation in mountainous places and near to the ocean, rise out of the nature of the situations themselves, and are therefore in constant operation, particularly in the summer season; whereas the causes of winds, in inland and level countries, being more accidental, occur only at uncertain periods.

THE clearing, draining, and cultivation, of that neighbouring and marshy tract of country, denominated the "Neck," is a measure calculated to improve the health of our city.

LYING but a short distance to the southward of Philadelphia, and giving origin

formerly to an immense volume of marsh miasma, this subtle poison must have been necessarily conveyed to the city by the autumnal winds.

THE cultivation of the soil has not only given a check to the generation of this poison, but has covered the surface of the earth with an abundance of vegetables, which absorb and convert it to their own nourishment. For vegetables act as the scavengers of the atmosphere, clearing it of such gases as are hostile in their nature to the health of man.

AN additional step might yet be taken to give us greater security against the influence of the deleterious air in question. Were several adjoining lots, to the southward and westward of the city, converted into a park or public garden, and covered with grove and forest trees, these lofty plants would not only aid the inferior vegetables in devouring miasmata from the neighboring marshy grounds, but would also act mechanically in arresting the winds, which mingle this exhalation with the atmosphere of our streets.

A fact recently communicated to me by an old and celebrated physician of this place,

confirms me still farther in the above opinion.

THIS gentleman informs me, that previously to our late revolutionary war, the city of Philadelphia was surrounded from east to west by a range of forest timber, which protected it from the exhalations discharged by the marshes of the Neck, and by the more distant shores of the Schuylkill.

THIS timber fell a sacrifice to the rapacious hand of the British army, in the winter of 1778-9, since which time the city has been more generally pervaded by bilious fever, than had been the case in former years.

THE principal cause of this unfortunate change would appear to be the destruction of the above range of timber, which had been previously our safeguard from distant exhalation.

THE city of Philadelphia is not built in all respects agreeably to the original plan of its founder. It was the intention of that enlightened statesman that no houses should be erected between Water street and the river.

INCLUDING the district of Southwark, Kensington, and the Northern Liberties, the buildings extend from North to South, along the Delaware, upwards of three miles, and nearly a mile in a westerly direction towards the Schuylkill. That part adjacent to the Delaware is most thronged with houses and inhabitants, and has always been most severely ravaged by our autumnal pestilence.

IT has been long known that large cities have an unfavourable influence on the health and strength of the human system. This effect of these establishments, appears to be in some measure in proportion to the extent and crowdedness of their population, but more particularly in proportion to the sedentary occupations of their inhabitants.

THE most diminutive of the Britons are those that are born and reared amid the smoke and dust of London, and in the large manufacturing towns of the kingdom, while Paris and other populous cities of Europe and Asia, are no less remarkable for the same effect on the growth of their native citizens.

NOR does even the duration of human life escape the influence of the same causes. It is among those born and raised in the coun-

try or in small villages, and not among the natives of large and crowded cities, that we are to look for the most striking instances of human longevity. It is indeed to be expected, that those causes which so far weaken the system of man as to prevent it from acquiring its natural magnitude, will, on the same principles, contract the usual term of its duration.

THOUGH Philadelphia is in infancy, both in age and size, when compared to London or Paris, yet still is her influence, as a city, becoming evident on the stature and strength of her native inhabitants. For in these respects, the Philadelphians, though well proportioned, active, and graceful, are certainly inferior to the inhabitants of the country.

THIS inferiority in the stature and strength of those born and reared in large cities, appears to result from the co-operation of several causes. The principal of these are, sedentary occupations, intemperate and irregular living, early incontinence, and an atmosphere impregnated with impurities unfriendly to animal nature.

BUT it is not the growth and longevity of man alone that are affected by the influ-

ence of populous cities. Dogs, cats, and other domestic animals are in like manner susceptible of injury from these laboratories of poison.

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### SECTION III.

OF SUCH WORKS OF ART IN PHILADELPHIA, AS APPEAR TO HAVE AN INFLUENCE ON THE HEALTH OF ITS INHABITANTS.

I am not unconscious of the important nature of the present section, nor of the difficulties attendant on a due examination and statement of the objects which it embraces. In entering on it I feel myself engaged in an undertaking, which, in its full extent, contemplates nothing less than a complete analysis of the city of Philadelphia, with an account of the physical influence of each artificial object it contains.

THE accomplishment of such a task in all its relations, would require habits of observation, powers of discernment, and perseverance in enquiry, of no common order.

UNDER the present head I might, without an inadmissible digression from my sub-

ject, proceed to delineate that plan for the construction of large cities in general, which should appear to me best calculated to secure the health of their inhabitants. But such a latitude and minuteness of enquiry would carry me far beyond the limits necessarily prescribed to this memoir.

THE utmost extent to which I can go will be, briefly to touch on those objects that appear first in consideration with regard to their influence on the health of our citizens, passing inferior ones without notice. In doing this I am sensible I shall only sketch the outlines of my picture, and must leave to the discretion of the reader to bestow on it, by his own reflections, such finishing as his judgment may approve.

It was observed in a preceding section, that whatever works of art tend either to augment the summer temperature or to diminish the general purity of the atmospheres of large cities, must necessarily injure the health of their inhabitants.

OF the principal causes which contribute to the former of these effects, a cursory statement has been already given. We shall

proceed to a brief consideration of those that give rise to the latter.

MANY of the causes which co-operate in encreasing the temperature, take part also in diminishing the purity of the atmospheres of large cities. This is particularly the case with combustion, respiration, and fermentation in all its stages.

THESE several processes contaminate the air, not in a simple, but in a twofold manner and degree. For while they depend for their existence on the absorption and neutralization of respirable air, they give origin to gases that are deleterious to health.

To the process of fermentation, particularly to its putrefactive stage, are we indebted for that formidable poison, which, when mingled with our atmosphere in a gaseous state, has so repeatedly threatened Philadelphia with final depopulation. This pestilential gas, aided by a high temperature, and by irregularities in living, gives origin to all our bilious affections of summer and autumn. It is therefore the parent of a great proportion of the annual disease of our city.

HAVING, in the fourth number of my second memoir, given an account of the principal sources that give origin to the febrile poison in question, a detailed repetition of them, on the present occasion, is unnecessary.

THEY are our docks, wharves, gutters, cellars, privies, common sewers, grave-yards, the foul holds of vessels, and every description of putrefactive substances suffered to pollute the streets of our city. (°)

I. To the grave-yards, in particular, I am anxious that the attention of our citizens and corporation should be directed.

FROM the number, extent, and situation of these receptacles of the dead, no doubt, I think, can be entertained of their influence in vitiating both the air and waters of their respective neighbourhoods.

THE public burying-grounds belonging to Philadelphia amount in number to about

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(°) HOWEVER superficial our observation may be, it is impossible for us to escape a conviction, that during the action of the summer heats, an immensity of noxious air must be evolved from these extensive magazines of filth.

twenty-two or twenty-three. OF these twelve or fourteen of the most ancient and extensive are situated in central parts of the city.

IN consequence of the progressive interments in these places, their volumes of perishable matter must receive a daily augmentation. Instead of being removed, therefore, we have before us the melancholy prospect, that during the present establishment of things, these sources of calamity will inevitably increase with the progress of time.

IT is to be hoped, however, that the period is approaching, when the wisdom of our police will provide a remedy for this palpable and long neglected evil.

TO this end all interments should be made without the city, in places set apart for that purpose, while the surfaces of the interior grave-yards now in use should be levelled, covered to a considerable depth with fresh soil, sodded, or sown with grass-seeds, and planted with grove and forest trees of rapid and luxuriant growth.

BY the adoption of such measures, those places which now exhibit the cheerless prospect of a waste of head stones, intermingled with

fresh and half-demolished graves, would soon burst on the eye arrayed in all the beauties of vegetation. Those dreary walks, which are at present but little better than charnel houses, pouring forth the seeds of pestilence and death, would be converted into groves ornamental to our city, the haunts of rational amusement, and the sanctuaries of health!

II. THE manner in which the houses of Philadelphia, and indeed of our country in general, are constructed, is by no means favorable for the prevention of disease.

INSTEAD of being in all respects adapted to the genius and character of our climate, they are built in perfect imitation of the houses of Great Britain. In this particular, as in too many others, it is fashion and habit, not experience and reason, that command our homage.

THE builders of houses in Philadelphia should recollect, that at opposite seasons of the year, we have to encounter great extremes of temperature. What can equal the occasi-

onal severity of the cold of our winters, unless it be the still greater intensity of our summer heats !

To counteract as far as possible the influence of these extremes, should be a leading object in the construction of our habitations.

For this purpose our walls should be much thicker, and our windows much smaller and fewer in number, than comports with the fashionable style of building.

WHAT can be more irrational and absurd, in a bleak and piercing winter-day, than a house, with a multitude of windows reaching almost from the ceiling to the floor, unless it be the same house, admitting through the same windows the undiminished blaze of the summer's sun? Such a phenomenon is no less unworthy of thinking beings, than would be that of a large piece cut out of a garment to render it a warmer covering, or a hole formed in an umbrella to increase its fitness for protecting us from the solar rays.

HOWEVER paradoxical it may appear to some, it is unquestionably true, that the principal part of the heat of our houses in

summer, and much of their cold in winter, gain admission through the windows. On a knowledge of this fact is founded the practice so common with our old housekeepers, of shutting up their rooms during the heat of the day in summer, in order to preserve in them an agreeable temperature.

THE jail of Philadelphia, notwithstanding it is considerably crowded by inhabitants, is, in the summer season, by far the coolest building in the city. This I advance, not as an opinion founded on conjecture or analogy, but as a fact ascertained by actual experiments during the heats of last July.

ADDED to the many other circumstances, suggested and devised by an enlightened and humane policy, which combine in softening the condition of the prisoners in our jail, these unfortunate characters enjoy the most comfortable retreat from the intemperance of our climate. For this they are indebted, in particular, to the thick walls and small windows of their place of confinement.

THE Spaniards are said to surpass the inhabitants of all other European countries, in the art of counteracting the influence of a warm climate by the construction of their

houses. For this purpose, they make their walls thick, their windows small, and their apartments spacious.

HENCE, by many persons, whose minds are probably more under the influence of prejudice than good sense, Spanish dwellings are said to resemble family prisons ; and, as that people are noted for habits of jealousy, are supposed to be constructed for the express purpose of securing the chastity of their females, by concealing them more effectually from the public eye. Let us for a moment analyse this subject, and we will find that their plan of building is directed by principles strictly philosophical.

THE warmth of our apartments, in the summer season, is the result of the external influence of the sun, either entering immediately through the windows, or making its way more gradually through the solid walls. The smaller and fewer the windows are, the fewer sun beams will they admit, to excite heat by their action on the interior parts of the houses ; and the thicker the walls are, the more difficult will it be for the heat to pass through them, and raise the temperature of the internal atmosphere.

IF, in addition to small windows and thick walls, the apartments be large, the security against the external heat will be carried still nearer to perfection ; for the larger the internal volume of air, in proportion to the avenues for the admission of heat, the less liable will it be to an increase of temperature. Very large apartments possess, both in summer and in winter, a kind of insulated atmospheres, to a certain degree independent of the external air. Hence a principal reason, why the temperature of the atmosphere in St. Paul's Church in London, is in summer from six to eight degrees lower than that of the general atmosphere of the city.

THE people of the Barbary states, as well as the inhabitants of most of the warm countries of the east, appear to possess just ideas relative to the effect of numerous and large windows, in the admission of heat. Hence their dwellings present to view but little else than dead walls. However unsightly and gloomy this may appear to the traveler, accustomed to the style of buildings in Europe and America, it forms the best defense against the intense heats, particularly the scorching winds, that prevail in many parts of Asia and Africa.

FROM this brief consideration of the philosophy of single houses, I shall pass to a few remarks on the general construction of cities.

To preserve coolness throughout a large city, in a warm climate, the buildings should be lofty, and the streets narrow. This remark is not the less true, in consequence of its opposition to popular opinion. For, however it may be in matters of morality, on physical subjects, common opinion is generally wrong.

By constructing cities in the above manner, the buildings, by their loftiness, would protect the streets from the rays of the sun, and the citizens might constantly walk in the shade. The sun beams could not, from the walls and windows of the houses, be reflected into the streets, as from the sides of reverberating furnaces. They would be, in a great measure, intercepted by the roofs of the buildings and thrown back again into the open air. In a word, lofty houses and narrow streets would diminish greatly the number of lateral and downward reflectors in large cities, and could not therefore fail to diminish proportionally the temperature of the atmosphere.

LET it not be supposed, that narrow streets are incompatible with free ventilation. Air will circulate as freely, in an avenue of twenty as in one of a hundred feet wide.

It is even true, that lateral confinement increases the celerity in the progressive motion of fluids and gasses. Hence the rapidity of currents of water through the narrows of rivers, and of air through close defiles of mountains,

NOR will the narrowness of streets, provided the squares of a city be not cut up by lanes and alleys, produce an excessive increase in the number of houses. If the centres of the squares be open, and abound in vegetation, there will be but little to be apprehended from the closeness of buildings round their circumferences.

It is to be lamented, that the plan of the city Washington—a city expressly founded as the metropolis of a great nation, (and destined perhaps to empire and grandeur, surpassing those of Carthage or Rome)—It is to be lamented, I say, that the plan of this city is so illy adapted to the genius of our climate. The streets are too wide, and the buildings too low, to

furnish any protection against the solar rays. This unfortunate error can be remedied only by planting the streets and public squares with lofty trees, and refreshing the city by currents of water.

NOR will even this precaution act as a perfect counterpoise to the evil in question. It is however the only practicable resource; and unless it be adopted, it requires no spirit of prophecy to foretell, that should the city Washington ever acquire that extent and population which its august name and destination promise, the summer temperature of its atmosphere will be but little below that of the inhospitable desert of Zaara.

A fault in the general arrangement of Philadelphia, greater than that which results from the construction of single houses, remains yet to be mentioned. It relates to the undue crowding of buildings, and to certain improper portions of ground which they cover.

IT has been already mentioned, that agreeably to the original plan of the city, Water and Penn streets, with the ground from thence to the Delaware, were to have remained free from houses. The deviation from th

arrangement, (a deviation prompted by a spirit of avarice,) has done an injury, not only to the appearance, but to the healthfulness of the city. The truth of this last remark is confirmed by recent events, which the distress that accompanied them, has imprinted indelibly on the memory of the public. It was in the fermenting atmosphere of these depressed situations, that the seeds of our late epidemics were chiefly engendered.

IN consequence of intersecting every square of the city by one or more alleys, too great a proportion of the ground is covered by houses.

HAD the squares been built on, only round their four sides, and had their centres been cultivated in gardens and grass plots instead of being covered by clusters of houses, such a disposition of things would have ensured a more free circulation, greater purity, and a lower temperature to the atmosphere of our city.

IT is further to be lamented, that we have not a greater number of public squares and walks, planted with trees and shrubs, especially as such an arrangement would contribute equally to utility and ornament.

It is worthy of notice, that the inhabitants of Philadelphia have been fortunate in selecting the Lombardy poplar and the willow, for the purposes of shading and ornamenting the streets and other parts of the city. I have found, by numerous experiments, that the leaves of these beautiful plants surpass those of most others, that grow in our country, in the quantity of vital air which they emit, when under the influence of the solar light.

I suspect (though it will be observed that I mention it only as a conjecture) that the plants of warm regions generally are superior to those of cold, in their powers of producing respirable air. These powers are to be regarded as the effect of habits, impressed on the plants by the character of their native climate, and are wisely calculated to answer the exigencies of the atmosphere in which they grow. For as the causes, which tend to contaminate the atmosphere, are more powerful in warm climates than in cold, so should those that are instituted by nature to restore its purity.

I shall close the consideration of those things that are injurious to the health of our citizens, by observing, that this is the case with

every process of art, (and such processes are innumerable in large cities) which tends either to rob the atmosphere of pure air, or to impregnate it with effluvia of a deleterous nature.

OF those establishments, that have for their object the preservation of the health of our city, the most conspicuous is that of the water-works, going forward under the direction of Mr. Latrobe.

THE completion of this enterprize, provided certain other essential parts of a general health system be made to co-operate with it, will no doubt be the commencement of an æra auspicious to the health and prosperity of Philadelphia.

## SECTION IV.

OF THE POPULATION OF PHILADELPHIA, WITH THE  
MODE OF LIVING, DRESS, CUSTOMS, AND AMUSEMENTS,  
OF ITS INHABITANTS.

SOME time having elapsed since the census of Philadelphia was taken, an estimate of the present number of its inhabitants must be in a great measure conjectural. It may probably be fixed at about seventy five thousand.

THIS, though not to be compared to the population of many cities in the old world, is notwithstanding too great to be favourable to health, in the summer season. The citizens therefore whose situation and circumstances do not forbid it, should always take refuge, from the summer heats, in the shades of the country. By such a step, they would not only adopt the best means of preserving their own health, but would also avoid all risque of injuring others, by swelling the catalogue of the city population.

THE mode of living of the Philadelphians is, as already mentioned, too high, particularly

for the warmth of our summer months. The extreme intemperance of our weather, during that period, bespeaks the necessity of temperance in man.

To use large quantities of stimulating aliment, while we are subject to the action of great external heat, is giving powerful aid to the natural evils of the season.

THE abundance of flesh, spirits, Madeira, and spices of all kinds, consumed at our tables, during warm weather, not only predisposes the system to inflammatory diseases, but acts at the same time as an exciting cause.

SUCH a mode of living tends, in particular, to debilitate the abdominal viscera, by an excess of excitement, and to create diseases with a marked determination to these parts. Of this description are our fevers of summer and autumn. In addition to the general symptoms of disease which they exhibit, they seldom fail to do particular violence to the viscera of the abdomen.

If then (as experience has long since proved to be true) high living is calculated

to invite disease into the intestinal region, and if this region is always invaded by our epidemics of summer and autumn, have we not reason to consider our luxurious mode of life, as a powerful auxiliary in the production of these evils ?

THE extreme malignity which, for the most part, characterizes our autumnal diseases, when they invade the systems of habitual drunkards, and the particular violence which, in those instances, they do to the abdominal viscera, afford the strongest evidence of the dangers incurred by habits of luxury. For it matters not, whether the predisposition be induced by highly stimulating food, or an excess of intoxicating drink.

It is not a little surprising, that the United States of America, where the human intellect has attained as high a degree of cultivation as in any other part of the globe, is the only civilized country, where the inhabitants have made no progress toward an accommodation of their manner of living to the nature of their climate, and the vicissitudes of their seasons. Even the ignorant and degraded inhabitants of Egypt, have the sagacity and prudence to confine themselves to a vegetable

diet, and the most cooling and diluent drinks, during their Khamsin, or season of hot southerly winds.

I rejoice in being able to congratulate the citizens of Philadelphia, on their partial abandonment of a certain custom, calculated to scatter the seeds of disease, with a most prodigal hand. I allude to the practice of eating meat suppers, accompanied by a liberal use of wine, or other heating liquors.

THIS custom, once (as I am informed) almost universal in this place, tends to lay a foundation for gout, apoplexy, and other diseases of the human system, depending on a similar diathesis. Nor does it only predispose to these diseases, but frequently acts as their exciting cause. How often do those persons, in particular, who are subject to apoplexy, experience an attack, on retiring to rest after a plentiful supper? To gout, under different forms, the same remark is equally applicable.

A physician, of the first reputation, who has practiced in Philadelphia for thirty years, assures me that his calls to patients suddenly attacked in the night, with colic, cholera, cramp, and other diseases of the alimentary

canal, have diminished in frequency, in proportion as the citizens have abandoned the use of this pernicious meal.

I have been farther informed, by a gentleman of observation and respectability, who has resided several years in Calcutta, that since the Europeans in that place have relinquished entirely the use of heavy suppers, their condition, with regard to health, has been greatly ameliorated. They have not only been more exempt from actual disease, but have also suffered much less, from that languor and lassitude so generally experienced by those who remove from high to warm latitudes.

It is to be hoped, that our late hours of dining and tea-drinking, accompanied by the influence of good sense and prudence, will, in a short time, wholly eradicate what yet remains among us of the pernicious custom in question.

It was remarked, in a former part of this memoir, that the inhabitants of Philadelphia experience, during the summer months, a tropical temperature. This consideration alone is sufficient to convince us of the necessity of adopting, during that period, a

tropical regimen. But such a regimen (as both nature and experience have long since taught us) consists not in animal, but chiefly in vegetable food; not in Madeira and ardent spirits, but in light wines, malt liquors, lemonade, and cider.

DESCENDED, as we are, from a British ancestry, and having kept up, at all times, a close and extensive intercourse with the mother country, it is not surprising that we should have originally adopted and long retained a variety of British customs. Nor is there any point, in which this would more probably be the case, than in our manner of living.

IT is on this principle of imitation alone, that we can account for our making use of such a large proportion of animal food. For both reason and nature discountenance the practice.

IT is surely time for us to relinquish these servile habits of imitation, and become as independent at our private tables, as we are in our public councils. It is time for us to begin to live, not in conformity to the customs of a remote nation, dissimilar in its circumstances, but in a manner adapted to the

climate and general nature of our own country. Finally, it is time for us to learn, that, though in the insular situation and beneath the temperate sky of Great Britain, the inhabitants can indulge themselves with impunity in a plentiful use of animal food, this is not the case amid the fervid temperature of Philadelphia.

THE foregoing observations relate only to our summer regimen. In cold weather, a free use of animal food is not only admissible, but perhaps necessary to enable us to bear, without injury, the inclemency of the season. Our appetite, though not at all times to be fully confided in, may notwithstanding serve us as something of a guide in the present instance. In summer, it is observable, that our desire for a diet of flesh is by no means so urgent as in the winter.

By denying us such an abundance of vegetables, in the winter months, nature would seem to give a farther sanction to our use of animal food during that period.

I am not sensible of any thing in the dress, customs, or amusements of the Philadelphians, peculiarly calculated to produce disease.

THE great and sudden vicissitudes of temperature which we experience, render it difficult for us to accommodate our clothing to the state of the weather. An attempt to do this, with accuracy, would frequently oblige us to change our dress several times in the course of the same day.

FLANNEL constitutes part of the clothing of most of our citizens, during the winter season. This is an article of dress highly necessary for the preservation of health, in cold climates. Nor is it without its uses even in tropical regions. By keeping up, in such countries, a due degree of action on and discharge from the surface of the body, it prevents a morbid determination to the abdominal viscera, and thus preserves them from congestion and inflammation.

THE Philadelphians very frequently subject themselves to disease, both by neglecting, till too late in the autumn, to put on their flannels, and by laying them aside too early in the spring. It is well known to the practitioners of the city, that omissions and errors of this kind, by producing a torpor of the skin, checking perspiration, and giving rise to a centripital form of action, or a determination to

internal parts, are instrumental in the production of many of our vernal and autumnal fevers.

THOSE, whose constitutions are delicate, and their health easily affected by changes of weather, should in this climate always assume their flannels before the autumnal equinox, and never lay them aside, till the latter end of May. During our summer months, muslin and not linnen should constitute the under clothing of such characters.

I shall take no notice of the attacks of disease, to which the ladies of Philadelphia oftentimes subject themselves by the lightness of their clothing, this being a misfortune common to every place, where females are solicitous to display, by their dresses, the elegance of their persons.

NOR do I think it necessary to mention the mischiefs that frequently result (particularly to the youthful classes of our citizens) from dancing, swimming, skating, and sleighing. It is only the immoderate or improper use of these amusements, or some concomitant act of imprudence, that can prove instrumental in the production of disease.

ONE particular relative to the dresses of the ladies of Philadelphia deserves our attention, and cannot fail to excite our regret. It is their servile habits of imitating foreign fashions. These habits lead them sometimes to the adoption of dresses wholly unsuitable to the seasons in which they are worn.

LONDON and Paris are the oracles of fashion to the ladies of America. It frequently however happens, that the fashions do not reach this country, till six months after their establishment in those cities. Hence, during the severity of winter, our females, instead of endeavouring to accommodate their clothing to the temperature of the season, adopt the same light and airy forms of dress, which had been worn, in Britain and France, during the heats of the preceding summer.

THIS unfortunate preference of fashion to reason and a principle of accommodation, or in other words, to common sense, in dress, cannot fail to prove occasionally destructive to delicate constitutions.

## SECTION V.

## GENERAL INFERENCES AND REMARKS.

**F**ROM certain facts and principles laid down in the preceding sections it would seem, that, in whatever degree large cities may facilitate the improvement of the arts, in whatever degree they may contribute to the cultivation of the human mind, and to the refinement of human manners, and however necessary they may be, on the great scale of commercial arrangements, yet, when considered in relation to their effects on the health of man, they must be acknowledged to constitute an evil of no common magnitude.

**T**HIS appears to be particularly the case in inland situations, and in middle and high latitudes, subject to an extensive range of temperature,

**I**T is perhaps in such situations only that large cities can exhibit the extent of their proper influence, in the production of disease. It is perhaps in such situations only that they can make a full display of the power, which they possess, of forming to themselves a tropical

atmosphere, during the summer season, and of giving rise to genuine tropical diseases, while the surrounding country is subject only to those of an inferior grade.

THESE remarks relate exclusively to the summer and autumnal seasons. During the winter and spring, large cities are no less healthy than the adjacent country. Most of the diseases of these latter seasons, originate from the general nature of the weather, particularly from its states as to moisture and dryness, and from great and sudden vicissitudes in its temperature. From such vicissitudes and their effects, the inhabitants of the country are no more exempt than those of cities. It is only to diseases, which originate from a warm and vitiated atmosphere, that the inhabitants of cities are peculiarly liable.

ALTHOUGH it is true that, during the prevalence of certain highly malignant constitution of atmosphere, pestilence has sometimes, even in temperate climates, become epidemic in country situations; yet this is by no means a common occurrence. History informs us of but few periods in which the elements have been so much at enmity with human existence. The evil in question, being a condensed epitome

of the whole range of febrile disease, is, like the consummation of moral depravity, the offspring and scourge of large cities.

CLIMATE and its effects, instead of being always produced by and corresponding with the latitudes of places, are frequently the result of local causes.

THE principal sources to which writers on this subject usually ascribe the discordance that frequently exist between the climates and latitudes of places are, the natures of soils, the proximity of mountains, forests, deserts, or extensive bodies of water, the courses of prevailing winds with the nature of the countries, over which they have passéd, and the elevation of the land above the level of the ocean.

BUT, from the foregoing sections it appears, that a source of local climate equal in power to either of the above, is the establishment of large and populous cities.

IF lofty mountains can create an artic climate within the bosom of the tropics, a large city can produce a tropical climate and many of its effects, in any inhabited portion of the globe. If a Pinchinca can present to the

burning zone, a summit venerable from the snow of ages, a Petersburg, a Moscow, or a Copenhagen, can prove the birth-place of pestilence, which requires for its origin a tropical temperature.

FINALLY, though it is true, as already stated, that neither human wisdom to devise, nor human power to execute, can ever render large cities as favorable to health as country situations; yet, it is equally true, that a great proportion of the calamities which they suffer from disease, is to be attributed either to some fault in their original plan, or to their want of wise and energetic police.

OF the truth of this Philadelphia furnishes incontestible evidence. For, notwithstanding its situation and summer climate are both exceptionable, there exists not a doubt, but we are chiefly indebted for our late sufferings from pestilence, to the joint operation of the two foregoing causes.

THE latter however is by far the most powerful and formidable. From the original imperfections in the plan of our city we have, comparatively speaking, but little to apprehend.

OUR calamities have resulted principally either from a want of wisdom in our police to concert, or a want of vigilance and energy to enforce, efficient regulations for general cleanliness, and for preventing a contaminated state of the atmosphere.

By the introduction of such regulations, and by perseverance in them to a proper extent, we have ground of assurance, equal to what most physical subjects afford, that Philadelphia may yet enjoy as perfect an exemption from disease, as is compatible with the establishment of large inland cities.



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MEDICAL & PHYSICAL

M E M O I R S.

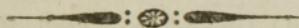
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*MEMOIR II.*

FACTS AND OBSERVATIONS RELATIVE TO THE ORIGIN  
AND NATURE OF THE YELLOW FEVER.

*ADDRESSED TO THE CITIZENS OF PHILADELPHIA.  
IN TEN NUMBERS.*



No. I.

INTRODUCTION.

FELLOW CITIZENS,

**T**HE origin and nature of our late autumnal epidemics have been so long and so repeatedly the theme of medical discussion, that they might be supposed to have already received all the elucidation that genius, learning, and industry can bestow. Believing, however, that this is not the case, but that these points, so interesting to science, and of such immense importance to the welfare of our country, are still capable of being brought forward under a form less questionable, and placed in a light less equivocal, I beg leave to make them the subject of a few communications.

WERE the particulars on which I mean to address you of private or inferior concern—Did my motives originate in ambition or party spirit, or were they debased by any personal or selfish considerations, I should think myself bound to apologize for presuming to intrude on a moment of your time. But conscious of being influenced by no views of a private or unworthy nature—conscious that my only object is, the establishment of truth, connected with the promotion of public good, I flatter myself my attempt to be useful will meet at least with your indulgence and approbation, and my numbers be favoured with some share of your attention.

THOUGH I cannot suppose you to be much interested in a knowledge of the character and history of an anonymous writer, I think it notwithstanding expedient to become, for once my own biographer, and trouble you with a few observations respecting myself.

KNOW, then, that I was formerly a sceptic with regard to the origin and nature of our autumnal pestilence ; or, to speak with more correctness, I was strongly inclined to consider it as a contagious and an imported disease. Having had no opportunity, however, of ob-

-serving for myself, and being unwilling to make the bare authority of others my only ground of conviction in matters of such moment, I was obliged still to remain in a state of uncertainty and enquiry.

WHILE engaged in the investigation of this subject, it has been my uniform and solicitous endeavour to prevent my mind from being either distracted by the whirlwind of passion, or swallowed up in the vortex of party. Preserving myself, as far as practicable, calm, collected, and unbiassed, amid a tumult of contradictory assertions and conflicting opinions, I determined, from the first, to suspend my final belief, till time should furnish me with facts sufficiently numerous and unequivocal to warrant a decision.

IN the epidemic of ninety seven this occurrence took place. During that period of calamity, facts so luminous and circumstances so weighty obtruded themselves on my observation, as convinced me that my original suspicion was unfounded, and constrained me to believe, that the disease in question was not imported, and was but very rarely and feebly if at all contagious.

NOR has this opinion been in any measure shaken by subsequent discoveries. On the contrary, like a plant in a fruitful soil, it has become more and more strengthened and confirmed by the progress of time. Every observation I have made, and every fact I have collected respecting the origin and nature of the epidemics of ninety eight and ninety nine, have contributed to its farther and more permanent establishment.

SOME of these facts and observations will be briefly detailed in the series of numbers I shall have the pleasure to lay before you.

THOUGH the following communications will appear without my proper signature, yet this circumstance shall not be considered as giving sanction to a departure from decency, veracity, or candour. Such a step would be no less beneath the dignity of a gentleman, than inconsistent with the spirit of philosophy. Throughout the present enquiry I will be guilty of no personal invective, with a view to vilify the character, to kindle the resentment, or to violate the feelings of those who may differ from me in opinion. I will assert nothing as a fact which I do not know to be

true, nor will I advance any thing as an opinion which I do not firmly believe.

CONCEALED behind the curtain of a borrowed name, and having, in my present character, neither personal friends to conciliate, nor enemies to dread, I shall deliver my sentiments in their genuine form and colouring, unperverted by the expected favours of the one, or the probable frowns and opposition of the other. Convinced that no one is qualified for the investigation of physical truth, unless he be divested of prejudice and passion, I shall endeavour, like the historian and philosopher, (but without aspiring to the character of either) to discuss the subject before me as if wholly disinterested in the objects which it embraces.

SHOULD any one think proper to reply to my observations, I hope he will conduct himself with equal moderation, candour, and general decorum, and in all respects be governed by principles equally conscientious. I shall derive pleasure from finding my facts, reasonings, and opinions, examined on their merit by a writer of such a character.

LEAVING to you, my fellow citizens, to judge of the propriety of the foregoing prin-

ciples and professions, as well as of the steadiness and fidelity with which I may adhere to them, I shall proceed, in my subsequent numbers, to the discussion of the subject proposed in this.

As I mean to take a survey somewhat general of the question respecting the origin and nature of our autumnal pestilence, and also to suggest certain measures for the prevention of its recurrence, I cannot promise that my communications will be either few or short. Facts may pour in, conjectures may present themselves, opinions may spring up, and thus matter be accumulated far beyond my present anticipation.

BUT however reluctant I may be to omit any thing that may appear of importance to the result of my enquiry, I pledge myself to my readers to avoid all trivial and irrelevant discussion. Should any of my numbers prove unexpectedly lengthy, and should I on any occasion, appear to speak with more than philosophic warmth, I hope the former will be attributed to the copiousness of my subject, and the latter to my zeal for the suppression of error and the propagation of truth.

As a further claim on your indulgence and attention, permit me to assure you, my fellow citizens, that amid the numerous tiresome and illiberal controversies, to which the question on the origin and nature of yellow fever has given rise, I have never before obtruded myself on your notice, on this subject, through the medium of the public prints. Nor shall I again presume on such a measure, unless I either find cause to renounce my present opinions, or become possessed of such further facts and arguments, as cannot fail to secure their universal establishment.

I am unwilling to conclude my introductory address, without expressing a hope, that an enlightened public will wait till my series of communications shall have been closed, before they decide on the question at issue. A desire in my readers to escape the charge of prejudication, cannot fail to secure me this indulgence. As my object is not the temporary triumph of party opinion, but the development and diffusion of physical truth, I will then attend, with pleasure, to the remarks of the candid, on such parts of my observations as may be deemed objectionable.

THE IMPORTANCE OF THE SUBJECT OF THESE NUMBERS—  
 THE INEFFICACY OF OUR PRESENT HEALTH-LAW—THE  
 VARIOUS ABORTIVE ATTEMPTS, TO TRACE THE YELLOW  
 FEVER OF NINETY NINE TO SOME SOURCE OF IMPORTED  
 CONTAGION.

**I**N entering on an enquiry relative to the origin and nature of yellow fever, I feel myself about to engage in an attempt, no less solemn than difficult and interesting. It is solemn, because its object is momentous, embracing nothing less than the exemption of the human species from, or their perpetual subjection to, one of the heaviest calamities. It is difficult, because it leads to an investigation of one of the most refined and abstruse branches of medical philosophy. And it is interesting, because, without its accomplishment, the science of medicine must remain for ever incomplete.

THE present question, then, exhibits no local nor temporary aspect. It is not the health of a particular people, nor yet the prosperity of a given period, it is the welfare of every nation, and the comfort and happi-

ness of every age, that are involved in its issue!

IF, as some believe, yellow fever is every where produceable by neglected and putrefying filth alone, it can, by the removal or destruction of such filth, be every where prevented. But, if it is, as others contend, the natural and necessary growth of certain regions, capable of being conveyed to, and propagated in, other places, by means of contagion, it is an evil as permanent as the present system of nature. Under the latter view of things, as well might we endeavour to countermand the droughts of Arabia, or the clouds that augment the waters of the Nile, as attempt to eradicate from our globe this wasteful malady! But, relinquishing general discussion, I must confine myself more particularly to the epidemic of our city.

IT is a truth, from which no one will withhold his assent, that a knowledge of the actual source of this disease, furnishes the only rational ground, for the establishment of regulations to prevent its recurrence. It must be admitted as a truth, almost equally obvious in its nature, and in its consequences no less interesting to humanity, that the inefficacy of the present health-law, under the most accur-

ate and faithful execution, bespeaks either deficiency or error in its fundamental principles. To trust any longer, exclusively, to such a feeble and fallacious barrier for the protection of our city from pestilence, deserves a name more unpopular than folly ! Conduct less productive of human misery has been oftentimes enrolled in the catalogue of crimes !

IN advancing these sentiments, I neither feel a disposition, nor assume a right, to arraign the motives, which have actuated either individuals or public bodies, in their enquiries and proceedings on the subject in question. I well know, however, that neither rectitude of intention, nor benevolence of heart, can secure us at all times from error and misfortune. The justness, therefore, of the principles adopted, and the wisdom and expedience of the measures devised, by our constituted authorities, for the purpose of guarding us from pestilential diseases, are points which every one has a right to question and examine.

THE vital principle of our existing health-law, is, the supposed impracticability of our autumnal epidemics originating from the influence of domestic causes, and their necessary importation from a distant climate. As

the means of prevention, which it directs, are the immediate offspring of this hypothesis, they possess, exclusively, like their parent, an external relation. Like the measures of a weak and inexperienced statesman, they are directed only against foreign invasion, while the dangers of internal faction are forgotten.

THE proceedings of the Legislature of Pennsylvania, in the instance before us, will exhibit a lasting monument, how unprofitable (not to say how destructive) it is, for men to attempt to legislate on subjects, with the nature of which they are wholly unacquainted. No remonstrance on the fallacy of their favourite principle, no representation of the extent and power of our domestic causes of disease, could influence this body, when engaged in devising measures that were to protect our city from the calamities of pestilence. Rejecting the lights of modern science, either as the speculations of visionary philosophers, or as innovations dangerous to the reputation of our country, and deaf to the voice of all, except the advocates of foreign importation, they gave birth to a law, founded on a very partial consideration of their subject.

COMING from what was considered as high and respectable authority, this instru-

ment could not fail to make an impression on the minds of the unthinking. It is to be sincerely lamented, that such a combination of ignorance and error in physics, as appears on the face of it, should so long have contributed to render the public incredulous of truth, and so long have diverted their attention from their interest and their safety!

CONSIDERATIONS, too powerful to be resisted, compel me to believe, that the complicated distresses and sorrows of Philadelphia, in ninety seven, ninety eight, and ninety nine, were, in a great measure, the fruits of a supine belief in the necessary importation of our pestilential epidemics. May the citizens of Philadelphia awake from this delusive dream, and dissipate, by reflection, these shadows of error, before the channels of their commerce be obstructed, before the sources of their subsistence be dried up, and their city be reduced to a waste of ruin!

THE present (7) is a period uncommonly auspicious for the establishment of truth, respecting the origin of the disease in question. During the late epidemic season, such a pow-

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(7) THE autumn of the year ninety nine.

erful combination of facts and circumstances occurred, as have already produced conviction in the minds of many of the enlightened, and are, in my view, sufficient to convince even the most sceptical, (unless where scepticism is sealed by prejudice or interest) that this evil is the product of domestic causes.

At the commencement of our epidemics, in former years, the industry of a few individuals was able to discover some vessel, which, in consequence of one or more of her crew being indisposed, or having died, some weeks, or perhaps months before, was, without sufficient examination, suspected by many to be the source of our calamity. Nor were attempts, by means of bold and unqualified assertions, wanting, to convert such suspicion into actual belief. Hence arose that apparent equivocality, which was always attached to subsequent enquiries, and hence the public mind was kept constantly immersed in error, or at best in a state of uncertainty and suspense.

FORTUNATELY, however, during the last season, the aspect of things was widely different. Neither at the commencement of our calamity, nor at any succeeding period of its progress, did a single vessel appear, which,

after the slightest examination, either credulity could be persuaded to regard as the vehicle of human contagion, or even prejudice itself dare charge with having imported the seeds of the disease. To a few vessels, indeed, busy rumour did at first affix a momentary suspicion. But, it was only necessary to institute an enquiry, and all suspicion was immediately at an end. The vessels were found pure, and the crews healthy, except a few disorderly and dissipated individuals, who, from irregularity and exposure, had contracted disease after their arrival in our port. Nor was this disease, in a single instance, communicated to the physicians, nurses, or attendants of the sick. Though always formidable, often fatal, to the patients themselves, it was innocent with regard to the health of the community.

IN proof of the fallacy and confusion of public report on this subject, we may further observe, that scarcely any two individuals attached suspicion to the same vessel. Some spoke of the disease having been introduced from Leghorn, some from Jamaica, some from the Havanna, some from Surinam, and some from Hamburgh. In short, there was scarcely a vessel from a foreign port, however healthy, and in whatever latitude the port

might lie, that was not looked on, for a moment, with an eye of suspicion.

BUT, to raise error and absurdity to their highest pitch, one or two vessels were charged with having infected places at the distance of several squares from where they lay, while both they themselves, and their immediate vicinity, were in perfect health. Such were the misrepresentations of facts, and the enormities committed on common sense by a perverting spirit of hypothesis! And such the solicitude and exertion to collect some shadow of support for an opinion, in the fate of which, its principal patrons foresaw their reputation as medical philosophers involved!

AT length, when all enquiries after sickly vessels had proved abortive, and, under the influence of repeated disappointment, even hope itself had deserted them, on this quarter, some of the partisans of importation had recourse to another expedient, to retard the dissolution of their beloved doctrine. Leaving entirely the vessels in the harbour, where every thing was hostile to their expectations and wishes, they asserted that the disease had been introduced by an illegal and

clandestine intercourse, between the city and the Lazaretto. On this subject, they were careful to deal only in general and indefinite assertions. They never ventured to descend to particulars, conscious that such a step would subject their surmises and fabricated stories to detection.

BUT, from this shallow stratagem, to impose a little longer on the credulity of their fellow citizens, they can derive no permanent advantage to the principles which they advocate. For the public are now assured, (and of the truth of this assurance the most indubitable testimony can be adduced,) that not a case of yellow fever appeared at the Lazaretto, last season<sup>(8)</sup>, till after the commencement of its ravages in the city. Nor did any one, suspected to have kept up this illicit intercourse with the shipping, during their performance of quarantine, suffer from such conduct an attack of disease—How wretched, then, must be the cause, or how impotent its advocates, when, even for the purpose of its temporary support, recourse must be had to such prevarication and mis-statement!

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(8) THE summer and autumn of ninety nine,

FROM several conversations, which I have lately had, with different members of the board of health, I am authorized to go still further and state, that, throughout the whole of last season, they had not, at the Lazaretto, a single case of yellow fever from on board an inward bound vessel. Every case of this disease that appeared on their sick list, was sent to them from Philadelphia, except one, which came from Port Elizabeth, in New Jersey. For two months previously to his attack, this man had neither been in Philadelphia, nor had any communication with vessels from abroad. He died on the fourth day of his illness, with the most marked and malignant symptoms of yellow fever

It is to be hoped, that a secret consciousness of error, accompanied by a final despair of success, will deter the partizans of importation from a further pursuit of their object!

It deserves to be remarked, that, after the advocates of the foreign origin of yellow fever had failed, in their attempts, to discover a vessel, either in port, or at the Lazaretto, in which contagion could be supposed to have been imported, some of them had recourse to a mode of reasoning, on the subject, no less extraordinary and absurd, than their research

had been fruitless. They resolved the whole matter into a kind of spurious syllogism, and said, "Because we have enquired and satisfied ourselves, that the disease was imported in ninety three, ninety seven, and ninety eight, it follows, of necessity, that it must have been also imported in ninety nine, and therefore, why should we trouble ourselves with a farther enquiry?" It is even asserted, that such a mode of reasoning was, not long since, introduced into the college of physicians, and acquiesced in, by a majority of the members of that institution!

It is to be lamented, that men do not always bear in mind, that neither numbers nor age—no, nor both acting in concert, can add respectability to weakness and error!

## No. III.

PESTILENTIAL EFFLUVIA GENERATED IN THE HOLD OF THE SLOOP MARY, AFTER HER ARRIVAL AT OUR WHARVES—FURTHER REASONS FOR BELIEVING THE YELLOW FEVER TO BE A DISEASE OF DOMESTIC ORIGIN—PESTILENCE CANNOT BECOME EPIDEMIC, UNLESS AIDED BY A MALIGNANT CONSTITUTION OF ATMOSPHERE.

ALTHOUGH I have expressed my disbelief, that any vessels were suffered, last season, to pass the Lazeratto in a foul, sickly, or infectious state, I have not denied their having become sources of disease, subsequently to their entrance into our port. On the contrary, there is reason to believe, that, in one instance, at least, this occurrence actually took place; and that some of the first cases of pestilential fever, which appeared in Penn street, were derived from a vessel of this description. I allude to the sloop Mary, sent in as a prize to the ship of war, Ganges.

THIS vessel came to, at Willings' and Francis' wharf, on the 14th of May, with all her crew in good health, and with a cargo

of coffee perfectly sound. She was not from a sickly port, nor had any of her people been sick, during the passage. In proof of these facts, I could furnish, were it necessary, the affidavits of respectable characters, belonging to the vessel.

As soon as the sloop's cargo was discharged, and the hands taken from on board, her decks were washed, and the ports and hatches all shut down. In her hold, and among her timbers, remained a quantity of vegetable matter (chiefly coffee), with which water had been mixed, at the time she was washed.

IN this state, without any one to open her, for the purpose of ventilation, she was suffered to lie at the wharf, during about three weeks of very warm and dry weather. The result of such a situation of things, it requires no great extent of foresight to discover. Imagination can scarcely conceive a combination of circumstances, more highly favourable to the putrefactive process. Nor was it long before this process rose to an uncommon height.

THE noxious effluvia, that were generated, in abundance, having no vent to escape,

and be dissipated in the atmosphere, mingled with the air in the vessel's hold, and produced in it an extreme degree of vitiation. A smell, resembling that of common bilge water, but much more offensive, became troublesome to those engaged about the wharf, and was at length traced to the place, where the *Mary* lay. She was soon suspected as the source of this nuisance. Her ports and hatches were accordingly thrown open, when the foul air rushed out in torrents, and spread through the neighbourhood a suffocating stench.

SEVERAL persons, exposed to these exhalations, were, in a few days afterwards, seized with decided symptoms of pestilential, or yellow fever. Of these, I shall mention, in particular, the family of Mr. M'Phail, and part of the crew of a *Hamburgh* vessel, that lay but a few feet distant from the prize sloop. Previously to this, not a case of malignant fever had appeared in that neighbourhood.

THE foregoing facts have been given in detail, because they are considered as constituting one of the most unequivocal instances of the domestic origin of yellow fever. They do not indeed amount to demonstration, this ultimatum of evidence not being attainable in the science of medicine. They furnish us,

however, with a ground of belief, equal to that which forms the basis of most of our physical opinions, that the preceding cases of fever were derived from the putrid substances, inclosed in the hold and timbers of the Mary. But, if this disease can arise from putrefaction, in the hold of a vessel at our wharves, the same process, in other parts of our city, cannot, under similar circumstances, fail to be productive of a similar result. Nor is there any thing in coffee, which can render it, during the putrefactive process, more peculiarly deleterious than other vegetable substances.

LET it not be concluded, from the foregoing statement, that I consider the sloop Mary as the sole cause of the epidemic, which made its first appearance in Penn street, and its vicinity. The utmost power of this vessel could extend no farther, than to the production of a few sporadic cases of disease, which would have terminated with the death or recovery of those attacked, had not the surrounding atmosphere been already possessed of a pestilential constitution, and contaminated with putrid exhalation from other sources. To me, the disease appeared to be propagated, not by means of contagion, but solely through the medium of vitiated air. Nor could this vitiation have

been produced by the effluvia arising from a single vessel. Such an extensive effect could not have proceeded from a cause more circumscribed, than that immensity of putrefying substances, exposed in various parts of our city. That general vitiation of atmosphere, known by the denomination of a pestilential constitution, must result from causes of greater extent and more powerful operation.

I am further confirmed in the above opinion, respecting the origin of the disease in question, by a recent determination of the board of health. This body is composed of characters, whose conduct, throughout the whole of our late calamity, bespoke a manly and laudable determination to think for themselves. Their decision, therefore, is not to be regarded as the echo of those with whom they associate, nor as a pusillanimous acquiescence in popular sentiment, but, as the result of a rational enquiry after truth.

At the commencement of the season, these gentlemen entered on their official duties, persuaded (one or two individuals excepted) that the enemy they were to encounter was of foreign descent. Unblinded, however, by interest or prejudice, and deaf to the sugges-

tions of party, conviction had still an avenue to their minds: This avenue was, faithful observation, combined with the most dispassionate reflection. That they might not be misled, either by voluntary or accidental misrepresentations of facts, they resolved to admit nothing on the credit of mere report.

UNDER this resolution, and with vigilance and intrepidity, that have never been surpassed, they visited and enquired into the state of every neighbourhood, where pestilence appeared, with a view to ascertain the source of the evil. The issue of three months perseverance in this painful and perilous research, is, an unanimous concurrence of the acting members of the board, that our late epidemic was a disease of domestic origin. Nor did they find any reason to believe that it was propagated by contagion. Had our fellow citizens, at large, an opportunity equally favourable for acquiring information, respecting the source and nature of our autumnal epidemics, I feel confident, they would be led to a similar belief.

BUT, the preceding are not my only reasons for believing, that yellow fever is an evil of domestic origin, propagated by means of a vitiated atmosphere. An additional ar-

gument in favour of such an opinion, is derived from the influence of the weather, in suspending and checking the progress of this disease.

WERE it imported and propagated by a cause, so permanent and indestructable as that of specific contagion, it would, like the small pox and measles, bid defiance to the air of every situation, and to every possible vicissitude of our seasons. It would not, as is now the case, limit its terms of existence, exclusively, to those months, during which the atmosphere is impregnated with putrid exhalations; nor would it confine its ravages to places abounding with vegetable and animal filth. Like other truly contagious diseases, it would show itself in every situation, and in every season.

THE progress of yellow fever through a city or country, is by far too rapid to depend entirely on the powers of contagion. We will select, in this instance, as a standard of comparison, the small pox, acknowledged to be, of all diseases, the most uniformly and certainly contagious. How slow, and almost imperceptible is the spread of this disease, compared to that of yellow fever? It is known that the latter will, in two or three weeks,

overrun an extent of city, which the former will not pervade, in twice as many months.

To what cause can such a remarkable difference be owing?—Certainly to this, that the small pox is propagated, only, by contagion, from the sick to the well, a source of disease which most persons have it in their power to avoid; while yellow fever is spread by a vitiated, or, what I shall here term, a malignant atmosphere, which, being a common medium, has access to every one.

THE progress of the small pox, when not epidemic, (<sup>9</sup>) can be arrested, by an entire interdiction of intercourse between the sick and the well. But the case is different with regard to

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(<sup>9</sup>) THERE is reason to believe, that, in many instances, not only in the countries of the east, but in Europe, and even in America, the small pox, like the yellow fever, has existed in the form of a genuine epidemic, depending on a peculiar constitution of atmosphere, heightened perhaps by exhalation from noxious substances. In such instances, a prohibition of intercourse, between the sick and the well, is not sufficient to put a stop to the progress of the disease. The variolous poison, not indebted for its existence solely to disordered secretion in the human body, but formed, on an extensive scale, by a certain morbid arrangement of the elements, impregnates the general atmosphere of the place where it prevails, and suffers no one to escape, who is susceptible of its action. The only mean of safety, is, an immediate removal from the epidemic region.

the yellow fever. The seeds of this disease hover unseen, in the atmosphere, at large, and attack us, with as much certainty in the streets, as in the sick-rooms of our friends.

THE last argument I shall advance in support of my opinion, is, the concurring belief of most of my enlightened fellow citizens, in every part of the United States, that has been lately visited by our autumnal pestilence. To this observation Philadelphia presents the only exception. To the injury and disgrace of this celebrated nursery of literature and science, it is sinking into the ultimate retreat of that exploded error, which directs us to foreign regions, in quest of the origin of yellow fever.

ENLIGHTENED strangers, who visit this place, and whose interests can be, in no measure, affected by the issue of the controversy, never fail to become advocates for the doctrine of domestic origin, when furnished with the facts and arguments on both sides of the question.

I hold the epidemic of last season, then, to have had no connection with imported contagion. It appears to have been, as in former years, the offspring of a pestilential constitu-

tion of our atmosphere, heightened by exhalation from our numerous domestic sources of putrefaction. Without the aid of the latter cause, the former would be inadequate to the production of pestilence, and without the co-operation of the former, the latter would give origin only to sporadic cases.

How long this pestilential constitution of our atmosphere may continue, is a matter impossible for man to predict. It is the effect of physical causes, which at present, philosophy is unable to fathom, and will terminate, only, in obedience to certain laws of nature, not yet subjected to human controul. Its continuance has been, in different instances, from two years to half a century, and its extent, sometimes over one nation, only, sometimes over two or three, and, at other times, over nearly half the globe. There is reason to believe, that the latter is, in some measure, the case, at the present time. In several parts of Europe, remote from the theatre of war, disease has been, for some years past, uncommonly malignant. The countries of the east have been, of late, extensively ravaged by pestilence. In ninety three, the yellow fever made it first appearance in Philadelphia. It is not a little remarkable, that, in the same year, the plague, for the

first time since the early part of the present century, began its devastations in the Barbary states. Since that period, it has nearly depopulated about two thirds of the empire of Morocco. Such a striking coincidence of time, certainly, affords some evidence of a community of cause.

OUR power, with respect to the constitution of atmosphere in question, extends no farther, than to the correction or removal of such sources, as co-operate with it in the production of disease.

FROM the occurrence of this malignant constitution, aided by an accumulation of their own domestic filth, most of the large and populous cities of Europe have experienced occasional visitations of pestilence. I may instance, in particular, Rome, London, Paris, Marseilles, Amsterdam, Lisbon, Madrid, and Moscow. In consequence, however, of a favourable change in the atmospheres of these places, and their adoption of wise and salutary regulations for the promotion of cleanliness, they have been exempt from this calamity for nearly a century.

LET the inhabitants of Philadelphia, then, console themselves under the pro-

spect, that their present sufferings are not to be perpetual, but, that from a combination of circumstances, similar to the above, their city may yet experience a change of fortune equally auspicious!

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No. IV.

AN ENUMERATION AND ACCOUNT OF OUR DIFFERENT  
SOURCES OF PESTILENTIAL AIR IN THE CITY OF  
PHILADELPHIA.

**I** COME, now, to the most important, because it is the most practical part of my subject. I shall attempt, in the present number, to unfold some of the various causes, which co-operate in the production of our autumnal epidemics. As minuteness, in the present instance, would lead me far beyond my intended limits, I must confine my attention to such sources of disease, as appear the most dangerous.

DEMOSTHENES, by the irresistible energy of his elocution, proved the guardian of

Athens from foreign conquest. Cicero, by the power of a splendid eloquence, became the saviour of Rome from internal faction. Had I the talents and qualifications of both, I would think them well expended, in an attempt to preserve Philadelphia from pestilence. But, though such powers be wanting, an effort shall be made with the resources I possess.

OUR domestic sources of pestilential effluvia, no less offensive to the senses than injurious to health, have already been the subject of repeated specification and remonstrance. I beg leave to press them, once more, on the serious attention of my fellow citizens. They are,

I. OUR docks and wharves. It would perhaps puzzle the ingenuity of man, to construct places better calculated than these, for the purpose of promoting the putrefactive process, during the summer and autumnal months.

THE timber of which they are built, running constantly into a state of dissolution, is itself an abundant source of pestilential exhalation. This evil can be remedied only

by removing this mass of perishable matter, and supplying its place with stone, which, from its cleanliness, will not be unfavourable to health, and, from its durability, will finally prove an article of less expense.

BESIDES the vast quantities of putrefiable substances, deposited in our docks and along our wharves, by means of commerce, these places are necessarily the receptacles of an immensity of filth, washed down by the waters, in their descent from the higher grounds of the city. The remedy for this evil appears to be, either to sink the bottoms of the docks, so that they may be always covered with water, or to pave them with flag-stone, to such a distance from their edges, and construct them, at the same time, with such a descent, that all noxious matters, collected there, may be washed beyond low water mark, and swept away by the current of the river.

UNDER this head, another, and perhaps a less costly expedient may be mentioned, namely, to fill up our docks entirely, and convert the whole landing place, in front of the city, into one straight continued wharf or quay, walled up with stone instead of wood. A few spacious docks might then be construct-

ed, either above or below the city, to protect our shipping from ice during the winter.

THE offensive smell emitted, in warm weather, even by our most cleanly docks and wharves, in their present state, is a proof that they contribute to vitiate the atmosphere. There exists not a doubt, but that the late epidemic of Southwark, which made its first appearance in Water between Christian and Queen streets, originated principally from the exhalation of a foul and extensive dock, contiguous to the Still-house wharf. Though several vessels, from the Havanna, lay in that neighbourhood, and, though much weight is attached to this circumstance, by those who advocate the doctrine of importation, yet, as the crews of those vessels arrived in perfect health, as the vessels themselves were cleansed, and rode quarantine at the Lazaretto, and as those who had most communication with them were not more sickly than others, we are bound to exonerate them from the charge of having introduced a contagious disease. It was not till after the crews of these and several other vessels had been, for a considerable time, exposed to exhalation from the above dock, that they sickened, in common with the citizens who lived in the neighbourhood.

THE most plausible and popular argument, advanced by the advocates of importation, in favour of their hypothesis, is, that the yellow fever has always appeared first, as an epidemic, in situations near to the river. This circumstance, however, admits of an easy and satisfactory explanation, from the fact, that our docks and wharves contain much more putrefying matter, exposed to the rays of the sun, than an equal extent of surface, in any other part of the city, and are, therefore, more abundantly productive of pestilential air.

II. THE foul air of ships. This source of exhalation is so notorious for giving rise to pestilential fevers, in warm climates, that, to dwell on its farther confirmation, would be a waste of time. Facts, amounting to unequivocal evidence, on this subject, may be collected from most writers on the diseases of seamen.

THE evil may be remedied by compelling all vessels to carry ventilators, and obliging such of them as are laden with perishable articles, during warm weather, to be discharged, to have their cargoes examined and aired, and to be, themselves, thoroughly cleansed, before entering our port.

THESE measures may be executed, at a trifling expence, and without imposing such oppressive shackles on the commerce of our city, as to drive it, eventually, into other channels.

I shall close this article, by observing, that, were due attention paid to the cleansing of foul vessels, and to the purification or destruction of damaged cargoes, I cannot help thinking the quarantine of sickly crews, as far as yellow fever is concerned, would be a very unnecessary, not to say an inhumane measure.

### III. DIRTY yards, cellars and privies.

In a city as extensive and populous as Philadelphia, these are sources of immense exhalation. They have been known to produce cases of yellow fever, even in the depth of winter, and must greatly increase our epidemics of summer and autumn. They should be subject to the inspection of officers of police, and, when neglected, their cleanliness should be enforced by the the imposition of fines.

BESIDES the influence of our privies, in injuring the atmosphere by exhalation, they have also, an effect in contaminating the wa-

ters of our pumps. These serve as an additional medium for conveying their poisonous particles into our systems, and are, probably, instrumental in the production of disease. Under the disadvantage of their present construction, I am sorry to observe, that our privies constitute a nuisance not easily remedied.

IN confirmation of the latter part of this article, I beg leave to mention the following important fact, for the knowledge of which I am indebted to the observation and politeness of Mr. Latrobe.

IN sinking the foundations of the Bank of Pennsylvania, the pits of twelve necessaries (eight of them old ones) were dug into by the labourers. On removing from these sinks their putrid contents, and filling them up with clean and solid masonry, the waters of several neighbouring wells were remarkably improved. The water of one well, in particular, belonging to the city-tavern, which had long been offensive and unfit for use, became, in a short time, sweet and potable. This well is situated at a short distance, in a south-easterly direction, from the foundations of the bank.

IV. OUR common sewers. In the present state of things, these may be ranked among the worst of our pestilential sources. Being the conduits of filth from every part of the city, much of their contents must be, necessarily, deposited by the way, owing to their deficient supply of water.

PROVIDED the docks be at the same time altered, as already recommended, this evil will be remedied, by the completion of the present plan for watering our city.

BUT, if the docks be suffered to remain as they now are, and streams of water be thrown through the sewers, the filth removed from the latter, will be then deposited in the former places, and will contribute to increase exhalation along our wharves.

V. OUR gutters and alleys. The former of these, though less offensive than they were some years ago, are still the repositories of much putrid matter, which bears a part in the vitiation of the atmosphere. They might be kept perfectly clean, by the waters of our pumps, were the persons, employed for that purpose, sufficiently attentive to their duty.

As to alleys, their very existence is to be lamented, and bespeaks a defect in the original plan of Philadelphia. In all large and populous cities, besides being the bane of ornament, they are too frequently the receptacles and sources, no less of moral than of physical evil. With us their filth furnishes the most forcible and disgusting evidence, either of the impracticability of keeping them clean, or of the delinquency of those to whom this important business is entrusted.

THOUGH it is scarcely to be expected, that the buildings, which now form our alleys, will be demolished, it is certainly a desirable thing, that no more in future, be erected in such places. On each occurrence of yellow fever, in Philadelphia, these offensive situations appeared to furnish the best fuel for the support of its devouring flame.

VI. COLLECTIONS of filth in the neighbourhood of the city. Neither the putrid substances removed from our streets, nor even the contents of privies, are conveyed to a sufficient distance, to secure us against their pestilential effluvia.

It is not yet ascertained, with precision, how far these exhalations will extend; but, to

ensure safety, the substances which emit them, should be removed, at least, a mile from the limits of the city and liberties.

UNDER this head must be comprised certain offensive ponds of water, still suffered to exist in the out-skirts of the city.

VII. PUBLIC burying-grounds. In no instance does our police betray a greater want of wisdom, than in suffering these numerous and extensive repositories of dead bodies, to continue in the central parts of our city. In no instance, perhaps, is the wisdom of former ages, more worthy of our imitation, than in having, wholly distinct from each other, what were then denominated living and dead cities; the latter consisting of places, without the walls of the former, destined, exclusively, for the interment of the dead.

THAT such immense masses of putrefying animal matter, must tend to contaminate both the air and the water of their respective neighbourhoods, is a truth too obvious to require illustration. If a powerful army was destroyed by pestilence, in consequence of encamping on an antient burying-ground, before

the walls of Carthage, surely, in Philadelphia, where the summer heats are no less intense, similar receptacles of human exuvia cannot fail to be inimical to health.

It is to be hoped, that a remembrance of our past sufferings, and a wish to prevent their future recurrence, will lead to a removal of such palpable evils.

VIII. THE covering our houses with shingles. These, in common with all other vegetable substances, are of a putrefiable nature, and, in their constant tendency to dissolution, cannot fail to assist in contaminating the atmosphere. Though this is an evil of a feeble nature, compared to others already mentioned, it deserves notwithstanding to be taken into the account, in summing up the causes, that contribute to vitiate the atmosphere of our city, and to render it different from the atmosphere of the country.

THE remedy for this is, the substitution of tile, slate, or sheet-lead, in place of the materials now in use.

IX. STABLES, shambles, and slaughter-houses. Though it is said, that, in times of epidemic sickness, the inhabitants in the

neighbourhood of such places have been known to remain unusually healthy, I conceive these occurrences to be wholly accidental. The processes that go forward in them, are such as must necessarily diminish the purity of the atmosphere.

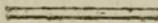
THEY should be subjected to the most strict regulations of cleanliness, or removed to a distance from the inhabited parts of the city.

X. THE last source of exhalation I shall mention, is, an undue crowding of the inhabitants of the city.

THIS is one reason, among many, why epidemics generally appear first, and rage with most violence, among the poor, where numbers frequently reside in the same confined apartment.

THE perspirable effluvia of human bodies, like all other descriptions of animal matter, are liable, after their elimination from the system, to undergo the putrefactive process. Hence results the pestiferous exhalation, with which they contribute to load the atmosphere.

To obviate this evil, as far as possible, all those whose circumstances will admit of it, should pass their summers, and part of their autumns, in the country, and, on the first appearance of an epidemic, provision should be made for an immediate removal of the poor.



## No. V.

A FEW ADDITIONAL MEASURES RECOMMENDED FOR ASSIMILATING THE ATMOSPHERE OF THE CITY OF PHILADELPHIA, TO THAT OF THE COUNTRY.—THE PROPRIETY OF AN ALTERATION IN THE SUMMER DIET OF THE CITIZENS—THE DOCTRINE OF DOMESTIC ORIGIN, WHEN PROPERLY UNDERSTOOD, LESS INJURIOUS TO THE INTEREST AND REPUTATION OF OUR CITY, THAN THAT OF IMPORTATION.

**B**UT, the regulations recommended, in the preceding numbers, are not alone sufficient to ensure, to the citizens of Philadelphia, the highest practicable chance for the enjoyment of health. In addition to these, various others must be adopted to assimilate the at-

mosphere of our city, as far as possible, to that of the country.

For this purpose, our streets, and the roofs and sides of our houses, should be frequently and plentifully watered, during the warmth of the summer and first of the autumnal months. This, by its evaporation, would moderate the intensity of the heat, so essential to the progress of the putrefactive process, and would also absorb some of those noxious airs, which diminish by their presence the purity of the atmosphere. Like the cold bath to the human body, it would tend to cleanse the fluid of respiration, and to render it more fit for the purposes of life.

TREES should be planted in all our public squares and walks, and at convenient distances along our streets. These, by their foliage, would not only intercept the rays of the sun, and protect our houses, pavements, and persons, from their action, but by their known property of devouring foul, and secreting pure air, would counteract the contamination of the medium which we breathe. If the cutting down of trees has been known to give rise to bilious fevers, which had not before an existence, it is, at least, presumeable, on principles of analogy, that the planting of

them must have some influence, in eradicating the same disease from places where it prevails.

ON the same principle, I also beg leave to recommend the cultivation of gardens and grass-plots, in all parts of the city, convenient for such purposes.

NOR should any land, in the neighbourhood of the city, be suffered to lie in an unimproved state. Every spot should be annually clothed in grass, or some other vegetable of active and luxuriant growth. For, the process of vegetation, under every form, is favourable to the renovation of our atmosphere, and the propagation of health. Covering with grass, or some other cleanly vegetable, every practicable part of the city and its vicinity, would have an effect on the superincumbent and surrounding atmosphere, and, consequently, on health, somewhat similar to the draining and cultivation of an unwholesome tract of meadow.

As rills and rivulets constitute a part of rural scenery equally beautiful, refreshing, and salutary, they should be imitated in our establishments for protecting our city from the ravages of epidemics. Nor is this a

project of difficult execution. As soon as the works for watering the city shall have been completed, our gutters, which, in their present state, so frequently, during the summer and autumnal seasons, disgust by their putrid appearance, and nauseate by their offensive smell, may be converted into rills of wholesome water.

IN a word, as large cities have been, in all ages, and countries, the great theatres for the tragic scenes of pestilence, the cause of this is acknowledged, by every one, to exist in the atmospheres of these places. Such is the dominion of the atmosphere, over the systems of men and other animals, that, were its qualities the same, in all situations, the epidemics of all situations would be nearly similar. For, this fluid is no less the vehicle of epidemic disease, than the source and vehicle of animal heat.

LET the contending parties unite, then, in adopting, and zealously pursuing, every possible measure, that can have the smallest effect, in assimilating the air of our city to the uncontaminated air of the country.

THUS far on the internal regulations of our city. I shall add a few observations re-

specting the regimen, which appears most conducive to the health of the inhabitants.

ON this subject (as a descent to particulars will not be expected) my opinions will be delivered in very general terms.

I conceive that health would be promoted, by the use of more vegetable and less animal food, particularly throughout the months of summer and autumn. I would also recommend, during the same time, the substitution of the lighter wines, or rather of cider and malt liquor, for the quantities of Madeira consumed at our tables.

NOR can I avoid expressing a wish for the general introduction and use of the cold bath. This delightful practice is particularly necessary, under the intemperate warmth of our climate. It is as essential to the cleanliness and comfort of the body, as repeated washing is to the purity and sweetness of our clothes or our streets. It carries off the perspirable matter, which, by adhering to the skin, might become a source of disease; it determines the vital action towards the superficies of the body; and counteracts that relaxation and lassitude, so universally experienced during the intensity of our summer heats.

By an adoption of, and steady perseverance in, the foregoing steps, it is hoped, that the citizens of Philadelphia will be no longer a prey to the wide wasting pestilence. They will, at least, discharge an important duty to themselves and to humanity, in neglecting no practicable mean of safety. They will exhibit a becoming sense of the high responsibility under which they lie, on the score of self-preservation, and exonerate themselves from the charge of being, in any measure, accessory to the calamities they suffer.

I am prepared for the clamours and defamatory attacks of certain individuals, who will denounce me as attempting an injury to the reputation and interest of our city. This charge is too much the offspring and nurseling of ignorance and illiberality, to create in me the smallest degree of uneasiness. Though I may pity the blindness, and entertain a contempt for the weakness, of its authors, it is impossible I should ever be induced to dread their malevolence. I am anxious to make the public sensible, that the doctrine of the importation of yellow fever, and its propagation by specific contagion, is much more injurious to the reputation of Philadelphia, and offers, to its inhabitants, a more hopeless prospect of

exemption from it, than that of its origin from domestic causes. On this subject, I beg leave to state the following considerations.

YELLOW fever is known to be an evil, which never entirely disappears from the West-India Islands. It is a native of their climate, and, in places abounding with putrid substances, every season of the year is competent to its production.

IF, then, this disease can be imported to us, in the form of human contagion, attached to a clean and undamaged bale of goods, to the timbers or sails of a vessel, where no putrefaction exists, to the contents of a sailor's chest, to his person, to his pocket handkerchief, or even to the ribband which he wears to his watch.—If it can be introduced through such a variety of secret and inscrutable channels as these, in vain will be the efforts of human wisdom and vigilance, in the present state of things, to secure our city against its annual return. Our only resource will be, an unconditional interdiction of commerce, and every species of intercourse with the West Indies, and other warm regions, where yellow fever prevails.

NOR will even this be sufficient for the attainment of our object. The disease is now among us, and, if it can be propagated by specific contagion, we have no reason to flatter ourselves that it will ever be eradicated. The contagion will lurk, from year to year, in the confined and dirty hovels of the poor, and render the evil as permanent as that of the small pox or measles. Its extinction can be insured by nothing less, than the destruction of our city, and other places, where it has prevailed, by fire.

LET us, for the sake of illustration, on this point, suppose the West India climate to be, at all times, capable of producing the contagion of small pox, and the human system to be liable to reiterated attacks of this disease. In such a state of things, and during the continuance of our present intercourse with the Islands, what security could we repose in the strictness of our health-law, and the vigilance of its officers? Would not the contagion find a thousand avenues of admission among us, notwithstanding every human exertion to the contrary? Would not the intention of quarantines, and Lazarettos, be so entirely frustrated, as to render their establishment, an unnecessary, and an oppressive expence? As well might we at-

tempt, by legislative interposition, to shade our shores from the light of Heaven, as to guard them from small pox under such circumstances. Nor would the case be, in any measure, different, with regard to yellow fever, were it introducible by means of specific contagion.

BUT, supposing this disease to be, as some alledge, not a native of the West Indies, but, imported thither in a vessel, from Siam, our prospect of its being eradicated from among us, will be in no measure brightened,

IT is almost a century, since yellow fever is said to have been introduced into the Island of Martinique, during which time it has never entirely disappeared. What ground, then, have we to hope, that it will be less permanent, in its residence with us?

HAVING taken such immediate and fixed root, when brought from the old world to the West Indies, there is every reason to believe that the result will be similar, on its exportation from thence to the continent of America.

SUCH is the melancholy aspect of things, presented to view by the importers of yellow

fever ! Their ill-boding doctrine threatens us with nothing less, than an endless succession of our present misfortunes !

LET US NOW, for a moment, attend to that picture of the same subject, drawn by the advocates of domestic generation.

How striking is the contrast ! How delightful the reverse ! Here is no perpetuity of evil, to banish us from our homes ! Here is no specific contagion, to be conveyed, in goods, from the city to the country ! Here is no ground for apprehension, that our clothes, our furniture, or the walls of our houses, are the constant reservoirs of a deadly poison. Here the period of danger and alarm is, only, co-extensive with the actual ravages of the evil. Its utmost duration is, from the middle or close of summer, to the commencement of winter. Were the disease capable of leaving a poison behind it, the season of danger could terminate, only with the existence of those susceptible of infection.

IN a word, by the advocates of the doctrine of domestic origin, yellow fever is represented as an evil of temporary duration,

subordinate to the change of seasons, and to human controul. It is declared to be the offspring of domestic filth, co-operating with a malignant constitution of atmosphere, and, our fellow citizens are assured, that by the removal of this filth, and by adopting and retaining habits of general cleanliness, they may look forward, with confidence, to a return of health. For, however malignant the general constitution of atmosphere may be, it is known to be, for the most part, incapable of producing pestilential fever, without the aid of putrid exhalations.

I am persuaded, that, from this view of things, a candid public will, henceforward, concur with me, that the reputation of our city and country is endangered, not by the advocates of the domestic origin of yellow fever, but, by those who contend for its importation from abroad.

IN matters of ordinary magnitude, it is neither necessary nor becoming, to appeal from the reason, to the passions of an enlightened public. But, when the lives of thousands of our fellow creatures depend on the issue; when the prosperity, (not to say the existence) of the metropolis of our country

is at stake ; when the welfare of our country, in general, is concerned ; and, when even the fate of posterity is involved, the occasion will justify an attempt to interest every virtuous feeling of the mind, and to touch every spring of human action !

CITIZENS of Philadelphia, bear with my importunity ! Be assured, that no obstinacy of opinion, no desire of rendering myself conspicuous in the public prints, no spirit of voluntary perseverance in error, induces me to trouble you with these communications. I act under the impulse of a sense of duty ! I address you, from a conviction, that I advocate a truth connected with your interests, and, that silence, on such an occasion, would be no less than criminal. I am importunate, because importunity is a virtue, when we warn our fellow citizens of impending ruin !

Is not the manifest inefficacy of the present health-law, sufficient to convince you, that its fundamental principle is a principle of error ? Are not the sufferings of three successive years, sufficient to induce you to abandon this principle, and to adopt another, which reason approves, and experience has not yet denounced as fallacious ? To how

many more hazards of life will you subject yourselves—how many more autumns will you pass, in a state of painful exile, from your homes—how many more valuable citizens will you resign to the grave, rather than relinquish this delusive hypothesis?

WILL nothing but the agonies of your expiring friends, and the lamentations of their disconsolate relatives—Will nothing but the desolation of your own families, render you awake to the voice of truth? Is it your determination to reject, in the face of all possible testimony, a belief in the domestic origin of our autumnal epidemics? Are you determined to rely, for security against a recurrence of these evils, on a health-law, founded exclusively on the hypothesis of their necessary importation? Under this determination, are you farther resolved, to suffer our present sources of exhalation, not only to remain as they now are, but even to accumulate with the progress of time?

IF so, prepare for the final abandonment of your city! Prepare for the melancholy tale of some feeling and contemplative traveller, who, at no very distant period of time, like the eloquent Volney, amid the fragments of Polmyra, will halt when he arrives at the

ruins of Philadelphia, and record them, in tears, as a monument of the prejudice and delusion of its inhabitants !

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No. VI. (10)

AN ATTEMPT TO SOLVE THE FOLLOWING QUESTION, *viz.*  
 WHY DOES THE FILTH OF PHILADELPHIA PRODUCE  
 YELLOW FEVER NOW, WHEREAS IT DID NOT IN FORMER  
 YEARS, WHEN MUCH MORE ABUNDANT, THAN IT IS AT  
 PRESENT ?

**W**ITH the close of my last number,  
 I thought to have taken leave of my subject,

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(10) BETWEEN many passages, in this work, but more particularly in the two following numbers, and certain parts of Mr. Webster's "History of epidemic and pestilential diseases," there exists such a similarity of sentiment, that the one might be supposed to have been copied from the other.

To exonerate us both, however, from the charge of plagiarism, it is proper to remark, that the present series of numbers was in print, sometime before the appearance of Mr. Webster's history, and that his work was ready for the press, long before the publication of this.

THE discovery of such a coincidence of sentiment with one, who, to the man of extensive reading, unites the acute reasoner, and the observing philosopher, while it flatters me not a little, contributes to heighten my confidence in the justness of my opinions.

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for ever. Nor is it without regret, that I find myself impelled to a farther intrusion on the time of my readers. But, like the prospect of the traveller, who descries Alps towering over Alps, while, as he proceeds on his journey, the most distant ridge gives place to one more distant still, my discovery of new and important matter, keeps pace with the progress I make in my enquiry.

IN my intercourse with my fellow citizens, I have had, of late, an opportunity of hearing frequent conversations, and considerable debate, on the following questions, viz.

I. WHY does the filth of Philadelphia produce yellow fever now, whereas it did not, in former years, when much more abundant than it is, at present?

II. WHY does this disease always make its first appearance, as an epidemic, in the neighbourhood of the wharves?

III. IF it be the result of putrefaction, why does it never break out, and rage, in the country, or in inland towns, remote from commercial cities?

THESE questions appear to constitute the strong hold of those, who believe yellow fever to be an imported disease. They have become arguments of such notoriety, that we find their use familiar to every one. From the philosopher, whose views are exalted as the Heavens, to the labourer, whose humble situation is a counterpart to his mind, these arguments pass in current circulation.

NOR is it surprising, that to the public at large, whose opportunities for acquiring physical knowledge are very limited, and whose credulity is always paramount to their spirit of enquiry, they should appear, in some measure, specious and plausible. But, by the man of liberal science, whose sources of information are more extensive, and whose business and practice it is, always to examine before he believes, they cannot fail to be rejected as unsatisfactory and fallacious.

To resolve whatever doubts may still exist, in the minds of the candid, to render the present series of numbers a final answer to all objections that have been raised against the doctrine of the domestic origin of yellow fever, and, as far as possible, to remove every difficulty connected with the subject, I beg leave to state a few observations, in an-

swer to the above propositions. I shall consider them in the order in which they stand.

I. WHY does the filth of Philadelphia produce yellow fever now, whereas, it did not in former years, when much more abundant than it is, at present?

WERE I, like my opponents, disposed to adopt the logic of Socrates—were it my intention to perplex and confound, rather than to enlighten and convince, I might reply to them, in their own sophistical spirit of interrogatory.

INSTEAD of attempting to answer the question, why the summer atmosphere of Philadelphia, gives origin now to diseases, which it did not formerly produce? I might demand of them,

1. WHY, in the eastern hemisphere, the plague frequently desolates whole countries, in one season, and, in the next, (when the sensible qualities of the atmosphere are in no perceptible degree different, and, when the supposed contagion of this disease might be suspected to exist in ten-fold quantity and

power) disappears, and does not return again for a considerable period?

2. WHY, when the sensible qualities of the atmosphere are precisely the same, we at one time suffer from, and at another escape epidemic catarrh? <sup>(11)</sup>

3. WHY, in certain tracts of country, domestic animals, such as dogs, horses, cows, sheep, fowls, &c. are occasionally attacked by epidemic diseases, which exist for a while, and then disappear, without any perceptible cause, either for their origin or extinction, in the seasons, or in the state of any of the surrounding elements?

4. WHY, in a place, peopled by emigrants from different nations, the natives of one country shall be suddenly attacked by a mortal epidemic, which shall have no power to injure the other inhabitants?

5. WHY, certain regions, at one time, escape, and, at another, are ravaged by myriads of destructive insects and reptiles, whose appearance and disappearance are

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(11) BETTER known by the trivial name of influenza.

alike inexplicable, from any preceding or concomitant phenomena of nature?

6. FINALLY, why, without being able frequently to attribute either their good or bad fortune to any of the sensible qualities of the atmosphere, or to any perceptible properties of the seasons, the inhabitants of low countries are, sometimes, exempt from, and at other times, attacked by, the bilious endemic of summer and autumn?

WERE I governed by the same illiberal principles of reasoning, which appear to influence the advocates of importation, I might call on them to answer the above propositions, and, in case of their failing to comply with my request, deny the existence of the well known phenomena, to which the propositions relate, and, in my turn, refuse to reply to their objections, against the domestic origin of yellow fever.

BUT, to propose one difficulty, in answer to another, is equally uncandid and unphilosophical. It is a mockery of reason—an expedient in controversy, which tends to darken, rather than elucidate, and, is therefore unworthy of the advocates of truth.

WERE we, in all instances, to make our ignorance of the operations of nature, a pretext for denying, or doubting of the reality of her phenomena, we would open a door for universal scepticism.

IN this case, we would render the evidence of our senses an absolute nullity. We would even deny the existence of polar attraction, of thunder-storms, of volcanos, of earthquakes, and of many other familiar and stupendous phenomena of nature, from our incompetency to explain the principles and modes of their production.

IT is worse than folly ; it is presumption and impiety, to propose our feeble capacities, and limited knowledge, as standards for the boundless operations of nature !

BUT, actuated by no petty ambition of triumphing at the embarrassment and silence of an adversary—Influenced, only by a wish for the ascertainment of truth, I shall endeavour to reply to the merits of the foregoing question, proposed by the advocates of foreign importation.

I conceive, then, that yellow fever may originate from the filth of Philadelphia, now, though it did not in former times.

I. BECAUSE, as observed in a preceding number, we have, at present, a pestilential constitution of atmosphere, favourable to the production of yellow fever, which did not exist with us, in its full force, previously to the year ninety three.

By the term, pestilential constitution, I mean a preternatural aptitude or predisposition in the air, to co-operate with other causes in the production and propagation of pestilence.

WITHOUT the aid of this general predisposition of the atmosphere, our topical causes, though they might prove the source of solitary cases of disease, would be too weak to give rise to an extensive epidemic.

THE evidences, on which I found my belief of the prevalence of the above constitution, are,

I. THE uncommon degree of disease and mortality, that has occurred, for some years past, among our domestic animals, such as dogs, horses, cats, hogs, and fowls. Nor have even the birds and beasts in our forests, nor the fish in the depth of our waters, found shelter from the effects of this wide spreading

evil. They have all, in their turns, been fellow-sufferers in the pestilence of our country. Disease and death, among these inferior animals, appear to have originated from the same state of our atmosphere, which has contributed to the generation and ravages of yellow fever, among the human species.

THIS fact is by no means new, or uncommon, in the history of diseases. Many such have occurred, at different times, and in different countries. Hence, we find, that in most histories of mortal epidemics, among men, notice is taken of cotemporary disease and death, among other subjects of the animal kingdom. This is particularly the case, in the account, left on record, of the plague which prevailed in the Grecian camp, during the siege of ancient Troy. It is, in like manner, the case, in the history of the memorable plague of Athens, by Thucydides, in that of a similar calamity, described, I think, by Virgil, in one of his Georgics, and, also, of that which desolated Marseilles, in the beginning of the present century.

2. THE late unusual violence and obstinacy of febrile diseases, both in the city and

country. This is a circumstance, of which no practitioner of medicine can be ignorant.

SINCE the year ninety three, a memorable revolution has occurred, in the type and state of fevers, in many parts of the United States. This event has, necessarily, given rise to a corresponding revolution in their medical treatment. Were it not that I am apprehensive of rendering my communications too lengthy, I could bring forward a host of facts, in proof of my assertion. I will trouble my readers with the detail of none but one.

So striking is the change, which has taken place, of late, in the malignity of the autumnal endemic, in certain districts of North Carolina, that Doctor Harris, my first medical preceptor, and now the most eminent physician in that state, has given it the name of the "Yellow fever of the country." From this, it is evident, that he considers it, as nothing else, than a lower grade of the yellow or pestilential fever of our seaports.

FROM the remoteness of his situation, and his want of a correspondence with the physicians of Philadelphia, it is impossible that Dr. Harris can be strongly prepos-

essed, in favour of any theory, respecting the production of yellow fever.

It is a fact of some importance, that, in the summer and autumn of ninety eight, the season, in which the pestilential epidemic rose to its height in this place, the doctor found the yellow fever of his district, more general and malignant, than at any other period.

BUT, the phenomenon in question, is by no means confined to the limits of our country. Jamaica, and several other West India Islands, have witnessed a similar change, in the character of their diseases. Nor have even the diseases of many parts of Europe, Asia, and Africa, escaped the influence of this modifying power.

SINCE the year ninety three, the fevers of winter and spring have exhibited, in this place, many of the alarming symptoms, which formerly characterized the diseases of summer and autumn; while those of the latter seasons, have assumed a malignity, which, till lately, was altogether unknown in our country.

FOR the truth of these facts, many physicians, of the first respectability, are ready

to pledge their observation and experience. They can be explained, only, by admitting the existence of the foregoing constitution of atmosphere.

I pass, in silence, over the swarms of insects, by which we have been infested, for a few years past; nor do I dwell on certain irregular and unusual appearances, that have lately marked the progress of vegetation. Such phenomena, however, must be considered as expressive of something peculiar in the state of our atmosphere.

A superabundance of destructive insects, is an evil which seldom fails to accompany pestilential epidemics, in the countries of the east. Nor has Europe been, at all times, exempt from a similar concurrence of calamities. Indeed we find, that, during the prevalence of most extensive plagues, both of ancient and modern times, either the countries, subject to the calamity, or those immediately bordering on them, and sometimes both, have been overrun by myriads of insects. This furnishes a strong ground of belief, that the same state of air, which favours an excessive multiplication of these tribes of animals, contributes to the generation of pestilential diseases.

HAVING delivered the foregoing arguments, in favour of the prevalence of the constitution of atmosphere contended for, I decline entering into any speculation respecting its cause. The establishment of its existence, is all that is necessary, for my present purpose.

IT may not be amiss, however, to observe, that different philosophers have considered the above constitution, as the offspring of different causes. In this diversity of opinion, some have ascribed it to planetary influence, some to volcanic eruptions, some to earthquakes, some to a general exhalation from the bowels of the earth, and some to a certain derangement of the electric fluid. Possibly most, or even the whole of these causes, may have occasionally co-operated in its production.

IT is not without much apparent reason, that mortal epidemics are considered as occasionally the offspring of, or, at least, as intimately connected with, earthquakes, and the eruptions of volcanos. In running over the history of former ages and distant countries, we learn, that pestilence has been frequently, not to say, uniformly preceded, or accompanied by these dreadful commotions,

THUS, (not to mention many other similar instances,) during the reign of Justinian, a period, in which pestilence and the sword threatened little less than the extinction of the human race, the foundations of the old world were shaken by earthquakes almost innumerable. Nor was this less the case, in the fourteenth century, during the greater part of which, pestilence appears to have been epidemic, over most of the inhabited countries of the globe.

IN reflecting on the phenomena and power of volcanos, we are convinced, that their influence, in changing the state of the atmosphere, must be extensive beyond calculation. If, by the quantity and force of their imprisoned gases, they can project immense fragments of rock to the distance of many miles—if they can raise vast mountains from the bottom of the fathomless ocean—if they can throw bodies, so ponderous as ashes and cinders, to the distance of more than fifty leagues—if, by their smoke and visible exhalation, they can involve the surrounding countries in a night of darkness, there is no doubt, but they may diffuse the light aeriform substances, to which they give origin in such abundance, throughout the atmosphere of half the earth.

NEARLY the same thing may be said, with regard to earthquakes. The elastic fluids, to which these concussions give vent, must contaminate the air to a great distance.

II. ANOTHER reason, why yellow fever may now originate, in part, from the filth of our streets, though it did not, in former times, even when this nuisance was more abundant than it is at present, is derived from the state, in which such filth must be, in order to emit the greatest practicable quantity of noxious exhalation. This is, a mean state, between the extreme of moisture and the extreme of dryness.

IF animal and vegetable substances be kept perfectly dry, it is known to every one, that they will not putrefy, and consequently will not give origin to pestilential effluvia. Nor is the result, as far as human health is concerned, in any degree different, when they are kept completely immersed in water. For if, in the latter situation, they do undergo the putrefactive process, the exhalation which they emit, is mostly absorbed by the water, and not suffered to rise and contaminate the atmosphere.

THUS, in low marshy places, subject to annual returns of bilious fever, extremely wet, and extremely dry seasons, are alike unfavourable to the prevalence of this disease. In the latter, a deficiency, and in the former, a superabundance, of moisture, prevents the generation of the poisonous effluvia, acknowledged to be the cause of the evil in question. It is only during those seasons, in which periods of wet and of warm weather, alternately succeed each other, that this evil prevails to the greatest extent.

IN former years, previously to the general paving of our streets, the filth of our city was in a state of too great humidity, to be a plentiful and dangerous source of pestilential effluvia. At present, however, the case is different. It appears to be now, in that intermediate condition, between the extremes of moisture and dryness, most favourable to the production of this fatal poison

To become again exempt from this evil, we must either keep our streets, and other reservoirs of filth, perfectly clean, or inundate them with water, during the summer and autumnal heats.

III. For more than a century past, the ground, on which Philadelphia stands, has been imbibing pestilential filth from graveyards, privies, sewers, and various other sources of putrefaction. It would appear, at present, to be so completely saturated with these putrid effluvia, as to be no longer capable of receiving any more. Whatever exhalation, therefore, issues now from the internal filth of our city, is not, as formerly, absorbed and imprisoned by the ground, but, partly in consequence of the above saturation, and partly from the general paving of the streets, is let loose, either to contaminate the waters which we drink, or to impregnate our atmosphere with the seeds of pestilence.

THIS we would assign as another reason, why our domestic sources may now aid in giving birth to pestilential epidemics, though they did not, in former years, when even more abundant than they are at present.

IT is to be hoped, that this consideration will act as an additional motive, in urging us to measures of internal cleanliness.

REASON WHY YELLOW FEVER HAS ALWAYS MADE ITS FIRST APPEARANCE, AS AN EPIDEMIC, IN PHILADELPHIA, IN THE NEIGHBOURHOOD OF THE WHARVES—THE QUESTION, SO OFTEN PROPOSED, “WHY DOES YELLOW FEVER NEVER ORIGINATE AND PREVAIL IN THE COUNTRY, OR IN INLAND TOWNS, REMOTE FROM COMMERCIAL CITIES?” CONSIDERED. FARTHER OBJECTIONS AGAINST THE DOCTRINE OF IMPORTATION.

I. **W**HY does yellow fever always make its first appearance, as an epidemic, in the neighbourhood of the wharves?

THIS question has been already, in some measure, answered, in a preceding number. It was there observed, that, in consequence of being the seat of commercial transactions, of being built entirely of putrefying wood, and, at the same time, occupying the lowest ground in the city, our docks and wharves are the reservoirs of an immensity of filth. This filth, lying mostly in a loose state, mixed with a sufficient quantity of moisture, and, more immediately, than in other situations, exposed, not only to the direct rays of the sun, but also to those

reflected from the water, must necessarily be earliest in giving origin to an abundance of pestilential air. We must, therefore, expect epidemics to appear first, in that place, where the poison, which gives rise to them, exists in the greatest quantity.

BUT, though yellow fever, as an epidemic, has always made its earliest appearance along our wharves, it has not been so with detached or sporadic cases. These have seldom failed to show themselves first, in parts of the city remote from the river.

OUR earliest instances of yellow fever, in ninety seven, ninety eight, and ninety nine, occurred in persons, who had had no previous connection with the wharves, with the shipping, or with seafaring characters. In support of these facts, I am able to produce the testimony of several physicians, of the first respectability.

IN ninety eight, I myself attended two cases of genuine pestilential fever, at a distance from the river, in the month of June ; whereas this disease did not commence its ravages, as an epidemic, along our wharves, till the beginning of August. My patients both recovered, with yellow skins, dark eva-

euations, and other symptoms of high malignity,

Two physicians of the importing party, who visited one of these cases, declared, that could they trace it to any infected source, they would not hesitate to pronounce it a case of yellow fever,

WHAT a melancholy perversion of the human intellect! What a solecism in medical indecision is here! Who, in any instance, except where yellow fever is concerned, ever heard of practitioners of medicine, deriving their opinion of the nature of a disease, from its equivocal origin, rather than from its manifest and characteristic symptoms?

WHAT physician, of experience and discernment, on seeing the small pox or measles, raging in all their violence, and attended by all their pathognomonic symptoms, will hesitate to pronounce the cases to be small pox or measles, till he shall have ascertained, by enquiry, whether or not the patients have been exposed to infected sources? What surgeon, on being called to a case of fractured limb, will suspend his determination, whether or not it be a fracture, till made acquainted

with the precise nature and degree of the violence to which the part has been subjected? Where is the physician so timid and sceptical, as to doubt respecting the name he should give to a paroxism of intermitting fever, from an ignorance, whether or not the patient has been exposed to marsh miasma? What botanist, after examining a common and well known plant, will refuse to bestow on it its proper name, till particularly informed respecting the seed from which it sprang? And, what would be our opinion of that naturalist, who, on finding, in an uninhabited country, a man, complete in all his parts, and perfect in all his faculties, would hesitate to acknowledge him to be a man, till assured of his descent from two individuals of the human race?

EQUALLY irrational and absurd is the conduct of that physician, who refuses to decide on the nature of a well known febrile disease, until particularly apprized of its origin.

IN our decisions, relative to the nature and identity of physical objects, we must wave all visionary discussions, respecting their origin, and rely solely on their leading and permanent characters.

WHEN we see an elephant, we must pronounce it to be an elephant, whether it be brought to us from the north or from the south.

WHEN we see a lion, we must acknowledge it to be such, whether it has been reared amid the Lybian wastes, or in the unexplored forests of our own country.

AND, in like manner, when called to a case of pestilential or yellow fever, let us not deny to it, either its nature, its name, or its treatment, because we are unable to trace its descent from a tropical climate.

III. IF yellow fever be the offspring of putrefaction, why does it never break out and rage in the country, or in inland towns, remote from commercial cities ?

THIS question is incapable of receiving a direct reply, because it is founded on a false presumption. A denial of the truth of its premises, is the only answer to which it is entitled.

BUT, even admitting it to be true, that yellow fever never has originated, in the above places, it would operate as an argu-

ment of but little weight, in favour of the foreign origin of this disease. The accumulation of putrid substances, either in inland towns, or in any given space of country, is, in common, comparatively small, and the quantity of exhalation proportionably inconsiderable. These circumstances, added to a constant and copious supply of fresh air, cannot fail to prevent such places, from being as subject to a highly vitiated state of atmosphere, as a city so extensive and populous as Philadelphia.

THE fallacy of the idea, however, on which the above question is founded, is fully exposed, by the history of Harrisburgh, and several inland towns to the eastward, as well as by that of some parts of New-Jersey, of an extensive tract of the Genesee country, and of certain districts in most of the southern states, but, more particularly, in the Carolinas and in Georgia. In these places, yellow fever has repeatedly originated, and prevailed with as much malignity, as in any of the commercial cities of the Union.

IT has been asserted by some, that yellow fever has never occurred in the United States, except when unusually prevalent in the West-India Islands. This, the advocates of foreign importation have construed into an

argument, in favour of its introduction from that quarter.

THE most diligent enquiry has not been sufficient to convince me, that the above assertion is founded in truth. On the contrary, the farther I carry my researches on the subject, the more am I inclined to doubt its authenticity—I should rather have said, the more am I convinced of its absolute fallacy.

ADMITTING the fact, however, to be as there stated, it is explicable on principles, rational, obvious, and in every respect consistent with the doctrine of domestic origin.

IT is a presumption neither extravagant nor improbable, that the same pestilential constitution of atmosphere, which contributes to the generation of yellow fever here, may reach to the West-Indies, and there be productive of similar effects. On some occasions, such a constitution has been known to extend, not simply from one country to another, but, over half the peopled surface of the globe.

THIS was the case with the pestilential constitution of atmosphere, during the reign of the Emperor Justinian. This was the case with a similar constitution, in the four-

teenth century. And, this was particularly the case, with that peculiar constitution, which, a few years ago, gave rise to the disease denominated influenza. This last is known to have pervaded America, the West-Indies, Europe, and part, or perhaps the whole of the continent of Asia.

SINCE the year ninety three, as mentioned in my last number, febrile diseases have been more than usually prevalent and mortal, in Jamaica, and others of the West-India Islands, This is an argument of much weight, in favour of the opinion, that these Islands have not been exempt from the influence of that constitution of atmosphere, which has increased the malignity of the diseases of America.

NOR has the year eighteen hundred, been less productive of evidence in confirmation of the same principle. If, for some time past, the West Indies and the United States, have been ravaged, in common, by pestilential diseases, they have enjoyed, during the present year, something like a common exemption, (12) from this calamity. The long wish-

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(12) I do not mean, that either the United States, or the West-Indies, have been, during the present year, wholly ex-

ed for period would seem about to return, when health shall again shed her influence through the atmospheres of both places, and sweep away, or blast, the seeds of disease. In the declension, therefore, no less than in the attack and devastation of pestilence, these regions appear to be connected by a kindred fate. But the atmosphere being their only physical bond of union, must necessarily be the medium of this apparent sympathy.

I will now take the liberty of stating, under the form of questions, a few farther objections to the importation of yellow fever, and will thank the advocates of that doctrine, to answer them, on principles consistent with medical philosophy.

I. THE crews of several vessels, charged with having introduced this disease from the West-Indies, are known to have arrived here in perfect health. How is it possible, that, in these instances, contagion could have

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empt from pestilential fever. I lament that the reverse of this is true. They have only escaped that extensive epidemic rage, by which they have been assailed for some time past. How long our present good fortune may continue, it is not for us to risque a prediction. It may endure for many years, yet, perhaps, even the next season, may bring us a return of our late calamity.

remained attached to the timbers or apparel of the vessels, or to the seamens' clothes, during their whole passage, without injuring any one on board, and have become active and deleterious only after their arrival in our port?—Real contagion (as that of small pox, measles, &c.) never fails to act in a very different manner. It poisons amid the depurated atmosphere of the ocean, with no less certainty, than in the vitiated air of a large city.

II. It is known, that yellow fever prevails, to a certain extent, every year, in many parts of the West-Indies. Supposing it then to be a contagious, and an importable disease, what cause can the advocates of this hypothesis assign, for its not having been introduced into Philadelphia, or some other seaport in the United States, when we were wholly destitute of quarantine regulations, between the years sixty two and ninety three, notwithstanding our constant and extensive intercourse with the Islands?

INSTEAD of yellow fever, let us suppose the West-Indies to be the birth place and nursery of small pox. Let us further suppose, all our citizens to have been susceptible of this disease, and that, for upwards of

thirty years, that is, from sixty two till ninety three, we had kept up an extensive and uninterrupted intercourse with that variolous climate. Under these circumstances, is it probable, that, without the aid of the most rigid quarantine regulations, we could, for such a length of time, have escaped the introduction of this disease? By no means—Common sense revolts from the supposition, which is indeed too extravagant to be admitted, even by the advocates for the doctrine of importation.

BUT the same reasoning would apply, with no less force, to yellow fever, were it a contagious disease, and did its contagion possess but half the activity necessarily bestowed on it by its importers.

III. BUT, this disease exists in the West-Indies, not only every year, but likewise during every season of the year. Why, then, if it be contagious and importable, is it never introduced from thence, into our commercial cities, except in the latter part of our summer, or in the first of our autumnal months?

IV. IF the disease in question, be imported and propagated by contagion, why is it so immediately checked in this place, as

soon as the temperature of our atmosphere descends beneath the exhaling point? i. e. as soon as it becomes so low, as to put a stop to the putrefactive process? Real contagion is not of a nature so tender and perishable. Small pox and measles defy the rigor of the most inclement winter, while, like the perishable cause of yellow fever, putrefactive exhalation, the child and nurseling of summer and autumnal heats, expires, as soon as they withdraw their fostering influence.

V. IF it be imported and propagated, not through the medium of vitiated air, but only by human contagion, how is it, that hundreds have been attacked by it, who had only breathed the atmosphere of our streets, without having been near to any one sick, to any corpse, or to any article whatever supposed to have been infected? Diseases that are propagated solely by contagion, may be avoided, by shunning the immediate atmosphere of the sick. But, from those that are produced by a vitiated state of the air, there is no certain escape, except by removing from the place where they prevail.

VI. IF yellow fever be so frequently imported into this place, notwithstanding all our vigilance and exertion to the contrary,

why has it never been introduced, through the same channel, into Great Britain or France, whose commercial intercourse with the West-Indies has been so incomparably extensive, and where no quarantine restrictions are imposed on vessels from that quarter?—To attribute this exemption, as some have done, to the length of the voyage, from the West-Indies to the mother countries, is an argument too weak to merit a serious reply. If the supposed contagion of yellow fever can lie dormant, for six or eight months, and then produce disease in the United States, it may certainly produce a similar effect in Europe, after having lain inactive for as many weeks.

VII. How will the partizans of the importation of yellow fever, reconcile their ideas on this subject, with those of the most respectable physicians in the West-Indies, who declare, that with them this disease is “wholly destitute of contagion,” and, therefore cannot, either in the timbers or rigging of vessels, in articles of merchandize, or in the clothing, or persons of the sick, be imported from thence to any other climate?

VIII. THE last objection I shall urge, against the contagion and importability of yellow fever, is founded on a fact, which,

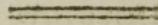
though already mentioned, and even familiar to every one, is notwithstanding of sufficient importance to be made a subject of further consideration.

IF this disease be propagated only by contagion, why is a summer and autumnal atmosphere, particularly the vitiated atmosphere of a large city, absolutely necessary to its communication? Why is it not, like the small pox, the measles, the hooping-cough, &c. communicable, during the summer and autumnal seasons, in the pure air of the country? And, why will it not spread, in a city, in the depth of winter? Finally, why, contrary to the laws which govern all other contagious diseases, is the progress of yellow fever, as certainly, and almost as suddenly, arrested by pure air and cold weather, as life is destroyed by azotic gas, or fire extinguished by the affusion of water?

A truly contagious disease, is a kind of self-dependent evil, which can be but little, if at all, either accelerated or retarded in its course, by any practicable condition of atmosphere.

As a candid discussion of the foregoing propositions, may tend to the interest of

science and humanity, by shedding light on a subject, in which both are concerned, I flatter myself the matter will be taken up, and treated on its merits, by some of my learned fellow members of the college of physicians, or by some of the other few medical characters in the United States, who have pronounced yellow fever to be an imported disease.



## No. VIII.

A SUMMARY OF OBJECTIONS AGAINST THE CONTAGION, AND CONSEQUENTLY AGAINST THE IMPORTABILITY OF YELLOW FEVER—THE FORMER PLAGUES OF GREAT BRITAIN NOT IMPORTED INTO THAT ISLAND, BUT GENERATED, IN A GREAT MEASURE, BY THE FILTH OF THE INHABITANTS—CONCLUSION.

**T**HE present communication, which I contemplate as my last, will contain but little else than a summary of the opinions and evidences, that have been, more amply detailed in my preceding numbers.

OF the merit of arguments thus abridged, simplified, and consolidated, my readers will be able to judge, with much more correctness and facility, than if they were suffered to remain in their present state of diffusion. If they be erroneous, their errors will be more readily detected and exposed; and if they be true, their truth, like the converging rays of light, will glow more intensely, by being collected to a point.

My reasons for doubting of, or rather disbelieving in, the contagious nature of yellow fever, are,

I. A similar disbelief, respecting the contagion of this disease, being entertained by the most experienced and enlightened physicians of the West-Indies, as well as by a majority of the same description of those, who have been conversant with it in our own country.

THOUGH this be nothing more than an argument founded on opinion, yet, even the opinions of men so respectable, and competent to judge of the subject in question, are not to be rejected without caution.

II. BECAUSE it requires, for its propagation, a vitiated atmosphere, and is not, like other contagious diseases, communicable from the sick to the well, in the uncontaminated air of the country.

THE non-communicable nature of this disease, in the air of the country, is a fact as well ascertained as any one connected with medical science. Were it really contagious, it would, as formerly observed, like the small pox and measles, bid defiance to every situation, and diffuse its poison through every possible description of atmosphere.

III. BECAUSE, even in the more clean and airy parts of Philadelphia, this disease is not communicable from one person to another.

THIS was particularly observable, in ninety seven, and ninety nine, seasons in which yellow fever was not epidemic over the whole city. During these years, such persons as contracted the fever in question, by exposure along the wharves, or in the lower parts of the city, and were nursed in situations remote from the exhalation of these places, did not, in any instance, communicate disease to their physicians, attendants,

or friends. It was a knowledge of this fact, that first impressed me with serious doubts respecting the contagion of yellow fever.

IV. BECAUSE the disease is immediately extinguished by the occurrence of a frost, so slight, as to affect only the air of the streets, and be scarcely perceptible in the atmosphere of our houses, which are considered, by the advocates for importation, as the principal reservoirs of the febrile contagion. This is a fact, of which none of the citizens of Philadelphia can be ignorant.

IF, then, an impression on the external atmosphere alone, is sufficient to check the progress of our autumnal epidemic, it must necessarily depend, for its propagation, on something contained in the air of our streets, and not attached to any of the contents of our dwellings. But, the general atmosphere of a place can be impregnated by nothing less than a general exhalation; whereas, human contagion is always confined to the persons, or apparel of the sick, or to the walls or furniture of the houses where they lie.

THERE is such a striking similarity of circumstances between the decline and termination of yellow fever, in Philadelphia, and

those of the common bilious fever, in marshy places (both taking place on the occurrence of cold weather) as must convince every candid enquirer, that these diseases depend, for their existence, on the same cause.

V. BECAUSE yellow fever has neither what can be strictly called a specific character, nor a definite period. In the appearance of its symptoms, it is the most irregular and multiform of all diseases; and, its term of duration is from twenty four hours, to as many days.

IN these respects, it differs essentially from small pox, measles, scarlatina, and every other description of truly contagious fever. When these latter diseases occur, they pass through certain regular, well defined stages, and each stage occupies a definite time. Nor is it in the power of the practitioner, either greatly to shorten or protract these periods, however he may moderate the violence of the symptoms.

THUS, for example, when attacked by small pox, we have, what is denominated the eruptive fever, the eruption itself, the maturation of the pustules, and their subsequent

desiccation. Nor is it possible for the physician, during any one of these stages, to check the disease entirely, and prevent the others from succeeding.

SIMILAR observations may be made, with respect to the whole catalogue of truly contagious fevers. Having once taken place, they have certain stages and periods, through which they will inevitably pass, the practitioner having nothing more in his power, than to moderate the symptoms, and thus render the issue less dangerous to the patient.

How different, in this respect, is the case with yellow fever! Have we not frequently seen this disease arrested, in its incipient state, by a well timed blood-letting, an active cathartic, or a plentiful diaphoresis? Can we not, by these means, oftentimes stifle the monster in his cradle, and rescue our patients from his forming grasp? And does not this circumstance tend, still farther, to destroy our belief in the descent of this disease from specific contagion? Of all contagious fevers, why should yellow fever alone resign its right to a specific character, and a determinate period?

ANOTHER fact deserves to be mentioned, which militates, not a little, against the opinion, that yellow fever is a contagious disease.

EVERY species of human contagion (I mean here, febrile contagion) with which we are acquainted, must remain, in the system, a certain definite period of time, before it produces its morbid effects. Nor is this period widely different, in different instances of the same disease.

BUT, this is by no means the case with regard to yellow fever. Some persons, exposed to the poison of this disease, have sickened in twenty four hours afterwards, while others have escaped till the expiration of nearly as many days.

My reasons for believing, that the disease in question is not imported, but originates from sources among ourselves, are,

I. BECAUSE it is not a contagious disease, and therefore its importation is utterly impracticable. A febrile poison, which cannot be conveyed from the city, to the distance of a few miles into the country, can much less be wafted through the pure air of the ocean,

from the West-India Islands, to the shores of America.

II. BECAUSE it was never introduced among us, from the year sixty two, till that of ninety three, notwithstanding our want of quarantine regulations, under an uninterrupted and extensive intercourse with the West-Indies.

III. BECAUSE it has never been conveyed into Britain or France, notwithstanding the exemption of the West-India vessels from quarantine restrictions, in all the ports of the mother countries.

IV. BECAUSE all attempts that party spirit could prompt, and ingenuity devise, to establish the importation of this disease, and to ascertain the channel of its introduction, have hitherto proved unsatisfactory and abortive.

OF this truth, the late season has furnished a striking instance. Though perseverance was wearied, and patience exhausted in the search, yet no vessel was found, that could be rationally suspected to have introduced the disease.

V. BECAUSE it is the constant product of putrefaction in other warm climates, abounding in neglected filth, and cannot, therefore, fail to result from the same cause, under the tropical temperature of the summer atmosphere of our city.

NATURE is too economical and wise, to admit into her system a plurality of causes for any one phenomenon; and, one of our most familiar rules of philosophy, teaches us, that, under similar circumstances, the same causes are always productive of the same effects.

VI. BECAUSE it has never raged among us, except during those months, in which, owing to the influence of the preceding heats, our atmosphere has been loaded with putrid exhalations.

IF it be a disease, depending on specific contagion, imported from the West Indies, why has it never been introduced, like the small pox, in the winter or spring, as well as in the months of summer and autumn?

IN reply to this it has been said, that the operation of a certain degree of heat, is necessary to prepare the air for the reception and propagation of the contagion of yellow fever.

IT must be observed, however, that heat alone is not sufficient to produce such a morbid condition of the atmosphere. In Jamaica, and others of the West-India Islands, where the heat is always great, such places as are at a distance from morasses, stagnant waters, and putrefying filth in general, are not only exempt from yellow fever, but are among the most healthy spots on the globe.

IT may be laid down as a physical maxim, to which there is no exception, that neither the yellow fever of America, nor the plague of the East, has ever been epidemic, in any place, where the atmosphere was not loaded with putrid exhalations.

VII. BECAUSE a genuine pestilence, or yellow fever, prevailed among the Aborigines of our country, previously to the existence of commercial intercourse with the West-Indies, and prevails, even at present, among our fellow citizens, in many places, remote from maritime situations.

IN proof of the former part of this assertion, testimony may be collected from the late Doctor Belknap's history of Connecticut; and, in support of the latter, we have the evi-

dence of many physicians, of strict veracity as men, and of high respectability in the knowledge and practice of their profession.

VIII. THE last reason I shall mention, for believing the yellow fever to be a disease of domestic origin, is, the concurring belief of the most distinguished medical and physical characters of the United States, whose opinion it would be presumptuous to treat with indifference.

THE present controversy, respecting the origin of the pestilential epidemics of our country, is not the only one of the kind to be found on the records of medicine. A contrariety of opinion, equally striking, existed with regard to the sources of those plagues which formerly desolated England, and many other countries of the old world.

I beg leave to detail, in their own words, the opinions of two celebrated writers, who believed that the plagues of Great Britain were not introduced from abroad, but generated by the action of their own domestic causes. In Dr. Jortin's life of Erasmus, we find the following passage :

“ ANOTHER letter of his” (meaning Erasmus) “ to the same friend, is very singular. Erasmus there ascribes the plague, from which England was hardly ever free, and the sweating sickness, partly to the incommodious form and bad exposition of the houses, to the filthiness of the streets, and to the sluttishness within doors.”

“ THE floors,” says he, “ are commonly of clay, strewed with rushes, under which lies, unmolested, an ancient collection of beer, grease, fragments, bones, spittle, excrements of dogs and cats, and every thing that is nasty,” &c.

“ ENGLAND” (continues Dr. Jortin) “ is happily altered for the better, in these respects, from its condition in the days of Erasmus; to which change, I presume, it may, in a great measure, be imputed, that we have been free, for so many years, from the plague.”

THE following extract is taken from Dr. Sims’ account of the epidemics of London :

“ IN 1665,” says our learned author, “ immediately after the frost, began the plague in London, which killed, according to the least

computation, sixty eight thousand five hundred and ninety six. Since that time the plague has vanished from the city, and all other epidemics seem to have become less malignant, owing to many causes; among which may perhaps be, a greater use of fresh vegetable food, less use of fish, an universal use of tea, superior cleanliness in our persons, a greater attention to our poor, in times of scarcity, which are now scarcely felt in any extreme degree; and, lastly, the tremendous fire in 1666, since which the streets have been very much widened, and the houses so enlarged, that the same number of inhabitants now occupy above double the space."

ON these extracts I shall offer no comment. They exhibit the decided opinion, of two very able judges, that Britain was indebted, not to foreign climates, not to commerce, but to her own atmosphere, aided by the influence of her domestic causes, for the wasteful plagues, and other epidemics, which so frequently spread desolation over a great part of her territory. A considerable portion of the writings of Dr. Sydenham, is little else than a chain of facts, calculated to establish the same doctrine.

My discussion of the question at issue being closed, I am unwilling to retire from the

public eye, without leaving a record of my regret, for the evils which have resulted (not indeed from the controversy itself) but, from the manner of the controversy, respecting the origin, nature, and treatment, of our autumnal pestilence.

FROM this source has arisen a determined and intolerant spirit of party, which a liberal and enlightened philosophy disowns, and humanity has had too much reason to lament. This tyrant of the mind, devouring every subordinate sentiment and feeling, (as the headlong torrent swallows up the inferior rivulets, in its course) has, in some instances, daringly trespassed on the palladium of private character, in others, dissevered the bonds of social intercourse, and too frequently excited distrust and animosity between individuals, who had been formerly on terms of intimacy and friendship.

NOR is this the whole amount of the influence of this spirit of party. It has contributed to a temporary degradation of the profession of medicine, and has, not a little, increased the quantity of human misery, and the frequency of death, by diminishing the confidence of the public in medical aid.

SUCH are a few of the effects, produced by the illiberal and unphilosophic manner of the controversy in question—Effects, which every virtuous citizen must devoutly deplore, and which nothing but a lapse of years will efface!

HAVING thus endeavoured to obviate whatever objections have been raised against the doctrine of the domestic origin of yellow fever, and to refute all arguments, advanced in favour of the contrary hypothesis, I shall submit the issue to the effects of time, and to the candid decision of future philosophers. In the present instance, I am much more concerned for the interest of truth and humanity, than for my own reputation, as a medical enquirer. If, therefore, from wrong impressions, or a want of better information, I have been unfortunately engaged in attempting the inculcation of an error on the public mind, it is my hope and fervent wish, that some auspicious combination of circumstances may speedily occur, that a spirit of illumination may be diffused through our country, to dispel the illusion, and avert the mischief!

AN EXAMINATION OF, AND OBJECTIONS TO, DOCTOR CHISHOLM'S ACCOUNT OF THE INTRODUCTION OF A CONTAGIOUS FEVER, INTO THE TOWN OF ST. GEORGE, FROM THE COLONY OF BULAMA, IN THE SPRING OF NINETY THREE—THE IMPROBABILITY OF THE SAME FEVER, HAVING BEEN BROUGHT FROM GRENADA TO PHILADELPHIA, DURING THE SUMMER OF THE SAME YEAR, EVEN ADMITTING THAT IT HAD BEEN INTRODUCED INTO THE FORMER PLACE, FROM THE COAST OF AFRICA.

**T**HOUGH sensible of the extent, to which the subject of the preceding numbers has already led me to tresspass on the time of my readers, I must still plead a claim to their farther indulgence.

I am induced to this, neither by my devotion to a spirit of controversy, nor by a belief that any portion of the respectability of a work, consists in the number of its pages; but, by that versatility of conduct, and multiform mode of defence, adopted by the advocates of foreign importation.

No sooner are these indefatigable combatants defeated in one point, and dislodged from one covert, than they retreat with Parthian

swiftness to another. I had almost said, that like the Hydra of ancient story, they are no sooner deprived of one head of error, than their ever wakeful but misguided industry, compensates them for their loss by an hundred more!

BUT, fortunately for the cause of truth, and the welfare of mankind, their numerous retreats of fallacy have been so far detected and exposed, that they appear to be reduced to their last hope. They have, at length, been obliged to entrench themselves in an insulated situation, from which a retreat would seem to be impracticable. Their only alternative now, is successful defense, or unconditional submission.

To drop the language of metaphor, and adopt a style more suited to my subject, the most active and decided advocates for the importation of yellow fever, rest the whole of their doctrine on a single fact, at least, they rely on a single source, for the collection of testimony to support it.

THIS change has somewhat altered the complexion of the controversy, and calls for a different mode of refutation.

INSTEAD of admitting our late autumnal epidemics to be the same with the bilious endemic of the West-Indies, and other warm regions—instead of granting them, as they did at first, to be produceable in every tropical country, the above characters declare them to be necessarily derived from the coast of Africa. They consider them as the same with the Boulam fever, reported, by Dr. Chisholm, to have been introduced, by the ship Hankey, into the Island of Grenada. In short, they hold them to be nothing else, than so many branches springing directly from that parent-stock.

SUCH appears, at present, to be the state of the controversy, that the scale of victory must incline to the one side or the other, according to the truth or fallacy of this opinion. My object, in this number, is, to subject it to a faithful and candid examination.

IN attempting this, I shall be led to the consideration of two particular and distinct heads.

I. THE nature and force of the evidence, adduced by Dr. Chisholm, in support of his

belief, that a contagious fever was introduced into Grenada, by the ship Hankey.

II. THE weight of testimony brought forward, by the advocates of foreign origin in this place, to prove the importation of this fever from Grenada to Philadelphia.

IT would be injustice to the memory of the late Dr. Elihu Smith, of New-York, (whose pen was a sunbeam to whatever it touched), not to acknowledge myself indebted to his industry and accuracy, for several of the facts that will be used, in the discussion of the first of these heads.

I am induced to believe, that the pestilence, described by Doctor Chisholm, was not introduced into the town of St. George, by the ship Hankey, for the following reasons:

1. BECAUSE the doctor appears to be himself the only physician of eminence in the West-Indies, who has adopted this opinion.

BUT, the catalogue of medical characters in that place, who advocate the doctrine of West-India origin, is extensive and illus-

trious. Among these I must notice, in particular, Mosely, M'Clean, Lempriere, Pinkard, Boreland, and Jackson, (13) men, from whom,

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(13) AMONG several fanciful opinions, and some interesting matter, contained in Dr. Jackson's late publication, entitled "An Outline and History of the Cure of Fever," there exists one error, in particular, which I should deem myself culpable were I to pass unnoticed.

WHAT must render this error peculiarly exceptionable to the mind of an American physician, is, its being calculated to disseminate wrong and unfavourable impressions, relative to the state of medical science and opinion in this country.

I do not mean to charge Dr. Jackson with any degree of voluntary misrepresentation. I am confident, that the liberality and rectitude of his mind, are incompatible with false and dishonourable intensions. I cannot, however, but lament, that he should, when possessed of but very imperfect information, have ventured to touch on a subject, which involves the professional reputation of some of the most respectable physicians in the United States.

IN the above mentioned work, page 219, (Edinburgh edition) our author says, "The other party (alluding to the physicians of Philadelphia) maintains the origin of yellow fever to be strictly domestic, but that the immediate source has been ordinarily artificial, *viz.* damaged cargoes of coffee, onions, &c. This party, at one time, supposed the disease to be virulently and generally contagious, it now supposes it to be so, only conditionally and in a low degree—Various proofs and testimonies are adduced in support of these contradictory opinions, which, publicly and privately are maintained by their respective partizans, with more zeal than discernment.

AGAIN, page 220, the doctor repeats, "The opinion of general contagion, maintained at one time by this party (the advocates of domestic origin) is now abandoned, but, a conditional or limited contagion is still believed to take place."

THE present memoir (which contains not my own sentiments alone, but the sentiments of most of the physicians of Philadelphia, who believe in the domestic origin of yellow

to use Dr. Chisholm's own expression, "it is unsafe to differ, on medical subjects."

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fever) furnishes abundant proof of the injustice done by Dr. Jackson, to that extensive and respectable class of practitioners.

It is here explicitly declared, (and most of my professional brethren concur with me in opinion) that so far from being conditionally contagious, yellow fever is not contagious at all; and that, so far from being essentially dependent on foul shipping or damaged cargoes, these constitute only one of its accidental sources.

NOR is this opinion, by any means, of recent date. It has been gaining ground ever since the autumn of ninety seven. I well recollect, that, in the summer of ninety eight, when Dr. Jackson was on a visit to Philadelphia, the non-contagious nature of yellow fever was a favourite topic with many of my medical acquaintance.

WITH respect to the other branch of the hypothesis, which Dr. Jackson has thought proper to attach to us, I believe it has never been advocated by any physician, either in this, or in any other country.

It has indeed been said, and apparently with much justice, that exhalation from damaged coffee, and other putrid substances, discharged from vessels at our wharves, gave origin to many of the early cases of yellow fever in ninety three, ninety seven, and ninety eight. But, no one has ever yet committed such an outrage on probability, as to suppose, that the effluvia from substances so limited in extent, could alone disseminate pestilence through all Philadelphia, and, independently of contagion, keep it in existence for several months.

THE physicians of Philadelphia are no less sensible, than those who have held staff appointments in the West Indies, that foul air from damaged coffee, and other imported vegetable substances, is of the same nature, and will produce the same disease, with that given out by our own domestic sources of putrefaction. And, they have uniformly contended, that a general epidemic, must have for its cause a general exhalation.

It is true, that all the practitioners of medicine in this city, fell into an error, relative to the contagion of yellow fever,

THESE enlightened physicians were incapable of regarding, with an eye of indiffer-

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when it first made its appearance among us in ninety three. But, by the advocates of domestic origin, this error has been long since abandoned; and Dr. Jackson has found too much cause to change his own professional opinions, to take exception at changes in the opinions of other physicians.

I will not contend with the doctor, whether the medical partizans, in Philadelphia, exhibit most "zeal" or "discernment" in defence of their respective opinions. But, I will venture to assure him, (and I feel the pride of an American in offering the assurance) that, within the term of the last seven years, more true light has been shed on the origin, nature, and treatment of pestilential diseases, by the writers of the United States, than by those of all the nations in Europe.

I know of no proposition more weak (I might have said, more absurd) than that which admits yellow fever to be conditionally contagious, or, as it is generally expressed, contagious only under certain circumstances.

If a disease be contagious at all, no circumstances can render it otherwise. Contagion forms an essential trait in its character, and to be deprived of that trait, would be, to be deprived of one of the most striking qualities of its nature,—would be, in fact, to be converted into another disease.

Who ever heard of small pox, measles, lues venerea, or any other really communicable disease, so far relinquishing its nature, as to become only conditionally contagious? It is indeed true, that at times certain constitutions resist the action of the poisons of these diseases. But such instances are extremely rare, and do not, in any degree, militate against their unconditionally contagious nature. They only bespeak the existence of a peculiar cast or state of constitution, in the persons exempt from the influence of contagion.

TRUE febrile contagion is the result of a morbid and specific state of action, in certain secreting vessels of the human body. Nor can these vessels do otherwise than secrete this contagion, while such specific action exists. But, to alter or destroy this action, in which the essence of the disease consists, is to alter or destroy the disease itself.

ence, the supposed importation of pestilence, into the Island of Grenada. Though they felt as men, for the calamity before them, yet, without suffering themselves to be misled, either by any thing of novelty in its appear-

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As well might we say, that fire can burn and cold chill us, only conditionally, or, that the saliva of a rabid animal, and the effluvia of the Mancinella, are only conditionally poisonous, as that a fever of a contagious nature, is propagable only under certain circumstances.

WHEN the poison of a contagious fever is once secreted, it is then a certain modification of matter, capable of a specific action; and, when applied to the human system, whether amidst pure or contaminated air, will as certainly produce that action, as any other physical cause will give rise to its appropriate effect.

I pass in silence, as being foreign from my subject, certain illiberal and unfounded remarks, admitted by Dr. Jackson into the same publication, relative to the conduct of the Philadelphians, during the yellow fever of ninety three.

“PUSILLANIMITY, selfishness, and depravity of heart,” are the heavy and degrading charges, with which our author has attempted to blacken the character of this respectable, benevolent, and virtuous people.

I will not enquire from what source the doctor has derived his information on this subject. But, I sincerely regret his having been misled by documents, which must have been inspired by envy, and dictated by falsehood!

IF ever courage and magnanimity appeared to tower above the common level of humanity! If ever considerations of self-interest were completely discarded! If ever, in the midst of danger and death, virtue was practised purely “for virtue’s sake!” Such spectacles ennobled the conduct of many of the citizens of Philadelphia, during the calamity in question.

WERE I not restrained by motives of delicacy, I could mention names, among which that of “Marseilles good Bishop” would be proud to be enrolled!

ance, or by popular prejudice, they enquired into its origin, with the calmness and deliberation of philosophers.

AFTER industriously collecting, and weighing with attention, all the evidence which the subject afforded, they found no reason to believe, that either the pestilence of Grenada, or that which appeared afterwards in the neighbouring Islands, was of African descent. On the other hand, the more they enquired, the more perfect was their conviction, that the disease, in question, was nothing else than the bilious endemic of their climate, heightened in malignity by various causes.

NOR did their conviction terminate here. In the course of their researches they became persuaded, that the disease was wholly destitute of contagion, and, therefore, incapable of being either introduced among them, from the coast of Africa, or exported from the West Indies to any other country.

WE have, then, on the one hand, the solitary evidence of Dr. Chisholm, surgeon to a small establishment of ordinance in the Island of Grenada ; and, on the other, that of a considerable number of medical characters, some of them first in military rank, and all of them in

the first grade of professional eminence, in the places where they resided. It requires no great power of discernment, to discover on which side the evidence ought to preponderate.

THOUGH the testimony of mere opinion cannot be admitted as conclusive on either hand, its weight must be in proportion to its accumulation, and to the respectability of those from whom it is derived.

2. BECAUSE the history of the Hankey, previously to her arrival at Grenada, renders it highly improbable that she could have introduced a contagious disease into that Island.

THIS vessel left Bulama, the place where her disease appears to have originated, on the 22d of November 1792, and arrived at Grenada, on the 19th of February 1793. Her passage from the one Island to the other, included a period of three months all but three days. During this time she had been twice very carefully cleansed and purified, viz. once at Biasso, and once at St. Jago. She had also undergone a similar process, previously to her sailing from the Island of Bulama.

THE purification, which the Hankey underwent at St. Jago, took place subsequently to the termination of disease among her crew and passengers. In point of time, therefore, it was peculiarly calculated to prevent her from continuing any longer a nidus of contagion. Provided the process was skilfully performed, nothing short of her entire destruction could have offered a higher security against future danger.

BUT, these purifications amount to nothing more than presumptive evidence, that the Hankey was clean, on her arrival at Grenada. We are in possession of other testimony, more positive in its nature, and more conclusive in its tendency.

THIS vessel, during her continuance at the Island of St. Jago, kept up an uninterrupted intercourse with the Charon and Scorpion, two British ships of war, without communicating a symptom of disease to either. On her passage from thence to Grenada, she touched first at the Island of Barbadoes, where she lay three or four days, and afterwards at that of St. Vincents, where she continued about a day and a half. At each place the crew were not only suffered to go

on shore, and mingle freely with the inhabitants, but the latter even came repeatedly on board, yet no disease resulted from this liberal intercourse.

WITH the facts contained in this last paragraph, and which are so important in an enquiry into the state of the Hankey, Dr. Chisholm appears either to have been ignorant, or to have suppressed them in his narrative respecting that vessel. To be ignorant of them, argued a palpable deficiency in the necessary knowledge of his subject, and their suppression, if known, could not have resulted from a spirit of candour.

IF, notwithstanding the above intercourse with the Hankey, the crews of the Scorpion and Charon, and the people of Barbadoes and St. Vincents, escaped infection, why should the inhabitants of Grenada have been more unfortunate?

Is there any thing in the constitutions of the Grenadians, calculated to render them peculiarly liable to pestilence? Can it be supposed that the matter of contagion, in the Hankey, was either less abundant, or less active, when she touched at Barbadoes and St. Vincents, than when she arrived at Gre-

nada? Did she not remain, at the two former places, a sufficient length of time, to have left behind her the seeds of disease? Finally, is there a single circumstance, in the whole history of the Hankey and her voyage, which can suggest to us a reason, why the Grenadians should have been infected by her, while others, equally and previously exposed to her, escaped unhurt?

ON the other hand, if there existed any difference, with respect to the chances of escaping infection, this certainly appears to have been in favour of Grenada.

THE actual sickness of the Hankey had ceased before her arrival at either Island. If, therefore, time could have had any effect in destroying the contagion she is supposed to have contained, she must, doubtless, have had less of this poison on her arrival at Grenada, than when she previously touched at Barbadoes and St. Vincents.

THE following is, at least, a very plausible, and, in my view, a just statement of the matter now under consideration :

THE pestilence of Grenada exhibited, on its first appearance in that Island, consider-

able novelty, combined with uncommon malignity of character,

It did not immediatly occur to Dr. Chisholm, that these novel phenomena might be the effects of a new and pestilential constitution of atmosphere, co-operating with a superabundance of the common exhalation of the place.

To use his own words, he considered the disease, as in all respects, a "nova pestis" specifically different from the endemic of the West Indies, the origin of which was to be sought for only in a distant climate,

THE Hankey, having arrived a short time before the appearance of this supposed foreigner, was fixed on as the vessel in which he had made his descent.

THIS charge appears to have been, altogether, under the influence and direction of accident. It was necessary for Dr. Chisholm and his associates in opinion, to select some vessel, as the vehicle of importation, and the Hankey, having, some time before, had a sickly crew, was more liable to suspicion than any other vessel then in the harbour.

HAD any vessel from the Levant, arrived, about the same time, at the port of St. George, the Hankey would, in all probability, have lain unsuspected, while the former would have been stigmatized, as the source of the calamity, and the disease have been denominated the plague of the East.

It was, therefore, the novel appearance of the epidemic, in question, connected with the necessity of coming to some decision with regard to its origin, rather than any direct evidence against the Hankey, that subjected her to the suspicion of being an infected vessel.

UNFORTUNATELY for Dr. Chisholm, that impatient propensity we feel, to assign immediately some cause for present evils, raised perhaps to a higher pitch, by repeated and pressing interrogations from the inhabitants of the town of St. George, precipitated him into a decision on this subject, before he had given it a sufficient examination. And, we well know the reluctance, with which men relinquish an opinion, for the truth of which they have pledged their judgment, and, in some measure, their character.

PHYSICIANS of discernment, in other parts of the West-Indies, remote from the tumult and confusion, occasioned by the pestilence of Grenada, had an opportunity of viewing the disease, in all its relations, with that degree of calmness essential to success in philosophical researches. No cause existed to hurry them into a premature determination, with respect to either the origin or nature of the evil. Their decision, therefore when formed, was neither the hasty result of the first impressions made by the novelty and malignity of the disease, nor was it the offspring of a troublesome importunity among the inhabitants, pressing in their enquiries after the birth place of the calamity. It was the mature result of accumulated and well digested evidence. But, this decision, as already observed, was uniformly in favor of the doctrine of West-India origin.

SIMILAR to the foregoing situation of Doctor Chisholm, and equally calculated to betray into error, was that of the physicians of Philadelphia, in the autumn of ninety three.

THESE gentlemen were the first, who were called on to decide respecting the origin of a disease, novel to them in several of

its symptoms, and, in its general malignity, devastation, and rapidity of progress, altogether unprecedented in the annals of our country.

ALARMED and disconcerted by such a formidable combination of circumstances, and, constantly importuned by the interrogatories of their fellow citizens, most of them, in like manner with Dr. Chisholm, were hurried into an opinion, founded on a hasty and very partial view of their subject.

EITHER unacquainted with, or not immediately adverting to, the laws which govern epidemic diseases, they conceived it impossible that a pestilence of such gigantic force, and, in many respects, so different from the common diseases of our country, could originate from the action of domestic causes. Hence, by one hasty and inconsiderate step, they were precipitated into that abyss of error and inconsistency, which constitutes the doctrine of foreign importation.

BUT, the case was different with most of the physicians of New-York, Baltimore, Boston, and Norfolk; not because they were more enlightened than those of Philadelphia, but, because their situations were more fa-

avourable for the discovery of truth. Remote from the place where yellow fever appeared first, with unmasked features, they were at liberty to suspend their opinion, respecting its origin, till the subject had undergone the necessary investigation. Nor was this suspension of opinion without its effect. When the disease appeared, finally, at their own doors, actual observation on it, instead of embarrassing them, served only to confirm them in that opinion, for which they were prepared by preceding circumstances, namely, that it was not the descendant of a foreign climate, but, an evil generated and pampered among ourselves.

HENCE it would appear, that medical characters have been, at all times, induced to adopt the doctrine of foreign importation, or that of domestic origin, accordingly as they have formed their determination from a partial and hasty, or, from a general and deliberate view of the subject. And, hence the reason, why so large a proportion of the older practitioners of Philadelphia, compared with the other commercial cities of the United States, persist in their belief of the former doctrine.

THE younger physicians of this country, generally, but particularly those who have

received their education at the University of Pennsylvania, since the year ninety three, and who, having no prejudices to encounter relative to the present controversy, were, on that account, the more susceptible of truth, have almost universally adopted the opinion, that our late epidemics were of domestic origin.

3. A strong circumstantial evidence of the fallacy of any doctrine, is, its advocates being obliged to involve themselves in inconsistencies in attempting its support. Truth is simple and plain, seldom requiring to be defended by intricate, and never by contradictory arguments.

LET us examine, by this test, Dr. Chisholm's hypothesis, respecting the introduction of pestilence, by the Hankey, into the Island of Grenada.

WE are told, by the doctor, in the seventy ninth page of his "Essay on the Malignant Pestilential Fever," that a warm climate, such, for example, as that of Grenada, and of the West-Indies in general, is less friendly to the propagation of contagious diseases, than a temperate one, such as that of

Great Britain, and of most of the countries of Europe. We are further informed by him, in the ninety-first page of the same work, that between the first of June, and the middle of August 1793, during part of which period, the pestilence of Grenada was at its height, two fleets sailed for Europe from the port of St. George.

As, from our author's own narrative, most of the shipping in the harbour, particularly that part engaged in the regular trade with Britain, appears to have suffered from the ravages of the epidemic, it is not possible, that all the vessels belonging to these two fleets, could have entirely escaped. Some, probably the greater part of them, on sailing for Europe, must have carried along with them more or less of the disease in question. Yet, without being previously subjected, either to quarantine or cleansing, they all entered their destined ports, and their crews mingled, as usual, with the inhabitants, without disseminating among them the seeds of pestilence.

IF, then, after a voyage of only four or five weeks from a sickly port, and, without being cleansed, two whole fleets were unable to introduce the above disease into any of the

ports of Great Britain, where, according to Dr. Chisholm, the climate is friendly to the propagation of contagious diseases ; how is it possible, that after a voyage of nearly three months from the place of her sickness, and, after two very faithful cleansings, the Hankey alone could have introduced the same disease into the Island of Grenada, where, according to the same author, the atmosphere is unfriendly to the existence and spreading of contagion ?

THE following is a brief but fair specimen of the logic of Dr. Chisholm, on this point :

THE climate of Grenada is unfriendly to the introduction and propagation of contagious diseases, while that of Great Britain is favourable to both. But, in the year ninety three, one sickly vessel, which had been three times cleansed and purified, from the commencement of her sickness, introduced a contagious fever into the former place ; whereas, in the same year, two whole fleets, a great part of which had been ravaged by the same fever, and, had not been subjected to purification at all, were unable to disseminate contagion through the latter.

As the doctor has, by his singular mode of reasoning, proposed this physical enigma, in the first edition of his "Essay on Malignant Pestilential Fever," I flatter myself he will favour the public with a solution of it in the second, which, I am told, he is now preparing for the press.

FOR the purpose of illustrating, and further impressing on Dr. Chisholm's mind, (should these memoirs ever fall into his hand) the inconsistency of his reasoning, in the above instance, I beg leave to lay before him the following proposition :

LET us suppose two persons, A and B, to be possessed of different degrees of susceptibility, with regard to the influence of contagion. A, whose susceptibility is much the weakest, is obliged to sleep, for a single night, on a bed, where, several weeks before, a person had died of a contagious disease. The bed, however, had been previously well aired, and all its apparel carefully washed. B, on the other hand, who is constitutionally much more liable to be injured by contagion, is obliged to sleep, for ten or twelve nights in succession, on a bed where a person had died of the same disease, a few days before,

and where no precautions of cleanliness had been adopted.

I beg to be informed by the doctor, or any of his adherents, which of the aforesaid persons runs the greatest risque of contracting disease?

LET the names be changed, and, other circumstances remaining as above, A will be Grenada, and B, Great Britain, in the case of the fever described by Dr. Chisholm.

OUR author's making the pestilence of Grenada, so readily introduceable, by single vessels, into Philadelphia, in the summer of ninety three, from thence to St. Pierre, and, from thence, again to Grenada, the climates of all which places are much warmer than that of Great Britain, where it could not be propagated, even by fleets, is nothing more than a continuation of the above inconsistency.

4. ANOTHER reason for believing, that the pestilence of Grenada was not imported from the coast of Africa, but generated by the action of domestic causes, is, that in a short time, after its appearance in the port

and town of St. George, it became the sole disease of the place, by either banishing all others, or obliging them to do homage, by assuming its symptoms.

As nothing can be more explicit and satisfactory on this head, than the account given of it, by Dr. Chisholm himself, I beg leave to quote it, in his own words :

“ Most other diseases,” says the doctor, “ degenerated into, or partook very much of the nature of this. Dysenteries suddenly stopped, and were immediately succeeded by the symptoms of the pestilential fever. Catarrhal complaints, simple, at first, soon changed their nature: Convalescents from other diseases were very subject to this; but, it generally proved mild. Those labouring at the time, under chronic complaints, particularly rheumatism and hepatitis, were also very subject to it. The puerperal fever became malignant, and, of course, fatal; and even pregnant negro-women, who otherwise might have had it in the usual mild degree, peculiar to that description of people, were reduced to a very dangerous situation by it.”

HAD Dr. Chisholm been endeavouring to prove the Grenadian origin of the disease,

in question, he could not have adduced a more forcible argument, in favour of his opinion, than that furnished by the above detail of facts.

FOR, by physicians, who have made the subject of epidemics their study, it has long been admitted as a physical axiom, that a disease which banishes from the place where it prevails, or assimilates to itself, all others, must result from a morbid condition of the atmosphere, in general: I mean the atmosphere of the place where the disease exists. From this self-evident truth (if any truth in physics be self-evident) I am confident Dr. Chisholm has too much discernment and candour to withhold his assent.

BUT, such a state of atmosphere as the above, requires for its production, a cause much more powerful and extensive, than the quantity of contagious effluvia, issuing from the bodies of a few hundred, or even of many thousand sick and dead.

DR. CHISHOLM admits, that the contagion of the pestilential fever of Grenada, never operated at the distance of more than ten feet from its source. How, then, is it possible, that a cause so circumscribed, and compara-

tively feeble (particularly as the sources of it were not extremely numerous) could so far effect the whole atmosphere of a place, as to suspend or modify all its native diseases? The supposition is certainly an extravagant one, and can originate only in a want of information, or a negligence of reflection.

THE small pox has been known to infect at double the distance, assigned as the limit of the above contagion. Suppose, then, this disease had been introduced, simply by infection, into Grenada, instead of the pestilence described by Dr. Chisholm, would it, in the space of a few weeks, have so completely revolutionized the atmosphere of the place, as to banish all other diseases, or transform them into its own likeness?—By no means. It would, as in other places, have spread gradually and slowly from house to house, allowing the usual diseases of the season to pursue their customary course.

IF a disease, simply contagious, can so far usurp the ascendancy in a place, as to banish, or assimilate to itself all others, why is not this the case with small pox, in Philadelphia, during the seasons of inoculation?

THE number of persons, in this city, affected with small pox, in the natural way, and by inoculation, every spring, is superior to that of those, who were ill of pestilence, at Grenada, in the year ninety three. The volume of variolous contagion with us must, therefore, be greater in at least the same proportion.

BUT this circumstance has no effect, in either banishing or modifying our vernal diseases. We have our pneumonies, our rheumatisms, and, our catarrhs, in the same number, and with the same symptoms, as we would, were the small pox unknown in our country.

THIS latter disease, being in some seasons more, and in others less malignant, is evidently influenced by the temperature of the weather, and, by certain states of the air; but, has never yet been able, by its contagion alone, to give rise to a variolous constitution of atmosphere—has, never yet been able, through this medium, to make its co-temporary diseases acknowledge its empire, and assume its livery.

It has been long my opinion, that a variolous constitution of atmosphere, produ-

ced originally, not by local contagion, but, by the operation of certain physical causes, which philosophers have hitherto sought after in vain, may, in any populous district or country, give rise to an epidemic small pox, which shall reign, for a while, the monarch of the place. But, I again repeat, that medical records furnish no instance, where either small pox, or any other contagious fever, has solely, by the power of contagion, so far revolutionized the general atmosphere, as to suspend or modify all other diseases.

NOR is it possible that such an event can ever occur, till the general laws of nature submit to the controul of topical causes. As well might we expect the fervour of the tropics to be subdued by the coldness of an ice-house, or, the inclemencies of a polar sky, to yield to the warmth of a few small fires, as the general constitution of the atmosphere to be counteracted by the influence of local contagion.

5. My last argument against the importation of the pestilential fever of Dr. Chisholm, from the coast of Africa, is, because it attacked those recently from Europe, and other high latitudes, much more readily than the natives and old inhabitants of the Island

of Grenada. Negroes, in particular, enjoyed a greater exemption from it, than any other description of people.

To physicians of reading and observation it is unnecessary to remark, that such discriminations constitute no part of the character of truly contagious fevers. The poison of these diseases assails, with equal success, the black and the fair, the native of the tropics, and the hardy descendant of the climates of the north. Of the truth of this, small pox, measles, and lues venerea, furnish conclusive testimony.

WHEN there was every possible chance for introducing the contagion of the pestilence of Grenada (supposing the disease to have been contagious) into the Island of Great Britain, the inhabitants remained in perfect safety. Why, then, should the very same people have been so peculiarly susceptible of disease, from the same poison, on removing from their own, to a tropical region? Admitting this apparent augmentation of susceptibility to have been real, it would have operated in contradiction to the well known fact, that warm climates are more unfriendly than temperate ones, to the existence and propagation of febrile contagion.

BUT, the peculiar liability of Europeans to the foregoing disease, is easily explicable on a different principle.

TROPICAL climates, though unfriendly to the existence and operation of contagion, are the hotbeds of putrefaction, and the laboratories of noxious effluvia. These gases mingling with the general body of the atmosphere, perpetuate in it something of a pestilential constitution, the power and malignity of which, are at times greatly augmented, by the influence of uninvestigated but general causes. This appears to have been the case in the town of St. George, in the year ninety three.

SUCH, however, is the power of habit, that the natives and old inhabitants of the place, (though apparently possessed of feeble health) having been long accustomed to a vitiated atmosphere, bore its impressions without much injury, while its malignity was destructive to robust strangers, from high latitudes, who had always been used to uncontaminated air.

It is thus, that, from habit, an enfeebled Turk will himself devour, with impunity, as

much opium, as would prove fatal to several hardy Europeans.

IF, instead of the natives of Great Britain removing to the town of St. George, the heated and contaminated atmosphere of that place could have been transported to them, it would, independently of contagion, have affected them with pestilence, in their own climate, no less than it did beneath that of the tropics.

SUCH are my reasons for believing, that the pestilence of Grenada, in the year ninety three, was not imported into that Island from the coast of Africa, but generated by the action of domestic causes.

BUT, even admitting that it was, in the first instance, carried by contagion from the coast of Africa to the Island of Grenada, what evidence is there, that it was introduced from thence into the city of Philadelphia?

CAN the advocates of importation point out any line of actual communication, in the summer of ninety three, between this city and the port of St. George, which could have

served as a channel for the admission of this disease?

So conscious are these gentlemen of the incompetency of their resources, for the accomplishment of this, that they have never dared to commit themselves in the attempt. They have only told us, in general terms, that the disease was introduced among us, leaving the particular manner to our own conjecture.

THEY did, indeed, during our distresses, in ninety three, at several different times, fix on as many different vessels, as the vehicles of its conveyance. Their misfortune, however, was, that neither of those vessels had, either directly or indirectly, had the slightest intercourse with the Island of Grenada.

THE only argument I have ever heard advanced, by the advocates of importation, to prove that our epidemic of ninety three, was derived from the Island of Grenada, is so pitifully weak, that it is impossible to listen to it with a serious countenance. It is taken from a note to page 201 of Dr. Chisholm's "Essay on the Malignant Pestilential Fever." I shall give it in the doctor's own words, begging the reader (should he attach to it no

more weight and respectability than I do) to be assured, that I introduce it, not because I think it worthy of refutation; but, to show by what flimsy testimony men will struggle for the support of a favourite doctrine.

“ THAT they,” (meaning the fevers of Grenada and Philadelphia) “ were the same,” (says our author) and consequently the latter a descendant of the former, “ the following fact renders evident: A vessel from Philadelphia introduced the disease into St. Pierre, Martinique, in October 1793. Another vessel from New-London touched at St. Pierre, in her way to Grenada, and received the infection. On her arrival in February 1794, the sick were put under my charge, and I found the disease to be my old enemy, the pestilential fever. I treated it with mercury and was successful.”

As there are certain truths so clear, in themselves, that reasoning cannot render them more impressive, there are, in like manner, certain arguments so consummately weak, that in refutation of them reasoning would be lost, as we attempt, in vain, to increase the darkness of a place, from whence all light has been already excluded.

I shall dismiss this subject, by a single remark, namely, that to depend solely for the support of any doctrine, on an argument so feeble and inconclusive as the foregoing one, bespeaks either a mind disqualified for controversy, or a cause incapable of defence.

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No. X.

A STATEMENT OF THE ANALOGIES BETWEEN BILIOUS AND YELLOW FEVER—OUTLINES OF THE PRACTICE PROPER TO BE PURSUED IN YELLOW FEVER—THE OPINION THAT YELLOW FEVER IS A DISEASE OF DOMESTIC OR AMERICAN ORIGIN, NOT NEW—VARIOUS POINTS OF DIFFERENCE BETWEEN YELLOW FEVER, AND TYPHUS MITIOR, OR COMMON SHIP FEVER.

**I**N my last number, I controverted, at some length, the opinion, which derives our yellow fever from the coast of Africa, and intimated my belief, that it is the same with the endemic of the West Indies, and the common autumnal fever of our own country.

THIS belief is founded principally on the numerous and striking analogies, existing

between these diseases, of which I beg leave to offer the following statement:

I. THE common bilious, and the yellow fever (I should have said states or modifications of fever) of our country, appear and disappear, at the same seasons of the year.

THE customary period of their prevalence, in temperate climates, is, from the middle or last of July, till the commencement of cold weather. Sometimes, owing to the warmth of the spring co-operating with other causes, they appear as early as the middle or beginning of June.

THE progress of these forms of disease, after they have spread to a certain extent, is but little affected by rain, unless accompanied or succeeded by cool weather. It is most certainly and effectually checked by the occurrence of frost. In climates bordering on the line, they prevail indiscriminately at all seasons.

II. THEY appear only in situations of the same description, being confined exclusively to such as abound, more or less, in putrid exhalations.

THE principal of these are, low marshy places, large cities, and camps, where cleanliness is not duly enforced. Mountainous and elevated countries are, to speak comparatively, but seldom and partially afflicted by the above calamities.

III. THE bilious and the yellow states of fever select their subjects, for the most part, from among persons of the same description.

IN this country, they attack Europeans and their descendants, rather than negroes, or people of colour. They attack men rather than women, and adults rather than children.

OF adults, the plethoric and robust are more subject to them than the weak and delicate; the inhabitants of high and healthy situations, who visit marshy countries, or large cities, only occasionally, than those who reside constantly in these places.

THE natives of tropical countries, who have never resided in high latitudes, are, in a great measure, exempt from the dominion of these maladies.

THE dissipated and the habitually intemperate, are their most frequent subjects, and their most certain victims.

IV. THEY are ushered in, in the same manner, they exhibit, during their course, symptoms differing only in degree, and commit their principal ravages on the same organs and parts of the body.

BOTH the common bilious and the yellow states of fever may be considered as seated primarily in the stomach and abdominal viscera, while the other parts of the system suffer only by sympathy. As it would seem almost impossible for the poison, which gives origin to these diseases, to have immediate access to the brain, lumber regions, or limbs, the pain experienced, in these parts, is probably not idiopathic.

V. They oftentimes give rise to the same forms of chronic disease.

JAUNDICE and dropsy are the frequent consequences of illy cured remittent and yellow fevers. Perhaps, jaundice was never so common, in this city, as in the the winter and spring, immediately subsequent to the yellow fever of ninety three. But the fre-

quent occurrence of this hepatic disease, in places subject, from their situation, to common bilious fever, is a circumstance of which no practitioner of medicine can be ignorant.

VI. THESE states of fever may be reciprocally converted into each other.

THUS, by proper treatment, a genuine yellow fever may be reduced to a remittent, while, by improper, the latter may be changed into the former state of disease, accompanied by the most highly aggravated symptoms.

OUR late epidemics, particularly, when on the decline, assumed, in many instances, something of the form and character of remittents.

VII. THE common bilious and yellow states of fever are alike destitute of the power of contagion.

WHEN patients labouring under them, and even exhibiting symptoms of the highest malignity, are removed to a distance from a contaminated atmosphere, they are uniformly nursed and attended with impunity. I have never known one instance, where either of

the forms of disease, in question, has been unequivocally communicated from the sick to the well, in the pure air of the country,

HOWEVER active, therefore, the poison producing these maladies may be, and however great the derangement it creates in the human system, yet, when it has taken effect, it appears to be entirely lost, and that without issue, having no power to perpetuate itself.

VIII. THE progress of both these forms of disease has been, at times, arrested by a continuance of very dry and warm weather.

IN such instances, like vegetables transplanted to a barren soil, they have died for want of proper nourishment. By being exhausted of moisture, in consequence of the heat and dryness of the weather, the sources of putrefaction have failed to supply them with the food of noxious exhalations.

No objection against this can be derived from the continuance of our epidemic, in ninety three, notwithstanding a drought of nearly three months duration. Our sources of putrefaction did not, at that time, depend immediately on the clouds for a supply of moisture. The quantity of water absolutely

necessary in the economy of our city, was amply sufficient to continue the process.

IN the surrounding country, many marshy tracts, by being completely exhausted of their superfluous moisture, enjoyed, during that season, an exemption from the prevalence of their common autumnal endemic.

IX. THESE states of fever frequently prevail in the same place, at the same time, and, therefore, under the same constitution of atmosphere.

IN the maritime parts, and other low lands of the southern states, while a great proportion of the inhabitants are attacked, in autumn, by the endemic of the country, the disease, in many instances, assumes the malignity of true yellow fever, carrying off its victims on the third or fifth day. This melancholy result happens, most commonly, to the inhabitants of more healthy places, who have visited the flat country during the sickly season.

THE co-temporary occurrence of two diseases, or forms of disease, in the same place, during a time of health, is no evidence of their identity or kindred nature. There

prevails, at such a time, no common and general cause, to give existence to a common disease. The complaints of such a period must be, in a great measure, the offspring of accident. And, as the very essence of accident is variety, so must it be of accidental diseases.

BUT, the case is different, during the prevalence of a morbid and powerful constitution of atmosphere. Such a constitution is known to banish or suffocate every disease, except that which it is peculiarly calculated to produce. During its continuance no essential variety exists among acute febrile diseases.

THIS is the case with what I shall denominate the endemic or autumnal constitution of atmosphere, which prevails, annually, in a higher or lower degree, in the maritime parts of the southern states.

THIS constitution is no sooner completely formed, than catarrhs, pneumonies, rheumatisms, and all other acute diseases, are suspended, while its peculiar offspring and nurseling, the bilious endemic, becomes in a great measure the monarch of the place,

WERE the common bilious and the yellow fever two diseases radically different, as well might we expect them to occur in the system of the same patient, at the same time, as to appear, at once, in the same place, and under the same constitution of atmosphere. Their co-temporary occurrence, therefore, under the above circumstances, bespeaks them to be nothing else than modifications of the same complaint.

X. THE last point of analogy between the bilious and yellow states of fever, which I shall mention, is, that the same mode of practice, urged with different degrees of energy, and to different degrees of extent, is found to be alike efficacious in their cure.

THIS leads me, not unnaturally, to offer a few remarks, relative to the treatment of yellow fever. Under this head I shall be very brief, as it is not my intention to enter into the detail of practice, but only to touch on general principles.

YELLOW fever, though not in every instance, a disease of excessive action, appears to be always produced and continued by an excess of stimulus. Hence, in its early stages,

the mode of treatment consists in the use of sedative or evacuant remedies.

THE only exception to this rule, is, when the cause of the disease has existed in such concentration and force, or the body been in such a state of preparation for its action, that the powers of life have been paralysed, by the first impressions, and the system immediately sunk below the depleting point.

IN instances like this, the practitioner must administer sedative remedies with a cautious hand. Yet even here, intestinal evacuations are allowable and necessary. In some cases of original and great prostration, venesection, to the amount of three or four ounces at a time, and frequently repeated, has, by relieving the system from an oppressive load of stimuli, allowed its action to rise, and, in this way, contributed to the restoration of health. But, in other cases, of a similar nature, the same mode of practice has not only failed of success, but apparently precipitated the dissolution of the patients.

IN yellow fever, as in all other febrile diseases, the morbid excitement is both general and local. It is general, as diffused through-

out the whole vascular system; it is local, as determined, more particularly, to the stomach and other abdominal viscera. The pain in the head, though frequently excruciating, appears, as already observed, to be only sympathetic, and the affection of the brain but seldom amounts to actual inflammation.

IN the stomach a degree of morbid excitement running on to inflammation occurs, which may perhaps be considered as the radix of the disease. It appears to be the first link in the chain of phenomena, which constitute, collectively, the malady in question. The other links most probably grow out of this, on the all-pervading principles of sympathy.

THAT the stomach is actually inflamed, in every severe attack of yellow fever, is a truth which no longer admits of a doubt. To the physician of experience and discernment, it is evidenced, no less unequivocally, by the nature of the symptoms which uniformly occur, than by the demonstrative discoveries resulting from dissection.

This affection of the stomach, frequently runs so high, as to terminate in gangrene,

or death, from excessive action. Hence, a vitiated secretion from the internal surface of that organ in its moribund state, appears to constitute the matter of "black vomit."

SOMEWHAT analogous to this discharge from the stomach, are the grumous hemorrhagies, that oftentimes occur, about the same period, from different parts of the body. They bespeak a tendency to dissolution in the parts or organs from which they issue.

CORRESPONDING to the symptoms they are intended to combat, the remedies for yellow fever must be both general and local.

THE general remedies are, rest, silence, a recumbent posture, cool air, or affusions of cold water, sudorifics, and blood letting.

THESE exert an immediate influence in reducing the action of the system, at large. They are peculiarly calculated, to meet and counteract what I have already denominated the general excitement.

THE local remedies are cathartics, enemas, cool drinks, and whatever has a tendency to diminish immediately the excessive action in the blood-vessels of the stomach and its appendages

Though these exert also an influence on the general excitement, they do it only through the medium of sympathy. They affect, in the first instance, the stomach and intestines, while these organs, by their extensive range of sympathy, produce similar effects on the other parts of the body.

THESE local remedies act probably through the same medium, by which the poison of yellow fever makes its way into the system. This pestilential gas enters the mouth, by respiration, is arrested by the saliva, food, or drink, and conveyed into the stomach, from whence, as from a centre, it diffuses its malignity through all the frame.

WERE venesection, in the stomach, a practicable operation, I have no doubt, but in certain cases of yellow fever, and subsequently to the reduction of general excitement, a small quantity of blood, drawn immediately from that organ, would prove an invaluable remedy. It would act like scarification of the turgid vessels of the eye, in ophthalmia, or, like cupping, in cases of local inflammation,

THE reader will perceive, that the above remedies are, with regard to their mode of

operation, partly negative, and partly positive.

THE negative are, rest, silence, and a recumbent posture.

THESE produce their effects by their prevention of the stimulus of sound and muscular motion, in the same manner as darkness operates as a sedative, by the exclusion of light.

THE positive remedies belong exclusively to the class of evacuants.

To this, cool air, cold affusion, and cool drinks, constitute no exception. By carrying off the fluid of heat, from those parts of the system, with which they come in contact, they prove evacuants no less genuine, than cathartics or blood-letting.

A free admission of cool air, and a general affusion of cold water, evacuate heat from the whole surface of the body, while cool drink performs the same office to the primæ viæ, particularly to the stomach.

COLD, therefore, in whatever manner applied, may be denominated, in medical nomenclature, the evacuant of heat.

SUDORIFIC remedies possess the power of a twofold operation, and, therefore, when judiciously administered, appear to be productive of a twofold advantage.

BESIDES their operation as evacuants, in carrying off perspirable effluvia, in combination with an abundance of the matter of heat, they alter the general drift or determination of the morbid action. They change a centripetal into what may be denominated a centrifugal disease. They transfer excessive excitement from organs that are more, to such as are less, essential to life. By opening the pores of the skin, exciting action in them, and rendering them outlets for constant and innumerable currents of stimulating fluids, they operate on an inflamed stomach, like setons in the cure of troublesome ulcers.

SUCH is the first, or what may be termed the sedative class of remedies, usually employed in the treatment of yellow fever. They are indicated in that stage of the disease, where excessive action constitutes the predominant feature.

THE second class shall be briefly spoken of under the denomination of alterants or equalizers.

THE aid of these is generally required, after the febrile symptoms have been sufficiently moderated by the operation of the first. Their effect is, to equalize excitement, to remove the occasional paralysis or torpidity of certain organs, and to prevent any part of the system from being debilitated or destroyed by excessive action.

THE reader will perceive, that the principal object in the use of these remedies, (as has been already observed, with respect to one of the effects of sudorifics) is, to transfer morbid action from organs that are more, to such as are less, essential to the economy of life. Being always applied at a distance from the part they are intended to relieve, they operate entirely through the medium of sympathy.

THE principal remedies in this class, are, the hot and the cold bath, sometimes alternated with each other, sinapisms, blisters, and mercury, pushed to the extent of salivation. The operation of cupping has, though not

perhaps with strict propriety, been arranged by some under the same head.

For the purpose of exciting action on the surface of the body generally, and in this way relieving deep seated affections on principles of sympathy, both the hot and the cold bath has been repeatedly used with the happiest effects.

THE application of blisters and sinapisms, is a point, in which practitioners of medicine have an opportunity for the display of no small degree of judgment.

THESE remedies, not extending, like the warm bath, over the whole system, but, being confined to particular parts of it, will be applied to no purpose, unless such parts be selected with skill.

To render blisters and other external applications effectual in the removal of local disease, they must not be laid indiscriminately on any part of the body, but, on such places only, as sympathize actively with the parts to be relieved.

A thorough knowledge of these seats of sympathy would furnish one of the best securities for the success of our practice.

Thus, in affections of the stomach, it is, in a great measure, useless to apply blisters to the shoulders or thighs, while much benefit results from their application to the epigastric region or wrists. In like manner, by blistering the ancles or neck, we oftentimes relieve affections of the head, whereas, in such cases, no benefit would be derived from similar applications to the abdomen or breast.

To discover and make known the numerous and diversified points of sympathy of the human system, should constitute a primary object with teachers of medicine. The above are referred to, not as any thing new, nor as a statement of all the sympathies at present known, but only in illustration of a principle of practice.

MERCURY, when urged, in febrile cases, to the point of salivation, appears, in like manner, to produce its salutary effects by means of sympathy. It transfers morbid excitement from the brain, stomach, liver, &c.

to the salivary glands and parts adjacent. It even appears to possess a power of extending and strengthening the bond of sympathy, and thus connecting the different parts of the human system more firmly together, by this nice and inexplicable tie.

DURING what may be denominated the salivary or mercurial state of action, certain parts of the body seem to sympathize with each other, which have no evident connection, on this principle, in a state of health.

SUCH are the leading remedies that have been found most efficacious, in the treatment of yellow fever, and, such appear to be their principles and modes of operation. The reader need not be informed, for his own penetration will discover it, that they are calculated to answer two general indications, namely, the reduction of excessive action, and the equalization of the excitement of the system. In other words, they possess the power of reducing general fever, and, of transferring morbid excitement from such organs and parts as are more, to such as are less essential to life.

RESPECTING the treatment of patients, in a state of convalescence, I shall say no-

thing, as diet and exercise, rather than medicine, are to be relied on here.

To those who wish for fuller information on the whole subject, I beg leave to recommend the perusal of several late publications, by the physicians of New-York, Philadelphia, and the West-Indies, but, particularly of the three last volumes of "Medical Enquiries and Observations," by Dr. Rush.

It yet remains that I should notice one argument more, which has been occasionally urged against the doctrine of the domestic origin of yellow fever.

By persons of illiberal and uninformed minds, it has been alleged, that this doctrine is altogether new, and such supposed novelty has been construed into an objection against its authenticity.

In reply to this, I beg leave to remark, that the charge of novelty, even when just, constitutes no solid argument against the truth of an opinion. Perpetual innovations on long established doctrines in physics, are the necessary result of the progress of science. Discovery and novelty are, in a certain re-

spect, synonymous terms ; for, every discovery must be new to those, to whom it was before unknown. To decry and attempt to check enterprize and innovation in science, is to meditate destruction to the spirit of improvement.

It is much to be lamented, that the antiquity of opinions is too frequently made the standard of their truth and respectability, as, in vulgar estimation, the wisdom of an individual is apportioned to the number of his grey hairs. Young men, and new opinions, have to encounter alike the prejudices and distrust of the weak and illiberal. They are duly respected, only by those few minds, that are sufficiently enlightened to appreciate their intrinsic worth.

BUT, the opinion that yellow fever is a disease of domestic origin, is not justly subject to the charge of novelty. It is perhaps no less reverend from age, than that which derives it from the West-Indies. It can be traced back, with certainty, to the year 1746, at which time this disease prevailed in the city of New-York. The Reverend Dr. Dickinson, an enlightened clergyman, and a respectable physician, of Elizabeth Town (New-Jersey), in an address

published in the "New-York Weekly Post-Boy," a public print of that period, declared to the citizens, during their calamity, that the pestilence which afflicted them was neither an immediate scourge from the hand of Deity, nor yet an evil imported from a distant country, but the offspring of their own domestic filth.

A similar sentiment was entertained by the late Dr. Bond, of this place, respecting the yellow fever, which prevailed here in the year sixty two. The doctor's opinion, on this subject, is stated in a lecture, delivered by him, in the Pennsylvania hospital, and preserved, in manuscript, among the records of that institution. With an enlightened boldness and liberality that do honour to his memory, he there declared the filth of our city to be competent to the production of the above disease.

I shall close the present memoir by a few remarks relative to the difference between yellow fever and the typhus mitior of Dr. Cullen, better known perhaps by the names of jail, hospital, and ship fever.

I am led to this by an opinion, adopted by some of the advocates of importation, "that

our late epidemics were nothing more than the common ship fever, under a highly malignant form." They even say, that the same disease, only inferior in degree, has been often introduced into this country, in crowded passenger-vessels, from Ireland, Hamburgh, and other parts of Europe.

THAT yellow fever may originate on board a foul vessel, from any port, and in any latitude, is certainly true; and in granting this, the advocates of importation furnish an argument readily convertible against themselves. No testimony, however, can be collected from hence, that this complaint is the same with typhus mitior.

THE opinion of the identity of these two diseases, appears to be satisfactorily refuted by the following considerations :

1. TYPHUS mitior is acknowledged, by every one, to be unequivocally contagious.

YELLOW fever is declared, by the most experienced and enlightened physicians, to be destitute of contagion.

2. TYPHUS mitior is a disease of temperate and cold climates, and prevails indiscrimi-

nately at all seasons, but commits its greatest ravages during the winter. Regions bordering on the Line appear to be altogether inimical to its existence.

YELLOW fever is a perennial disease of tropical climates only. It originates and prevails, however, occasionally in all countries, but, in temperate and high latitudes, rages as an epidemic, only during the warmth of summer and autumn. It is arrested by the cold of winter no less effectually than the putrefaction of animal and vegetable substances.

3. THOSE persons most subject to typhus mitior are, the weakly and such as suffer from a deficiency of nourishment. From some observations on the subject, women appear more liable to it than men. I do not know that it makes any discrimination in favour of blacks or people of colour.

YELLOW fever attacks, more particularly, the healthy, plethoric, and well fed part of the community. Women are known to be less subject to it than men. Against Africans and their descendants, it appears to possess, comparatively speaking, but little enmity. In

favour of people of colour it makes, in like manner, a marked discrimination.

4. **TYPHUS** mitior seldom, (I believe never,) spreads, as an epidemic, through whole cities, or tracts of country, banishing all other diseases, or imperiously forcing them to assume its symptoms. Depending, for its propagation, on contagion alone, it is too feeble to assume such an ascendancy in the atmosphere.

BUT, the reverse of this is known to constitute a very striking trait in the character of yellow fever.

5. **TYPHUS** mitior, in its attack, is generally gradual and slow, as if intending to destroy the system by sap.

**YELLOW** fever is mostly rapid and impetuous, in its onset, determined to carry every thing by a coup de main.

**THE** former disease often continues from four to nine weeks, while the latter is limited to as many days.

**THE** former originates only in situations illy ventilated, and too much thronged by

human inhabitants. But the latter, though rendered more malignant by such situations, may originate, at least in sporadic cases, wherever the atmosphere is impregnated with putrid exhalations. The one appears to be the result of a poison formed by a vitiated animal secretion, the other of a much more powerful one, produced by the process of putrefaction.

6. FROM its commencement, typhus mitior is marked with great prostration and languor of the moving powers of the system. It does not admit of free evacuations, but calls for the use of cordials and stimulants.

WITH regard to yellow fever, the case is different. In its first stages, the commotion of the system is, for the most part, excessive, copious evacuations are indispensable, and stimulant remedies inevitably destructive.

7. YELLOW fever is characterized by certain degrees of remission, which serve to confirm its identity with common bilious fever, while typhus mitior gives no hour of respite throughout its whole course.

8. FROM dissection we learn, that typhus mitior and yellow fever occupy different seats in the system.

THE former appears to commit its chief topical ravages on the brain, while the latter is more particularly the vulture of the abdominal viscera.

SUCH are a few, though perhaps not the whole of the points, in which typhus mitior and yellow fever differ from each other.

As I write this part of my memoir in haste, it is even probable, that I may have omitted some, more important than those I have mentioned.

I flatter myself, however, that the facts, here stated, are sufficient to convince every candid enquirer, that there exists a radical difference between the two diseases in question.

I am unwilling to conclude this lengthy memoir, without declaring, that as truth and not victory is my object in writing it, I will

rejoice no less sincerely, at the refutation of its errors (for who can boast an exemption from error ?) than at the general prevalence of the principles which it advocates.

## MEMOIR III.

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ON THE WINTER RETREAT OF SWALLOWS.

**T**HE winter destination of swallows (*hirundines purpureæ, rusticæ, &c.*) though of little, perhaps, no practical importance, is a subject interesting to the naturalist and philosopher. It has attracted the notice of both hemispheres, and of all countries. It has long engaged the attention, and employed the pens, of characters grown old in the study of nature, whose names will be immortal as the science which they cultivated. What has given scope to the talents of a Ray, a Willoughby, a Catesby, an Adanson, a Buffon, a Linnæus, a Kalm, a Pennant, and a Hunter, without being exhausted, must still claim a respectable place, as an object of research, with more modern naturalists.

It is to be lamented that the elucidation which this subject has received, is, by no

means, in proportion, either to its antiquity as an object of enquiry, or to the number and eminence of the characters, who have taken part in its discussion.

JUDGING from these latter circumstances, we would be led to class it with the most luminous points in natural history; whereas, so far is this from being the case, that it may, perhaps, be ranked among the most dark and undecided.

I have not the vanity to suppose myself qualified to unloose, at once, as by a touch of magic influence, all the intricacies of this gordian knot of science, which has so long withstood the united efforts of the philosophers of Europe and America. Believing, however, as I do, that the point in question is capable of receiving additional illustration, I have ventured to make it the subject of the following memoir.

As I do not aim at the character of much originality, I shall proceed in what I may conceive to be the most natural order of enquiry, without discriminating particularly between the arguments, that are my own, and those for which I am indebted to the writings of others. My best apology to

the reader for this, is, an unwillingness to trouble him with what to myself is irksome and disagreeable, I mean, a repeated reference to authorities.

To those who have made philosophical ornithology their study, it is unnecessary to remark, that three different opinions have been advanced, and defended, by naturalists, relative to the winter retreat of swallows. They are,

I. THAT these birds migrate from high latitudes, and pass their winters in warm climates, where they can readily procure appropriate food, and where the temperature is congenial to their delicacy of constitution.

II. THAT they do not migrate to a distant climate at all, but retire to rocks, caverns, hollow trees, and other places of security, and there spend their winters in a state of torpidity.

III. THAT they retreat, about the close of summer, not to any dry land abodes, but to the bottoms of rivers, lakes, and arms of the sea, where, embedded in mud, they remain torpid, till awakened to life by the return of spring.

EACH of these opinions, however contradictory they may be, has been occasionally defended by philosophers of equal talents, acquirements, and fame.

THE last has been supported, more particularly, by the naturalists of Sweden, and the two first, by those of Britain, France, and America.

IT must not, however, be concealed, that some late writers, in this country, have advocated the hypothesis of the watery hybernation of swallows.

ON the second opinion, I mean that which places the winter habitation of swallows, in rocks, caverns, and hollow trees, I shall bestow but little attention. As it does not appear to be opposed to any general law of animated nature, it carries with it no physical or intrinsic improbability, sufficient to render it altogether incredible. Many warm blooded animals are known to pass the winter, in a state of hybernation, and it is, therefore, possible that the swallow may be of this number.

I am willing to admit, with Dr. Barton, (to whose lectures and writings I am much

indebted for what knowledge I possess on subjects of natural history) “that swallows have occasionally been found in the hollows of decayed trees, in different parts of our country, during that very season, when it is supposed these birds are in a more southern climate.” But, with that enlightened naturalist, I must also believe, that these are to be considered as “extraordinary instances, which very rarely occur,” and not as facts illustrative of the common history of these animals.

I am persuaded that the entrance of swallows into the above places of retirement, is altogether accidental, and that none have ever been found there, except either such as, through indisposition or weakness, have been unable to accompany their fellows in their autumnal migration, or, as have been arrested by cold weather, in consequence of a premature return to northern regions, in the spring.

UNDER such circumstances, these unfortunate birds have been obliged to betake themselves to the best shelter they could find, from the inclemencies of the season.

WERE it a general fact, that all the swallows of our country hibernate in such

situations, it is impossible that they should not be found, more frequently, and in much greater numbers, than the advocates of this hypothesis presume to be the case.

BUT, it is the first and third of the preceding opinions, that claim my attention in the present memoir. Before entering, however, on the immediate consideration of them, I beg leave to offer a few remarks, in reply to a sentiment of Professor Kalm, one of the most able and decided advocates for the winter submersion of swallows.

“NATURAL history,” says the professor, “as all other histories, depends not always upon the intrinsic degree of probability, but upon facts founded on the testimony of people of noted veracity.”

THIS is certainly true, when the facts related are of a common cast, and neither opposed to, nor above, any of the well known laws of nature. But, when such opposition or superiority exists, they are beyond the reach of common testimony. In such a state of things, the evidence necessary for their support, must be such as would, in any case, be sufficient for the establishment of

a belief in miracles. For, a miracle is nothing else than an event, either contrary or paramount to the established laws of nature.

EARTH and air are the natural elements of man. A watery abode is known to be incompatible with the terms of his existence; for, when he ceases to respire, he ceases to live.

THE same is the case with all truly warm blooded animals, of which we have any knowledge. Submersion, continued even for a short space of time, proves no less certainly destructive to them, than the most deadly poison.

IT may be laid down, then, as a general law of nature, that a submarine habitation, is incompatible with the life of warm blooded animals.

IF, notwithstanding this, a few voyagers, or travellers, even of unimpeached veracity, should give an account of a newly discovered country or island, the inhabitants of which are accustomed to pass five months of the year on land, in the full display of all their faculties, and the other seven in a

state of torpidity, at the bottoms of their lakes and rivers, what reception would such a story meet with from an enlightened public? Would any weight of human testimony be sufficient to give it respectability, and an accredited circulation? Would not its own intrinsic improbability, resulting from its opposition to a law of nature, be sufficient to stamp it as the offspring of deception, or as a monster of fable?

IN such a case, the physical improbability of the story might, without the least departure from the spirit of philosophy, be urged as an argument subversive of the weight of any common testimony brought forward in its support,

THESE general remarks amount so nearly to self-evident principles, that no farther reasoning is necessary for their establishment. Their application to the present subject, will appear in subsequent parts of this memoir.

AT the present time it may not be amiss to remark, that I mean to controvert the hypothesis of the winter submersion of swallows, rather by endeavouring to expose its improbability, than by advancing facts

in direct opposition. On the other hand, the strong probability of the migration of these birds, shall be made the principal foundation for a belief in that doctrine.

IN the farther consideration of this subject, the following order shall be observed:

1. I shall take a brief view of the testimony in favour of the submersion of swallows, advanced by the advocates of that hypothesis. And,

2. ADDUCE such arguments, as appear to militate against this opinion, and to favour a belief in their migration to a distant climate.

THOSE who have ventured to give positive testimony in favour of the winter submersion of swallows, may be divided into two classes,

THE first assert, that they have seen these birds descending into the water, in the autumn; the second, that, in the depth of winter, they have seen them brought from the bottoms of lakes, or rivers, in a torpid

state, and recalled to life by the application of heat.

OF the former class, the most distinguished is Dr. Wallerius, a Swedish chemist, who informs us, "that he has seen, more than once, swallows assembling on a reed, till they were all immersed, and went to the bottom," meaning the bottom of the lake, or river, where the reed grew.

THE credibility of this assertion is much impaired, if not wholly destroyed, by the following considerations :

A reed, being a tubular plant, and containing in its cavity a quantity of air, is specifically lighter than water. It will not, therefore, sink in this fluid, unless forced downwards by a considerable weight.

BUT, the same thing is true, with regard to swallows. These birds, possessing a great extent of plumage, in proportion to their size, will not sink in water, in consequence of their specific levity.

How then is it possible, that two substances, each specifically lighter than water, can sink together to the bottom of a river or

lake, without some additional force to urge them downwards? As well might we expect heat to result from the joint operation of ice and snow, or darkness to follow the combined action of two luminous bodies, as the above event to take place under the above circumstances.

THE only other eye-witness I shall mention of the descent of swallows into the water, is, a certain Peter Cole, author of a late article in the Medical Repository of New-York. (See Medical Repository, Vol II. page 178).

“As I was standing,” says this gentleman,” at my door, between the hours of five and six in the morning, I observed a very large flock of swallows, flying in an easterly direction. I immediately repaired to the pond, <sup>(14)</sup> where there was already a vast number collected in the reeds and rushes. They continued coming for nearly the space of half an hour, and vast numbers of them were flying over the water, in almost every direction. Some of these birds appeared to run on the surface of the water, with great rapidity,

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(14) A pond of fresh water, adjoining a marsh in the vicinity of the city of New-York.

towards the east corner of the pond, and, in the twinkling of an eye, disappeared under the water, and rose no more."

THOUGH I am far from doubting Mr. Cole's veracity as a man, he must suffer me, in the present instance, to call in question his accuracy as a philosopher.

It appears from his account of the above phenomenon, that he made use of a "spy-glass" in attending to the motions and actions of the swallows. This he surely would never have done, had not these birds been too remote from him, to have their conduct examined with the naked eye. From the face of his narrative, therefore, we have reason to believe, that he was considerably distant from them when he made his observations.

BUT, every one acquainted with the use of small optical tubes, must be sensible of the extreme difficulty, not to say the impracticability, of keeping an object, no larger than a swallow, and moving, "with great rapidity," in the proper field of vision. The slightest motion of the glass, or the least deviation of the bird from a right-lined direction, would make the animal disappear, as

suddenly and certainly, as if it had plunged to the bottom of the pond.

THIS circumstance, therefore, independently of the inherent improbability of the fact, renders the story of Mr. Cole extremely equivocal. It is further evident from his own account, that his mind, from early impressions, was predisposed to a belief, in the submersion of swallows. It would, perhaps, be thought uncandid in me to say, how far this might have influenced him in the present instance. It is a truth, however, for mentioning which I can incur no censure, that a strong predilection for an opinion is unfavourable to accuracy of observation respecting the subject of it. The fallacious nature of a system-building spirit is already proverbial.

INDEED, our author's whole narrative appears much more like the loose story of a man relating a common event, as it appeared to the eye of common observation, than like the accurate statement of a philosopher, drawn up after a faithful examination of his subject.

As the place of the supposed descent of the swallows, appears to have been near to the "east corner of the pond," is it not

probable, that instead of actually immerging beneath the water, they alighted, either on the shore itself, or on some of the reeds or rushes which grew about its borders?

THESE birds, when flying near to the surface of water, are seen frequently, either for the purpose of procuring drink, of washing themselves, or in pursuit of insects, to strike against the water, and immediately rise again and pursue their course. Might not occurrences of this kind, have readily deceived Mr. Cole, especially as he trusted the accuracy of his observations to a "spy-glass?"

IN one respect, at least, our author's investigation of his subject, must be acknowledged, even by himself, to be extremely imperfect.

As he seems to have been sensible of the particular place where the swallows descended into the water, why did he not proceed to make search for them, in the bottom of that part of the pond? Had he done this, and succeeded in discovering them, the truth of his narrative would have been rendered incontrovertible. He would then have had the honour of finally deciding a point of contro-

versy, which had hitherto set bounds to the researches of philosophers.

BUT, till Mr. Cole's observations shall have been conducted in a more accurate and satisfactory manner, his testimony can never be admitted as decisive. On the other hand, its weight must be considered as more than counterbalanced, by the improbability of the event which it is intended to establish.

AMONG the stories of all those, who profess to have been eye-witnesses of the resuscitation of swallows, from a state of submersion, that related by Professor Kalm, appears to be the only one worthy of attention.

“ IN January,” says this gentleman, “ the lake of Lybshaw, (a lake in Polish Prussia) being covered with ice, I ordered the fishermen to fish therein, and, in my presence, several swallows were taken, which the fishermen threw in again; but, one I took up to myself, brought it home, which was five miles from thence, and it revived, but died about an hour after its reviving.”

I feel that it is no easy matter to speak of this narrative exactly as it deserves. While,

from the character of its author, it would seem to possess a claim to our respect and belief, its want of internal probability is so glaring, that it appears better calculated to mingle with the stories of romance, than to occupy a place in a work devoted to science (15).

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(15) If a swallow were first rendered so torpid, by the action of cold, as to have its respiration completely suspended, and then submersed in water, or placed under the mud of the bottom of a river, there is little doubt but it might remain there for a considerable time, and be afterwards resuscitated by the proper application of heat.

THE same thing is perhaps true with respect to every other animal capable of being reduced to a state of torpidity. For, after an animal is completely torpid, I think it probable, that it may be preserved in water nearly as well as in air.

SUPPOSING Professor Kalm to have been accurate, in his statement of the fact already mentioned, this must have been the case with the swallow, which he saw reanimated, after having been taken from under the ice. It must have been overtaken by the water when already in a torpid state.

I do not, therefore, contend against the possibility of a few swallows having, in consequence of proper treatment, revived, after having lain, by accident, for days, weeks, or even months, under water. I only argue against the generality of the fact, by endeavouring to shew, that this is not the common destination of these birds. And I farther contend, against the possibility of such swallows having placed themselves in that situation, by their own voluntary act. They must have been first rendered torpid, and then placed there by the hand of accident. Nor could they ever, by their own exertions, have extricated themselves from such a situation. Without assistance from some quarter, the sleep they were in must have been the sleep of death.

THAT a swallow which has lain some time torpid, in a dry situation, may be reanimated, is a circumstance that does not surpass belief; because, (independently of the fact itself being well ascertained) the animal kingdom furnishes many analogies, which render such an occurrence probable.

BUT, the resuscitation of one of these birds, after having been first drowned, and then macerated, for several months, in water covered with ice, is an event so wholly unsupported, either by principle or analogy, that it appears impossible for the unprejudiced mind to admit it as a fact. Such an occurrence would be no less truly miraculous, than

WE frequently meet with extraordinary facts, of animals being found torpid, yet capable of resuscitation, in the hearts of rocks and trees, and at great depths beneath the surface of the earth, where, circumstances would induce us to believe, they had continued for ages. Nor do the respectable authorities, on which these facts are related, allow us any shadow of ground to suspect their truth.

THEY appear to be explicable only on the same principles, which I have applied to the explication of the above accidental phenomena, relative to the submersion of swallows.

THE inclosed animals, in question, must have been placed in the situations, where they were found, when in a torpid state. And, being in that state, and requiring no air for their subsistence, such situations were perhaps as compatible as any other, with their retention of a certain degree of vital energy.

the resuscitation of the human body, after a similar continuance in the same element.

I now proceed, agreeably to the order proposed, to a more particular statement of such facts and arguments, as, while they militate against the opinion of the submersion of swallows, favour that of their migration to distant climates.

1. My first argument, under this head, is derived from Dr. Barton's "Fragments of the Natural History of Pennsylvania," page 16.

"My friend, William Bartram," says the doctor, "assures me that he has seen, in the spring, large flocks of all our swallows, upon their passage from the south, and in autumn, on their return southward, from Pennsylvania through Carolina to Florida, where, however, neither of them winter, but continue farther on southward." "I cannot," continues our author, "but consider the testimony of this gentleman, in matters of this kind, as of high value."

THIS is, perhaps, the most respectable and conclusive fact, on this subject, to be found in any writer on the natural history of

the swallow. It, alone, falls but little short of a full refutation of those, already mentioned, relative to the winter submersion of this bird.

MANY similar facts may be collected from the journals of navigators, and the writings of naturalists.

WE are informed, by Mr. Adanson, that, on the sixth of October, about fifty leagues from the coast of Senegal, four swallows settled on the ship, in which he sailed. These birds were recognized, by our author, as the swallow of Europe, and appeared to him to be on their passage from that continent to the coast of Africa.

MR. KALM, himself, furnishes us with a fact no less in point, relative to the settling of a swallow on a vessel in the Atlantic Ocean, nearly midway between the continents of Europe and America.

UNDER this article I shall only add a brief extract from a memoir, by Sir Charles Wager, published in the fifty-third volume of the Transactions of the Royal Society.

“RETURNING home,” says our author, “in the spring of the year, as I came into soundings in our channel, (the British Channel) a great flock of swallows came and settled on all my rigging: every rope was covered; they hung on one another like a swarm of bees; the decks and carving were filled with them. They seemed almost famished and spent, and were only feathers and bones; but, being recruited with a night’s rest, took flight in the morning.”

THE foregoing facts, though they do not amount to what can strictly be called positive proof, yet very strongly favour the opinion of the migratory movements of swallows. The testimony which they furnish, derives strength from this circumstance, that the above mentioned flights of these birds, have occurred only in the spring and autumn, the proper seasons of migration.

2. THE flight of swallows, when they have been observed in autumn, have been always in a southerly, and, when in the spring, in a northerly direction.

THIS fact rests on the testimony of many respectable naturalists, and favours a belief

in the northerly and southerly migration of these birds.

3. SWALLOWS, when they disappear in the autumn, are fat, full, and vigorous; but, when they appear again in the spring, lean, empty, and languid.

IN the former instance, they resemble birds prepared to undergo, and, in the latter, those that have already undergone, the fatigues of a long journey, where food is not easily procured by the way.

NOTHING like this happens to other animals, in consequence of passing through a state of hybernation, particularly to those that remain perfectly torpid, as must be the case with swallows, if they reside under water.

IN such a state, there can be no more consumption of the substance of the body, in consequence of vital action, than would occur in a piece of inanimate matter; because, all the motions of life, which could produce such consumption, are completely suspended. The animal, therefore, must emerge in the spring, possessed of the very same flesh

which it carried with it in the autumn, to its winter retreat.

4. IT is evident, from many circumstances, that swallows, like other birds, moult, or cast their feathers, at stated periods.

BUT this process never takes place, during the summer residence of these birds in northern latitudes. This season appears to be appropriated exclusively to the pleasures of love, and to the care of their offspring.

THEY must moult, therefore, during their absence from us, in winter. But this could never be the case, did they lie all that time in a state of torpidity, at the bottoms of our lakes and rivers. For, the business of casting an old, and giving birth to a new crop of feathers, is no less the result of vital action, than the general nourishment and growth of the body.

5. INSUPERABLE objections against the hypothesis of the submersion of swallows, arise out of the nature of the situations, in which they are supposed to reside.

Not to mention the impracticability of these little animals descending to any depth into the water, in consequence of their specific levity, (a circumstance to which I have already adverted), and to pass unnoticed the hazards they would run of being devoured by rapacious fish, aquatic quadrupeds, water serpents, &c. they would still incur many additional dangers, of being destroyed by the changes the banks and bottoms of rivers and lakes suffer, in consequence of the action of their own waters.

By the autumnal and winter rains, and the melting of snows in the spring, these bodies of water are subject to frequent swells, and occasionally to extensive inundations. Hence, their shores, and the mud and sand which constitute their bottoms, are sometimes washed promiscuously away, by the impetuosity of their currents, and at other times covered with vast quantities of alluvial matter, deposited by the gradual subsidence of their waters. I need not add, that either of these occurrences would prove alike destructive to swallows in a state of submersion.

6. In high latitudes swallows disappear as early as the latter end of August, while the weather is yet very warm, and, sometimes

after long severe winters, appear again in the spring, before the lakes and rivers are clear of ice.

How will the advocates of submersion reconcile, with their extraordinary hypothesis, facts which speak such a contradictory language?

A state of hybernation in animals, is always the result of necessity, not of choice. If, then, the temperature of the month of August, when the mean heat is as high as  $75^{\circ}$ , renders it necessary for swallows to take shelter from it, by descending to the bottoms of lakes and rivers, how is it possible that these same birds, can ascend again in the spring, amid sheets of floating ice, and through water but little above the freezing point?

BUT the fact is otherwise. Nature admits no such paradoxical phenomenon among her works, as that of a bird becoming torpid beneath the fervors of August, to be recalled to life by the chills of April. Animals that are known to hybernate, never go into that state till the actual commencement of cold weather.

ONE of the strongest evidences of the fallacy of an opinion, is the incompatibility of the facts with which it is connected. But, such incompatibility, and that in a very high degree, must be encountered by the advocates of the submersion of swallows.

EVEN, in the climate of Pennsylvania, if we take one of these birds, on its first appearance in the spring, and immerse it in one of our lakes or rivers, all but the head, so that the process of respiration may still go forward, it will become, in the course of a few hours, so torpid as to be unable to fly, or to make any effectual efforts to extricate itself from the surrounding element. If, in this situation, it be abandoned to its fate, it will immediately perish, by the well known and inevitable action of water on warm blooded animals.

HERE, then, the advocates of submersion are reduced to the necessity of either relinquishing their doctrine altogether, or admitting the absurd proposition, that the very same temperature, which has already roused a swallow from the deepest torpidity, may, in a few days (I might have said a few hours) afterwards, reduce it again, from a state of perfect life and activity, to the same

death-like condition. But, I need not add, that to attribute such opposite effects to the same cause, is an abuse of reason, and an outrage on the spirit of sound philosophy.

7. SENSIBLE, that, in common times, swallows are as liable to be drowned as other warm blooded animals, I conceived, that in case the hypothesis of their submersion were true, the constitution of these birds must, at the period of their disappearance in autumn, undergo such a change, as to render their lives indestructible by the action of water.

To reduce this supposition to its proper test, the following experiment, (which, were it not my own, I would call interesting) was performed in the presence of my invaluable friend, the late Dr. Cooper.

IN the close of the summer of ninety six, I was so fortunate as to become possessed of two swallows, (the *hirundo rustica*) just before the annual disappearance of these birds. I kept them uninjured, till such disappearance actually took place.

IMMEDIATELY on the occurrence of this event, the above gentleman and myself lost no time in repairing to the Schuylkill, where

we immersed our two little prisoners in the river, with weights appended sufficiently heavy to sink them to the bottom,

THAT our experiment might be rendered as unexceptionable as possible, the weights were fixed in such a manner, as to draw one of the swallows down headforemost, and the other in the contrary direction.

WE chose a part of the river of such a depth, and with such a bottom, that the actions of our birds could be distinctly observed.

THESE little animals no sooner came in contact with the water, than they manifested signs of great alarm, and struggled with their wings, as if desirous to escape from the embraces of an element that was unnatural to them.

WHEN immersed to the bottom, air began to escape from them, partly from their lungs, and, in part perhaps from among their feathers, and rose to the surface of the water, in considerable bubbles. They exhibited, for a short time, the anxiety and convulsions of animals in a drowning state, but,

in less than three minutes, became perfectly motionless.

HAVING allowed them to remain under water about three hours, we took them out, with such caution as to prevent them from sustaining any violence, and made use of every mean we could devise, to restore them to life. All our efforts, however, for this purpose, were fruitless. Our birds were reduced, not to a state of torpidity, or suspended animation, but, of absolute death. The water appeared to have affected them, in all respects, as it would have done other warm blooded animals, if subjected an equal length of time to its action.

EXPERIMENTS, similar to the above, but at different seasons of the year, have been performed, by other gentlemen, with the same result.

HAVE we not ample reason, then to conclude, that all swallows would, in similar situations, and, at all seasons, share precisely the same fate, whether immersed in water, by their own act, or by the hand of an experimenter?

8. BUT, should we even admit the practicability of swallows descending, without being actually drowned, to the bottoms of lakes and rivers, of their becoming torpid there, and remaining unmolested in that condition, throughout the winter, how could they possibly be resuscitated in the spring?

IT is well known, that warm blooded animals can pass from a state of torpidity to that of actual life, only through the medium of respiration. When about to revive, respiratory efforts constitute the first of their voluntary actions. In such a situation, if air be excluded from them, they can never regain a state of activity, but must inevitably perish.

NOR do swallows form an exception to this general rule. These birds have been frequently rendered torpid by means of cold, and restored to life again, by the gradual application of heat. During this process, their dependence on air for a recovery has been satisfactorily illustrated. Their first voluntary efforts have always been those of the respiratory kind, or what are denominated, in common language, gasping for breath.

Nor have they been capable of any considerable degree of muscular exertion, till respiration has become perfectly free, and even continued for some time.

BUT, it is unnecessary for me to add, that it is impossible for these birds to breathe, when submersed to the bottom of a lake or river. And, it is equally impossible for them to acquire, without respiration, strength sufficient, either to shake off the accumulated mud of a whole winter, or to rise beneath its pressure to the surface of the water.

HERE, then, the advocates for sub-sion are reduced to a most serious and obstinate dilemma.

THEY must either admit, that swallows can breathe, at the bottoms of lakes and rivers, where there is no air, or that they can pass from torpidity to active life, without the aid of this vital process.

I submit the matter, thus analysed, to their consideration, convinced that it presents them with nothing but a choice of difficulties. For, to admit either branch of the dilemma,

would involve them in error too gross to mislead.

9. SWALLOWS are not birds of darkness, and, therefore, make none of their movements by night.

BUT, were their descent into lakes and rivers a general fact, and, were this descent always performed in open day, it is impossible that there should not have been more spectators of the phenomenon, than the advocates of submersion are able to adduce.

DR. WALLERIUS, of Sweden, and Mr. Cole, of New-York, (the weaknesses and improbabilities of whose stories have been already exposed) are the only characters, I now recollect, who have publicly declared themselves to have been eye-witnesses of the submersion of swallows.

BUT, the number of persons is considerable, who have seen flocks of these birds on their passage, in the autumn, to southern, and in the spring, to northern climates. I have already mentioned the names of several naturalists, who have been spectators of

these migratory flights, and could, were it necessary, add many more to the catalogue.

NOTWITHSTANDING this, I know it has been frequently asked, by the advocates of submersion, why, if swallows are migratory birds, have they not been still more frequently seen on their passage from one climate to another?

THERE are several circumstances, which, when jointly considered, furnish a satisfactory answer to this question.

SWALLOWS are very small, they soar to a great height in the atmosphere, they fly with much rapidity, they are mostly silent when on the wing, and are capable of performing a vast journey, without halting for the purpose of rest or nourishment. These I conceive to be the principal, perhaps I might have said, the only reasons, why the birds, in question, are less frequently observed, during their migrations, than the heron, the wild goose, or the storck.

BUT, were the hypothesis of submersion true, no such weighty considerations exist, to prevent the discovery of swallows, when descending into the water. Were the

descent conducted, in every instance, as in that described by our countryman, Mr. Cole, the phenomenon must be annually witnessed by thousands.

10. IN the construction and mechanism of the heart and large blood vessels of animals, nature has drawn lines of essential distinction between the truly aquatic, the amphibious, and the terrestrial.

JUDGING from this source, swallows are found, on examination, to be no less really terrestrial than the human race. This fact alone, must convince the naturalist, that they are calculated for an exclusive residence in air.

As well, therefore, might we expect man, himself, to descend, without drowning, to the bottoms of lakes and rivers, to remain there throughout the winter, in a torpid state, and to emerge again to life on the approach of spring.

11. THOUGH, in matters of science, analogy is not a ground of conclusive evidence, yet, when it coincides with facts, it is not to be disregarded.

BUT analogy is directly opposed to the submersion of swallows.

ON examining the habits of all the terrestrial animals, that pass their winters in a state of torpidity, we do not find one that forsakes its native element, in making choice of a hybernating residence.

AQUATIC animals do not, on this occasion, seek an asylum on land, nor do the truly terrestrial retreat to the water. Each one chooses to reside, during its torpid state, in that element which is most congenial to its nature, when in the enjoyment of perfect life.

WHY then, I beg leave to ask, should swallows alone constitute an exception to this general rule? Why should these birds, which appear to be among the most perfectly terrestrial (I might have said aerial) of all animals, choose, without the shadow of necessity to compel them to the choice, a watery residence for more than half the year?

12. It has been already remarked, that a state of torpidity in animals, is always the result of physical necessity.

NONE hybernate that are capable of escaping the severities of winter, by migrating from a northern to a southern climate. None are doomed to encounter, annually, this near approach to death, except such as are disqualified for the performance of long journies.

OF this description are several of the smaller quadrupeds, in high latitudes, and a great proportion of the class of reptiles.

EXPOSED, as these animals are, to numerous enemies, but illy qualified for a journey over land, and wholly incapable of making the passage of large rivers, they are excluded from the privilege of migrating to southern climates. Possessed of constitutions unable to endure, unprotected, the rigors of their native winters, they are obliged, during that season, to retreat to the best hybernacula their own inclement regions afford.

BUT, how different is the case, with regard to birds in general, and particularly with regard to swallows, which are among the most active of the feathered race?

No unfitness for migration confines them to a particular region, no necessity interposes to prevent them from travelling even from the Pole to the Line.

SUCH is the swiftness of these birds, and such their power of wing, that they would require but a short time to make the entire circuit of the globe. Neither mountains, rivers, nor even oceans themselves, are able to set boundaries to their course through the Heavens. They have only to will it, and their passage from climate to climate, is but little more than an excursion of pleasure.

FROM the facility and speed, with which the feathered race in general, can perform long journies, and from their being able to find appropriate food in different regions, there are but few, if any of them, doomed to endure a state of hybernation. More favoured by nature than certain other branches of the animal kingdom, they appear to be exempt from the horrors of this semi-annual death.

BUT, if such be the situation of birds, in general, why should the swallow be selected to constitute an exception?

WHETHER we take into view its capacity for flying, or its living on insects, which are known to abound in every region of the earth, it certainly deserves to be ranked with the foremost of the feathered race, with respect to qualifications for the business of migration.

For what purpose do the old swallows exercise themselves so sedulously, and with so much industry and apparent solicitude, train up their young, in the art of flying, for some time previously to taking leave of us in the autumn?—To what end is all this parade of preparation directed?—Is it to fit these birds for a state of torpidity, during the six or seven succeeding months, or to strengthen them for a journey to a distant climate?—If, for the latter purpose, nature, in this instance, is wise, and consistent with herself; but, if for the former, she appears to deviate, strangely, from that wisdom of design, which constitutes such a prominent feature in her economy.

To encounter the fatigues of a long journey, animals should be strong, active, and inured to labour; but, a state of preparation for a lengthy and profound sleep, consists rather in slothfulness and debility.

13. WHEN swallows disappear, in autumn, the young of the preceding season can be readily distinguished from the old.

THIS, however, is not the case, on their return in the following spring. During the absence of these birds, such a perfect similitude takes place, that it is impossible to distinguish the parents from their offspring.

BUT, such an assimilation could by no means occur, were they consigned, during the winter, to a state of torpidity. In that case, no vital action would go on in their systems, to produce any change in their general appearance. Each swallow would awake, in the spring, possessed of the same colour, length, and firmness of feathers, and of other parts, which it carried with it, in the autumn, to its winter retreat.

14. NATURE delights in the life and enjoyments of all her creatures. Nor does she ever, even for a moment, deprive one of them of the pleasures of existence, unless impelled to it by a necessity resulting from the principles and laws of their being.

BUT, a state of torpidity in swallows, would, during its continuance, be no less incompatible with their enjoyment of pleasure, than actual death.

It has been already observed, and the observation substantiated by facts, that the nature and condition of these birds is such, as to give rise to no shadow of necessity for their sinking, at any time, into a torpid state.

WHY, then, should nature, as if in sport and wantonness in her treatment of the swallow alone, eminently qualify this bird for migrating to, and subsisting in, climates the most remote from each other, and afterwards deprive it of the pleasures and advantages which might result from such qualifications, by unnecessarily rendering it torpid, and obstructing all its avenues of enjoyment, for more than half the year?

SUCH tantalizing inconsistency is incompatible with that wisdom of arrangement, and benignity of design, so conspicuously displayed in the economy of the universe!

15. THE last argument I shall urge in favour of the migration of swallows, is derived

from what appears to be the principal use of these birds, in the economy of nature.

I am not ignorant of the inconclusiveness of this mode of reasoning, when separately considered; for to argue from final causes alone, (of which we know but little) is, by no means, conformable to the spirit of philosophy. But, when taken in conjunction with other arguments, it must be acknowledged to add something to the general weight and respectability of testimony.

As far as we are able to carry our researches into the system of final causes, the principal use of the swallow appears to be, to feed on, and destroy, a variety of noxious insects, which are at enmity with man, and other parts of nature, and would, if proper bounds were not set to their increase, become a most formidable and wide spreading evil.

But, such insects are not confined to any particular tract of country, nor to the summer of high latitudes. They abound in all countries, and in certain regions, during all seasons of the year.

At all seasons, therefore, as well during its winter absence from us, as during its residence with us in summer, may the swallow be engaged in contributing to the general balance of nature.

WHY, then, should the Deity, who delights no less in the utility, than in the happiness of his creatures, deprive us, without any obvious reason, of more than half the usefulness of this bird, by burying it, for more than half its time, in a state of torpidity?

I shall close this memoir, by expressing a confidence, that no splendour of talents, nor authority of names, will ever be able to give permanency to a belief in the submersion of swallows.

WHEN the history and science of nature shall be better understood, I have no doubt but this extraordinary hypothesis will be classed with the story of the phoenix, which is said to descend from the ashes of its parent, or, with the fable of Proserpine, who, after her marriage, was reported to be in the annual habit of passing six months with her lover, in the infernal, and six with her mother in the celestial regions?

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Why, then, should the Dairy, who delights no less in the utility, than in the happiness of his fellow-creatures, without any obvious reason, of more than half the usefulness of this bird, by buying it for more than half its time, in a state of

**MEDICAL & PHYSICAL**

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**M E M O I R S.**

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MEMOIR IV.

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STRICTURES

ON

“ A MEMOIR CONCERNING THE DISEASE OF

*GOITRE,*

AS IT PREVAILS IN DIFFERENT PARTS OF

NORTH AMERICA.

BY BENJAMIN SMITH BARTON, M. D.”

Uc. Uc. Uc.

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**I**T is not my intention to offer any remarks, either on the historical, or therapeutic part of the memoir before me.

WERE I to analyse and examine the former of these, I should run a risque of being charged with a spirit of flattery; for, my analysis would be but little else than an effusion of eulogy. Respecting this part, therefore, I shall only observe in general, that it exhibits that variety of matter and simplicity of manner—that richness and perspecuity

which characterize most of the writings of its author. But, its chief merit consists in its embodying more information respecting the appearance and range of Goitre, in the New World, than is to be found in any other publication on the subject.

My strictures shall be confined to that division of our author's third section, where he offers "his own opinion upon the cause of Goitre."

THIS opinion is submitted to the public, with so much of the modesty and candour of true philosophy, as to disarm criticism of all its severity, and almost persuade it to relax in its justice.

IN the beginning of that part of his memoir, where the doctor states the grounds of his opinion relative to the cause of Goitre, he bestows on his reasoning (the very best, perhaps, of which his side of the point in question will admit) nothing but the humble name of conjecture. Had he even gone no farther than this, I should still have considered a reply to him necessary; because, the very conjectures of men distinguished in science, and more particularly of those, who

act as public teachers, produce an affect on subordinate minds.

BUT, in the close of an appendix to his memoir, our author assumes a tone of more confidence and decision, and says, "Upon the whole, the farther I proceed in this enquiry, the more I am inclined to believe, that the principal remote cause of Goitre, is a miasm of the same species, as that which produces intermittent and remittent fevers, dysenteries, and other similar complaints."

THE plan which I mean to pursue, in the present memoir, in reply to Dr. Barton, is,

FIRST, to enquire into the nature and force of the evidence, on which the above belief is founded. And,

SECONDLY, to state a few arguments, which seem to militate against the opinion, that Goitre and bilious fever result from the same cause.

THE doctor's first reason, in support of his opinion, is expressed in the following words :

“As glandular affections,” says he, “of different kinds, are not unfrequent in countries in which intermittent fevers prevail, I was early led to conjecture, that the Goitre might be occasioned by the same matter or matters, which induce these fevers.”

To this I would reply, that if we except the liver, spleen, and mesenteric glands, (I allude, more particularly, to the mesenteric glands of children) glandular affections are not, in proportion to other diseases, more frequent in bilious regions, than in other places. It will be found on enquiry, that, with the above exception, the inhabitants of our maritime flats, in the United States, are no more subject to diseases of these organs, than those who reside in midland or mountainous tracts.

MARSH miasma appears to possess a peculiar power of producing disease in the stomach, intestines, and abdominal viscera, in general. Hence, the frequency of indurated spleens and livers, and of bowel complaints, in marshy countries.

BUT, I believe pathology furnishes no fact, in proof, that the poisonous exhalation, in question, has ever been known to give

origin to idiopathic affections of the glands, in other parts of the body. Next to the abdominal viscera, the vascular system suffers most from its deleterious influence.

THIS argument of our author appears, therefore, to be founded in error, and can furnish no shadow of support to his hypothesis.

THE doctor proceeds next to show, by a number of facts, that most places, both in Europe and America, where Goitre prevails, are also subject to intermittent and remittent fever.

THIS position is undoubtedly true; but, it is no less true, that many other places are still more subject to these latter diseases, where the former has never possessed an existence.

BILIOUS fever, under some form, may be denominated, not improperly, the endemic of the earth. There appears to be no habitable tract of country, of whatever elevation, or in whatever latitude, where this disease may not, under certain circumstances, originate and prevail. Like the light and heat of its parent, the sun, it extends its dominion

from the valley to the mountain, and from the Line to the Pole.

How different is the case with regard to Goitre? This disease is so circumscribed, in its extent, that when compared with the other, it may be said to occupy only a point on the surface of our globe. But, in diseases, as in other things, a community of origin should produce something like a community of extent.

If we consider Goitre as derived from the same origin with bilious fever, for no other reason, but because it exists occasionally in the same place, we may, with equal propriety, draw a similar conclusion, respecting every other description of complaint. For bilious fever being, as already observed, a common tenant of our globe, it is impossible for other diseases to find out a single spot, of which it is not already an occupant.

In relation to this earth, man, like bilious fever, possesses a kind of ubiquity, inhabiting occasionally every part of it, from the Line to the Pole. Elephants, on the other hand, are found native only in certain districts of the Torrid Zone, where man also resides. What would we think of the reasoning of that

naturalist, who, in consequence of this partial (I might have said accidental) coincidence of habitation, would venture to infer, that men and elephants are descendants from a common progenitor?—We would certainly consider him, either as visionary almost to madness, or as attempting to expose and weaken his hypothesis by ridicule, rather than to support it by serious argument.

BUT, such evidence, however fanciful, respecting the common origin of man and the elephant, would stand on precisely the same footing, with that which I am now examining, relative to the common origin of Goitre and bilious fever.

IT would be uncandid, however, to close my remarks on this head, without acknowledging that Dr. Barton appears to have considered the argument, now under consideration, of but little weight in the defence of his opinion.

OUR author's next reason, for believing in the common origin of Goitre and bilious fever, is communicated in the following words:

“THE complexion of many goitrous persons,” says he, “especially those in whom the disease has arisen to a considerable height, is an additional circumstance in favour of the opinion which I have advanced. Their complexion,” says Dr. Saussure, speaking of the Cretins “is a yellow, approaching to brown, from which, probably, they obtained the name of Marons (7) which is given to them in the Valley of Aoste.”

FROM the simple circumstance of the complexion of patients, but little solid information can be derived, relative to the origin of the diseases which afflict them.

ALL permanent constitutional affections (phthisis perhaps alone excepted) have a very perceptible influence in darkening the skin. But, there is a reason why this effect should be more particularly, and to a greater extent, produced in those “in whom the disease of Goitre has arisen to a considerable height.”

CRETINS, or persons affected with a high degree of the disease in question, are

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(17) “The maron is a large kind of chesnut.”

pretty generally subject to an imbecillity of mind, approaching to idiotism. In consequence, therefore, of that inattention to dress, which never fails to accompany this unfortunate state, they are exposed, unprotected, to the influence of the weather. This circumstance, accompanied by a neglect of cleanliness, (another uniform characteristic of idiotism) are causes sufficiently powerful to produce the Cretin complexion, independently of the operation of marsh miasma.

FURTHER, in Cretins, the powers of life are uncommonly weak, and, therefore, worse calculated than in most other descriptions of persons, to resist the influence of the weather, and of other causes, that have a tendency to darken the complexion. For, the more vigorous and healthy the human system, the farther is it removed from the condition of inanimate matter, and the less liable to receive and retain the alterative impressions of external agents.

I shall only add, that cretinism prevails most in the lower walks of life, where swarthy complexion is no uncommon occurrence, even among those exempt from disease.

I come now to our author's last argument, in favour of the common origin of Goitre and bilious fever.

"I was informed," says he, "that in the state of New-York, those persons who are affected with Goitre are commonly exempt from intermittents, though in the midst of persons labouring under these latter complaints. If this be a fact, it would rather serve to show, that the Goitre and the intermittent are owing to the same cause."

I have no disposition to question the truth of the fact, that Goitre, especially in an advanced stage, serves as a shield against intermittents. In this respect, however, it stands by no means alone, a similar effect being produced by many other diseases. But, that power which it possesses, only in common with other complaints, can furnish no solid testimony relative to its origin.

Who does not know, that the human system is often preserved from bilious fever, by phthisis, scrophula, large wens, especially when painful, large painful bubos, inveterate gleans, and psora or itch? Yet, who will venture to infer from hence, that these

complaints result from the operation of the effluvia of marshes?

FINALLY, is not the circumstance of Goitre guarding its subjects from intermitting fever, explicable on the well known principle, that two general morbid actions (for Goitre, in an advanced stage, is certainly a general disease) cannot exist in the same system at the same time?

As well might we expect in the same patient, a co-existence of measles and small pox, as of Goitre and any form of bilious fever. And, as well might we expect two particles of matter to occupy, at once, the same point of space, as two distinct kinds of action to co-exist in the same parts of living matter.

HAVING endeavoured briefly to show the inconclusive nature of Dr. Barton's reasoning, relative to the cause of Goitre, I shall pass to the second part of my memoir, namely,

To state a few arguments, which seem to militate against the opinion, that this

disease possesses a common origin with bilious fever.

I. To whatever quarter of the globe we direct our attention, we observe, that in those tracts of country, where bilious fever produces its greatest ravages, and consequently where the noxious exhalation, that gives origin to it, is most abundant, Goitre has never possessed an existence.

THIS remark is forcibly exemplified in that range of sea-coast, which extends from the Delaware to the river St. Mary. Though this maritime region produces more bilious fever, than exists in all other parts of the United States, it has never, I believe, been known to give origin to a case of Goitre.

THIS fact (as Dr. Barton has himself had the penetration to discover, and the candour to acknowledge) militates much against his opinion respecting the cause of the disease in question. For, if Goitre were the descendant of marsh miasma, it is physically impossible that no cases of it should ever occur, in the above maritime tract of country, where, for three months in the year, the atmosphere is saturated with this poisonous exhalation.

II. GOITRE, though not exclusively a disease of the female sex, attacks women much more generally than men.

BUT the reverse of this is true with respect to bilious fever. Of those who suffer from this complaint, the number of men, in relation to that of women, bears the proportion of about five to three.

IF, then, Goitre and bilious fever are descendants from a common origin, whence is the reason of their selecting the opposite sexes as their proper subjects?

III. THOUGH particular attention has been paid to this point, yet it does not appear to be a general fact, that the disease of Goitre is more troublesome from the middle of summer till the close of autumn, than during any other season of the year.

BUT, this would unquestionably be the case, were it the offspring and nurseling of marsh miasma. For, it may be laid down as a medical axiom, that diseases are always in their highest state, when the causes which produce them are most active. But, it is unnecessary to add, that the close of sum-

mer and the months of autumn constitute the season of riot to marsh exhalation.

IV. WERE Goitre produced by the miasm of putrefaction, it would, generally, like other forms of bilious fever, make its first appearance in summer or autumn.

BUT, the case is directly the reverse of this. Winter and spring (I mean the beginning of spring) are the most common seasons for the commencement of Goitre.

HENCE, this disease has been so frequently ascribed to the action of cold, but more frequently still, to the use of water obtained from the solution of snow.

V. DISEASES, or forms of disease, which spring from a common cause, oftentimes exchange appearances, or alternate with each other.

THIS well known fact constitutes a principal point of evidence, in favour of the opinion, which ascribes a common origin to intermitting fever, remitting fever, yellow fever, and dysentery. To the practitioner of experience and observation, it is unnecessary to remark, that these complaints possess,

and frequently exhibit, what may be termed a reciprocal transmutability, or vicarious existence.

BUT, this is by no means the case, with regard to Goitre and bilious fever. Medical records furnish no instance, where these two diseases appear to have been changed, by vicarious action, the one into the other.

VI. GOITRE, as formerly observed, is oftentimes accompanied by an approach to fatuity.

BUT, no such affect as this has ever been known to result from the action of marsh miasma, except as a consequence of general and protracted fever. The inhabitants of bilious tracts of country possess, in general, as much strength and acuteness of intellect, as those of other places.

VII. IN all places where bilious fever prevails as an endemic, it is marked by a kind of periodical violence; that is, the inhabitants are severely afflicted by it for one or more years, after which they are in some measure exempt from it, for an equal, or perhaps a greater length of time. Similar

remissions, with regard to their epidemic force, are observable in the pestilential diseases of the East.

BUT no such intervals occur in the prevalence of Goitre. Checked by no season, and fed by no periodical constitution of atmosphere, this disease, wherever it prevails, is, at all times, nearly uniform in its extent and violence.

VIII. THE last argument I shall propose, in opposition to the opinion, that marsh miasma gives origin to Goitre, is, that this noxious gas is never known to produce, in any instance (except perhaps in the hepatitis of the east) a topical and chronic affection, unless as the result of preceding general fever.

THIS is undoubtedly the case with regard to the enlargement and induration, which it occasionally produces with us, in the viscera of the abdomen. Indeed, the above miasm, when it gives rise to disease, appears to be almost as uniformly and essentially a febrile stimulus, as that which gives origin to small pox, measles, or scarlatina.

BUT, Goitre occurs at first independently of fever, and must, therefore, be attributed to some other source.

I shall make no apology to Dr. Barton for the freedom I have used, in the consideration of his opinion. I know his mind to be too enlightened and liberal, to take umbrage at an enquiry, where truth is the object, and where all personalities are studiously avoided.

WHEN characters conspicuous for their talents and philosophical attainments, become, through mistake, the advocates of error, it is necessary that early opposition be made to their opinions, lest, like encreasing torrents, they prove at length irresistible, and hurry along with them inferior minds, in a triumphant wreck.

By this consideration alone, have I been principally actuated, in offering the foregoing strictures on the opinion of our author, relative to the cause of the disease of Goitre.

It will probably be expected, that after having rejected the theory of Dr. Barton, respecting the origin of the complaint in question, I should now proceed to deliver a less exceptionable theory of my own. This

task, however, I must for the present decline. It belongs, more particularly, to those physicians, whose lot, by throwing them into goitrous regions, has given them access to the only kind of knowledge worth possessing on the subject, I mean the knowledge derived from observation.

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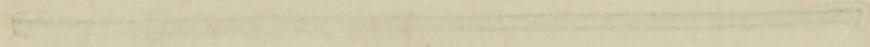
TO THE

*Philadelphia Medical Society.*

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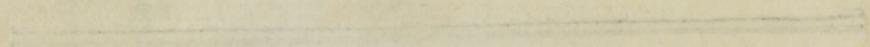
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AN

A D D R E S S

TO THE

Philadelphia Medical Society,

ON THE ANALOGIES BETWEEN

*Yellow Fever and True Plague,*

DELIVERED,

BY APPOINTMENT,

ON THE 20th OF FEBRUARY, 1801.

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BY CHARLES CALDWELL, M. D.

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1801.



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# A D D R E S S,

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*Gentlemen of the Medical Society,*

**I**T is not of my own but of your choice, that I rise to commemorate the anniversary of our institution. An obedience to your will, and a resolution against delinquency, in whatever may become my duty by the suffrages of the society, are the only motives which could have drawn me from the secure walks of private membership, to appear as the minister of the present occasion. These considerations encourage me to hope, that the same sentiments of partiality, which predominated in my appointment as your orator, will induce you now to palliate my faults, and to condemn even my errors with a spirit of mildness. For, who will venture to become a candidate for your indulgence, if it be denied to a functionary of your own election, whose ambition is rendered virtuous, by consisting in a wish to merit your approbation!

As the art of oratory is foreign from the profession to which I am devoted; and, as I mean to address myself, at present, to your understandings, not to your imaginations or your feelings, I disclaim all pretension to the ornaments of rhetoric. It neither comports with my qualifications, nor falls within my aim, to awaken your sorrows by the enginery of pathos: it belongs not to me to conduct you enraptured through the Elysium of fancy, to cull on our way the flowers of taste, and strew them before you in the extravagance of declamation: nor is mine the power to overwhelm your souls by the grandeur of imagery, to lead them captive by the magic of harmony, nor to hurry them away by the energy of action: the accomplishment of these ends calls for endowments which none but the favourites of nature can boast.

SPEAKING as I do, not to persuade and rouse to action, but simply to elucidate my subject, and to produce, if possible, a conviction of its truth, some degree of perspicuity, and correctness of argument, are the only properties of oratory at which I shall aim. For such is the modest simplicity of attire in which physical science delights to appear.

HAVING attempted, in a work which will be shortly before the public, to establish the

identity of the common bilious and the yellow fever, I beg leave to lay before you, in the following address, a statement of a few analogies between the latter disease and true plague, or, in other words, between the American and the oriental pestilence.

I am persuaded you will accompany me, without reluctance, in a brief contemplation of these diseases, of which one has so lately been the scourge of our own country, and the other is now spreading terror through the continent of Europe. Calamities of such magnitude and extent, call for the united exertion of the intellect of nations, to shed light on their nature and cause, and for the strenuous co-operation of society at large, to stay or avert their desolating progress.

THOUGH the analogies between yellow fever and the pestilence of the East might be treated of on a very extensive scale, I shall confine myself to narrower bounds, and dwell chiefly on those, which relate to the epidemic rise, progress, and termination of these forms of disease. Analogies resting on the correspondence of either their general or particular symptoms, being less characteristic shall receive less of our regard.

It is alike inconsistent with my intention, and with the necessary limits of my address, to attempt a detail of all the hypotheses on the origin of pestilence, that have contributed to mislead the world, and to perpetuate the weakness and ignorance of their authors.

A certain writer, (1) however, in our own country, whose pen has been lately employed on this subject, has given birth to such a physico-theological monster—has erected such a Colossus of bigotry, error, and absurdity, that a few words in describing and exposing its deformities may not be amiss! Indeed this hypothesis, while it constitutes, in its nature, a paragon of ignorance, is, in its form, so perfect a non-descript in the catalogue of folly, that to pass it unnoticed would bespeak inattention.

THE writer, to whom I allude, is Mr. James Tytler, a plodding compiler in medicine, much more accustomed to reading than to thinking, and much more remarkable for illiberal invective than for solid argument. An indefatigable drudge in medical literature,

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(1) THE following remarks relate exclusively to this writer's medical pretensions, and have no reference to his acquirements in any other department of knowledge.

but wholly incapable of combination or arrangement, the summit of even his probable usefulness will be (like that of those who supply the mason with mortar and stone) to furnish materials for others to systemize.

THIS author, whose vanity is the only counterpart to his weakness, supposes the contagion of plague to have been manufactured in Heaven, for the express purpose of inflicting the vengeance of Deity on the profligate Jews. Respecting the manner in which this celestial poison, when compounded, was conveyed to the devoted theatre of its ravages, our author has unfortunately left us in the dark. But, as conjecture is allowable, where information is wanting, we may supply this deficiency, by supposing it consistent with this gentleman's belief, that a special messenger was dispatched from above, bearing the matter of contagion in a box, which, like that of Pandora, was opened in the midst of the camp of Isreal, and its contents suffered to escape, and attach themselves to the objects of divine resentment. However extravagant this supposition may appear, and however near it may be thought to approach to the reveries of lunacy, it commits no greater outrage on reason and common sense, than

may be found in many parts of Mr. Tytler's publication.

SPREADING, through the medium of conquest and otherwise, from the chosen people to surrounding nations, the plague has been thus, through every vicissitude of seasons, and every revolution in our atmosphere, perpetuated by contagion from the days of Moses to the present period!

SUCH is the monument of ignorance and superstition, which a man, who pretends to instruct his cotemporaries, has erected in the close of the eighteenth century! A monument, worthy of a place amid the barbarism of Egypt, where the inhabitants attribute the cessation of the plague, in common with the swelling of the Nile, to the immediate agency of a tutelary angel!

So monstrous are the errors, and so gross the absurdities of this hypothesis, as to preclude the necessity, and even to render doubtful the propriety, of a refutation. For, in the words of the poet,

“ VICE is a monster of such hideous mien,  
 “ As to be hated, needs but to be seen!”

And such is also the case with the consummation of bigotry and folly!—But to proceed to an enumeration of the analogies proposed.

THE plague of Asia, like the yellow fever or pestilence of our own country, is a disease which delights in the devastation of populous cities. Perhaps neither of these calamities has ever been known to originate, as an epidemic, in villages or country situations; nor do they oftentimes extend to such places, even in times of their most general prevalence. It is only in the artificial and vitiated atmospheres of large cities, that they are able to find a sufficiency of their proper nourishment.

TRUE plague, when it has prevailed in the cities of Europe, has always made its appearance about the close of spring, or in the course of the summer, has reached its summit in the autumnal months, and declined or wholly disappeared on the commencement of cold weather. But such is known to be, in like manner, the course of the yellow fever or pestilence of America. To the generation and propagation of both these diseases, therefore, a warm atmosphere is no less necessary, than the filth and crowded

population of large cities. Even when committing their heaviest devastations, a few nights of cold weather, particularly if it be accompanied by frost, will check them as certainly, and almost as speedily, as it will the vegetation of tropical plants. I know of no instance on record of either of these diseases having prevailed, to any extent, throughout the winter of high latitudes. (2)

It is a circumstance alike common to plague and yellow fever, that they occur epidemically, in places subject to them, only at certain irregular periods, or after indefinite intervals of time. Fortunately these destroyers of the human race do not appear as the regular endemics of any situation. Though summer and autumn are their native seasons, yet these seasons are not alone sufficient to produce them, unless they be aided by a pestilential constitution of atmosphere.

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(2) It is perhaps possible that, independently of summer and autumnal exhalation, the atmospheres of places may be rendered so malignant by more general causes, as to protract pestilence throughout the winter. But such occurrences (supposing their existence practicable) have been certainly no less rare than calamitous.

EPIDEMIC plague banishes from around it every other form of febrile disease, and reigns itself the solitary tyrant of the place where it prevails. It would be superfluous to offer testimony in confirmation of this fact. Most authors on pestilence, who have written from observation, bear witness to its truth. But the same thing is true with regard to the epidemic state of yellow fever. Taking possession of the atmosphere, it expels or suffocates all other descriptions of fever, and creates for itself a dismal solitude. During the late autumns in which it prevailed in this place, it is known by our practitioners to have suffered no rival disease to approach it.

PLAGUE and yellow fever are alike remarkable for being preceded, followed, or accompanied in adjacent places, either by new diseases, or by an increase in the frequency, but more particularly in the malignity of common diseases. Since the year eighty nine, this country has been several times visited by epidemic catarrh, and in some places by an epidemic cynanche, diseases which had not before occurred to such extent, within the memory of our oldest citizens. Since the same period, the common diseases, in different parts of the United States, have

undergone such a striking change, as to call for a different and much more energetic mode of treatment. That similar phenomena are connected with the prevalence of plague in Europe, and in the East, we learn from many works on the subject, particularly from that of Dr. Patrick Russel, and from Mr. Webster's excellent "History of Epidemic and Pestilential Diseases."

It belongs in common to plague and yellow fever to be attended with most fatality on their first occurrence. It is a melancholy truth, that these diseases seldom fail to hurry to the grave a great proportion of their earlier subjects. As they become more general, but especially when they are on the decline, individual cases, laying aside their malignity, prove much more manageable, and may be generally conducted to a favourable issue. These circumstances are probably attributable to a threefold cause.

1. THOSE first attacked by, would appear to be most strongly predisposed to, the above diseases, and therefore to be most likely to have them in a violent degree.

2. In this early state of things, an ignorance of the dangerous nature of their com-

plaints, prevents patients from being sufficiently prompt in applying for medical aid.

3. ON the first occurrence of an epidemic, physicians themselves, neither acquainted with its character nor aware of its malignity, generally fail to treat the early cases of it with sufficient boldness.

NEITHER plague nor yellow fever can prevail at any time, nor in any place, which is not calculated to give rise to an abundance of putrid exhalation. Whatever is inimical to the origin of such exhalation, proves equally inimical to these complaints. But the production of this poisonous gas is particularly prevented by three causes, namely, cold, great humidity, and excessive heat accompanied by an excessive aridity of the atmosphere.

THE hostility of the first of these causes to the diseases in question, has been already mentioned, that of the two latter shall be treated of in a subsequent part of my address.

THUS far on the analogies derived more immediately from the origin of plague

and yellow fever. In the phenomena connected with their propagation, they exhibit no less of a kindred nature.

THOUGH they have both somewhat the appearance of spreading by contagion, their progress is certainly too rapid, to depend on a cause of such limited powers. Allow me to call your attention to a palpable inconsistency (not to say an absolute contradiction) which exists in the state of common opinion on this subject.

PLAGUE and yellow fever are acknowledged by every one to be much less contagious than small pox, because they attack with much less certainty persons exposed for a short time to their influence. Nor are they supposed to be communicated to so great a distance as small pox. Notwithstanding this, they spread with nearly tenfold its rapidity. In the course of a few weeks, they will overrun an extent of city, which it would scarcely pervade in twice as many months. Here then, admitting plague and yellow fever to spread by contagion at all, they would appear to be both more and less contagious than the small pox. But this is a position which even the advocates of contagion will reject.

Perhaps the only method of removing the contradiction, is to admit that the two former diseases are not propagated by contagion at all, but by the more powerful medium of a vitiated atmosphere. But more of this hereafter.

It is a fact notorious in the United States, that if a patient, in the most malignant state of yellow fever, be removed from the city to the country, he may there be visited and nursed, without endangering the health of his physicians or attendants. But we learn from Prosper Alpinus, Russell, Mariti, Sonnini, and various other writers, that the same thing is true with regard to the pestilence of the East. When persons ill of that disease are conveyed from a place where it is epidemic, to one where it is not, they may be approached and attended without hazard.

TRUE plague, therefore, exhibits no unequivocal marks of contagion, when removed without the limits of a malignant atmosphere. That calamity is believed to be, for the most part, introduced into Syria and Egypt from Constantinople. Yet, in common

years, when no pestilential state of the elements prevails, persons in all stages of it arrive from the latter in different parts of the former places, without communicating infection to any one.

THE physicians of America have not now to learn, that certain classes of persons are much more liable than others to be attacked by yellow fever. But this is in like manner true with respect to the oriental pestilence: and it is not a little remarkable, that these two diseases manifest a predilection for persons and habits of the same description.

DOES yellow fever attack and destroy men rather than women? So does pestilence.

DOES the former select, as its victims, the robust, the healthy, and the young, rather than the weak, the infirm, and the aged? Such is also the case with the destroyer of the East. Persons turned of their seventieth year have, comparatively speaking, but little to apprehend from that dreadful calamity.

DOES yellow fever spare infants and children rather than adults? And does not a

similar discrimination characterize the desolating course of pestilence !

FINALLY, do not both these diseases either entirely pass over, or but slightly affect, the frugal and the sober, while they attack more certainly, and more certainly destroy the luxurious and the intemperate ?

BUT it is not alone for the same descriptions of the human race, that these two diseases possess and exhibit a common predilection. They also attack, in common, the same species of inferior animals. Of creatures subservient to man, the dog, the cat, the horse, and the cow, have been pre-eminent in their sufferings from yellow fever and pestilence. And, to extend the analogy still farther, these diseases appear to have attacked, in common, even the tenants of the air, and the more secure inhabitants of the flood. The liability of such a variety of disconnected animals to their influence, would seem to furnish incontestible evidence, that their cause exists in the common atmosphere of the places where they prevail.

THE prevalence of plague and yellow fever is marked, in the countries where they appear, or in adjacent places, with similar

peculiarities in the surrounding and concomitant phenomena of nature. Some of these peculiarities are,

I. CERTAIN irregularities in the seasons and weather; such as, extremely severe winters, intensely hot summers, excessive droughts, or profuse rains, and an uncommon prevalence, but more frequently an unusual absence, of hurricanes and thunder storms. To these phenomena may be added, the occurrence of earthquakes, and the eruptions of volcanos.

II. THE temporary disappearance of certain species of birds. As many of the feathered race emigrate annually to shun the severe winters of the north, some of them have been known to forsake for a while their places of residence, to escape the effects of a vitiated atmosphere.

III. Hosts of new, or an excessive increase in the numbers of common insects and reptiles. It would be needless to remind you of the myriads of locusts, that so frequently desolate the countries of the East, during periods of pestilence; and many of you will long remember the profusion of musquitos, grasshoppers, worms, &c. which

for some years past, have infested certain parts of the United States.

IV. GREAT luxuriance, alarming sterility, or an unusual degree of disease, in the vegetable kingdom. Though in common expression, and in the association of our ideas, pestilence is generally connected with famine, yet medical records inform us, that this calamity has also prevailed in times of uncommon plenty.

SUCH are a few of the irregular phenomena, which, in their respective countries, accompany in common the course of yellow fever, and the course of pestilence. Some of them appear to be the effects, and others only the kindred concomitants, of that malignant constitution of atmosphere, which cooperates in the production of pestilential diseases.

By plague as well as by yellow fever we are liable to be affected sundry times: yet these diseases resemble each other, in leaving the system, which has already suffered from them, less liable than before to further attacks.

THE present is not an improper place to remark, that the leading pathological characters of plague and yellow fever bear a reciprocal and strong resemblance.

THEY are both ushered in by febrile symptoms, sometimes rapid, violent, and alarming; at other times, slow in their progress, and light in appearance, yet in reality insidious and dangerous. It is common to these diseases, that the subjects of them are, in some instances, to the greatest degree prostrated in their strength, from the commencement of their illness, and in others walk about, apparently but little indisposed, till within a few hours of dissolution.

THEY both direct their principal force against the head, stomach, and abdominal viscera. Evidence in favour of this assertion may be collected, no less from the symptoms and complaints of patients while living, than from dissections of their bodies after death. In both diseases the stomach, in particular, is observed to be almost uniformly affected by inflammation.

DOES yellow fever oftentimes terminate in the black vomit, and in hemorrhages from different parts of the body? And do not

similar phenomena sometimes mark the termination of pestilence?

Does yellow fever derive its name from the frequent colour of the eyes and skin, in those whom it affects? And does not a similar yellowness oftentimes appear in protracted cases of true plague? When death occurs on the first or second day of illness, this symptom is alike wanting in both diseases.

Is plague characterized, in most cases, by bubos, and, in many, by carbuncles or malignant ulcers of the skin? And is not yellow fever accompanied at times with the same symptoms? Occurrences by no means unfrequent in the autumns of ninety three, ninety seven, and ninety eight, authorize the physicians of Philadelphia to reply in the affirmative.

It is certain, however, that, in the frequency of these glandular swellings and cutaneous ulcers, plague differs more from yellow fever, than it does in any other particular. But an occasional difference between the external symptoms of two diseases, is not alone sufficient to establish the existence of an essential difference between their na-

ture and causes. Even the same disease, under different circumstances, never fails to appear under a different form. To such an extent is this true, that we seldom find an entire similarity between any two cases of the same epidemic.

It is a truth, of which no one acquainted with medical science can be ignorant, that yellow or bilious fever is oftentimes attended with certain cutaneous affections in the West Indies, which but seldom accompany it in the United States. Yet no physician will suffer such a circumstance to excite a doubt in his mind, respecting the identity of this disease as it prevails in the two countries.

WHAT complaints can be more different in their appearance and general character, than the British plague of 1666, and the Sudor Anglicanus or sweating sickness of the same century? Yet, have not these diseases been uniformly considered as nothing else than modifications or varieties of pestilence?

WHO does not know, that even the complaints of pregnancy and the pains of parturition, are greatly modified by the influence of climate? Yet, who will deny that

these processes are the same, in every inhabited portion of the globe?

It may be further observed, on this subject, that plague is more generally characterized by glandular swellings in the Turkish dominions, and in other parts of the East, than it is when it prevails in the countries of Europe. Hence there appears strong ground to infer, that these affections, instead of constituting one of its essential symptoms, are only the result of accidental circumstances. And hence, from this difference, on the score of bubos and carbuncles, between plague and yellow fever, no argument of weight can be drawn, to establish a difference in their nature and cause.

IN their type, their critical days, and indeed their whole course, cases of plague and yellow fever exhibit a perfect similitude.

THEY are both marked with very evident morning remissions, and evening exacerbations.

THEY both attack, in some instances, with such force, as to prove destructive to life in a few hours. But, in general, their progress is not so rapid. They seldom reach

their crisis before the third, fifth, or seventh, and sometimes not before the ninth, or the eleventh day. It will be observed, that with regard to their critical days, they seem alike partial to odd numbers. Even that state of apyrexia, which oftentimes occurs about the third day in yellow fever, and which has been considered by some as peculiarly characteristic of that disease, forms no uncommon feature in the pestilence of the East.

BUT epidemic plague and yellow fever resemble each other in their decline and termination, no less than they do in their rise and progress.

HAVING raged with more or less violence throughout the summer and autumnal months, the career of both is immediately closed on the accession of cold weather. So completely are their semina blasted by a moderate frost, that, after such an occurrence, there remains in general no shadow of ground to dread their influence. It is indeed true, that sporadic cases of these diseases appear even in the depth of winter: but they are the offspring of causes which operate only on a circumscribed scale. It belongs to spring, summer, and autumn, particularly to the two latter seasons, to render the plague and yellow fever epidemic. The

reason of this is obvious. It is during these seasons only, that a sufficiency of putrid exhalation can be evolved, to impregnate the atmosphere to the pestilential point.

To the foregoing account of the termination of plague, I am not ignorant that there exists an exception. Instead of continuing till the commencement of winter, this disease, in Egypt and Syria, terminates uniformly about the summer solstice. Hence it has become proverbial, that extremes of heat and cold are alike destructive to pestilential contagion.

Does not this circumstance, it may be asked, constitute an essential difference between plague and yellow fever? I answer, it does not. For, did the latter disease visit the above mentioned countries, it would terminate at the same season with the former.

HOWEVER paradoxical it may appear, it is unquestionably true, that in Syria and Egypt, plague expires during the heats of summer, on the same principle, which, in European countries, leads to its termination on the commencement of winter. The cause, in both cases, is a failure of the food of putrid exhalation. For, as already observed,

plague and yellow fever prevail only at such times and in such places, as are favourable to the production of this gaseous poison.

IN most parts of Asia, and Africa the climates are materially different from those of corresponding latitudes in Europe and America. This difference is in a great measure attributable to the burning deserts of the East, which, by communicating their temperature to the surrounding countries, render them much warmer than others remote from such torrid regions. But epidemic diseases are known to be greatly under the controul of the temperature of the atmosphere. We must therefore expect, that the epidemics of countries so dissimilar in their climates as those just mentioned, will not only be somewhat different in appearance, but will rise and terminate at different seasons of the year.

SYRIA and Egypt may both be considered as southern regions, subject no less to extremely dry than to intensely hot weather. In the former country no rain falls from the middle of May till the middle of September, while the latter suffers a drought of a much longer continuance. Nor has nature been more liberal in supplying

them with terrestrial streams, than she is in refreshing them with the waters of Heaven. Syria contains no river of note but the Orontes, and the Nile is the only one that waters the land of the Pharoahs. The existence of smaller streams is rendered impracticable, partly by the scanty falls of rain, and partly by the thirsty nature of the soil.

IN consequence of this deficiency of moisture co-operating with the extreme heat of their climates, these places, throughout the summer months, exhibit the most parched and dreary prospect. During this inclement season so completely suspended are the powers of vegetation, and so dead and withered the foliage of most plants, that both countries appear as if scorched by actual fire. Exhausted of their waters, to the last drop, even the air and the earth contribute to heighten the general aridity. Under such circumstances, putrefaction, no longer able to go forward for want of humidity, ceases to impregnate the atmosphere with deleterious effluvia. For, to the existence of this process moisture is do less necessary, than it is to preserve the verdure, or to promote the growth of the tenderest vegetable.

No sooner have the heat and drought of the season produced in every thing such an excess of dryness, which happens about the 20th or 24th of June; no sooner has the atmosphere become thus depurated of putrid exhalation, than the ravages of the plague, which had been kept up by the putrefaction of the vernal months, are immediately at an end, as if staid by the influence of supernatural agency. Deprived of its proper aliment, in consequence of this deficiency of water, the monster may be said to perish by famine. Were Syria and Egypt supplied with uniform rains, like the countries of Europe, there is no doubt but summer and autumn would be their principal period of suffering from this disease. After the autumnal rains of Syria, there is not a sufficiency of heat, previously to the commencement of winter, to generate afresh the seeds of pestilence.

WE may lay it down, then, as a physical axiom, that the destruction of putrid exhalation, whether effected by the frost of winter, or by the co-operation of heat and drought, will arrest the desolating progress of plague. But the same thing is true with regard to yellow fever, which depends for

its origin and propagation on the same effluvia. In this particular, therefore, no less than in others already mentioned, these two diseases exhibit a striking affinity.

I am not ignorant that several writers of note, have ascribed the cessation of the Egyptian plague to a different cause, namely, to the superflux of the river Nile, which they alledge purifies the air, either by drowning, or washing from the neighbouring country, all existing sources of putrefaction. But a reference to dates will immediately convince you that these authors are mistaken.

THE Nile begins to swell about the seventeenth of June, rises at the rate of four inches a day, and does not overflow its banks till the middle of August. But the plague ceases uniformly about the twenty fourth of June. How then is it possible, that the waters of this river, which do not begin to inundate the country for nearly two months afterwards, can, at this period, either overwhelm or wash away the filth of its surface?

WERE the face of Egypt covered with water at the time when the Nile is in reality only beginning to swell, I would be disposed

to attribute the ceasing of the plague to this inundation. For an excess is no less inimical than a deficiency of water to the putrefactive process. But, as every cause must necessarily precede its effect, it is unphilosophical, not to say absurd, to ascribe the cessation of the plague of Cairo, on the twenty fourth of June, to the overflowing of the Nile about the middle of August. Though the superflux of this river is the saviour of Egypt from depopulation by famine, it does not appear, from our latest and best accounts of that country, to have any particular influence on the health of its inhabitants.

THOSE persons acquainted with my infidelity respecting the contagion of yellow fever, will, no doubt, suppose me at a loss to discover, on that score, any analogy between this disease and the pestilence of the East.

ON this subject it becomes me to speak with diffidence and caution, because I am unable to speak from observation. To the writings and conversation of others am I indebted for the principal part of what knowledge I possess, relative to the nature of true plague. But from all I have been able to collect through these channels, I find

no solid ground of belief, that this disease is really contagious. On the other hand, the farther I pursue the enquiry, the more am I inclined to consider it as propagated, not by contagion, but solely through the medium of a vitiated atmosphere.

My principal reasons for this opinion I will endeavour to lay before you in a few words.

I. **PLAGUE** prevails only under certain constitutions of the atmosphere, which medical writers denominate pestilential, and during those seasons of the year, which favour the generation of putrid exhalations. Two circumstances therefore seem essential to its existence and propagation, an atmosphere radically malignant, rendered still more so by the admixture of deleterious gases. On the aid of these two adventitious causes it is as dependent for its prevalence, as combustion is on that of vital air.

**BUT**, how different is the case with small pox, measles, lues venera, and other truly contagious diseases? Possessed of an inherent and independent power of self-propagation, these maladies prevail and spread at all seasons of the year, and under every

varying constitution of atmosphere. To their communication from the sick to the well, foul air is no more necessary, than it is for the spreading of flame from one combustible body to another.

II. WHEN plague is epidemic in a town or city, and cases of it are removed to healthy situations in the surrounding country, or to neighbouring towns and villages free from disease, it is not communicated to the nurses or attendants of the sick. This fact is amply attested, and seems to declare in the most explicit terms, that the disease in question is not possessed of any specific contagion, or inherent power of self-propagation, but is altogether the creature of adventitious causes. Under similar circumstances how different are the phenomena exhibited by small pox? Like an electron per se, this disease, by means of an infectious power, of which nothing can deprive it, propagates itself alike in every situation.

III. THE sudden and entire cessation of plague in Syria and Egypt about the summer solstice, and in Constantinople on the accession of cold weather, is inimical to a belief in its contagious nature. Immediately after its termination in these places (which

is sometimes almost instantaneous, and where a belief in the doctrine of fatality prevents every measure for the removal or destruction of contagion) the apparel of the dead is worn by their surviving connections, their beds are slept on, and their furniture in general used and handled in the most familiar manner. Nor is this all: Even the low filthy hovels, which had been utterly depopulated by the disease, are, without purification, presently filled up again by fresh inhabitants: Yet, from all this intercourse, apparently so inconsiderate and dangerous, no inconvenience whatever is experienced. Instead of immediately sweeping off those who thus plunge into the midst of its supposed fomites, the disease is heard of no more, till the return of the next season of exhalation, or perhaps till a much more distant period, and then appears again without being attributable to any cause, except the existing state of the atmosphere.

UNDER the foregoing circumstances, plague ceases at the very time when its supposed matter of contagion would seem to exist in the greatest abundance, and when things would consequently appear to be in the best state of preparation for the continuance of its ravages. But if this disease cannot be con-

tinued in action, by such an immense volume of fresh contagious matter issuing immediately from the bodies of many thousand sick and dead, how can it be called into being again; some time afterwards, by an inconsiderable quantity of the same contagion (now perhaps grown stale with age) adhering to a bale of goods, a chest of clothes, or even to a single article of wearing apparel? As well might we attribute to a solitary and fading spark a power of producing and propagating flame, superior to that possessed by an extensive and vigorous conflagration, as to alledge, that from a small and weakened portion of contagion a disease may originate, which an incalculable quantity of the same contagion in the most active state, was unable even to preserve in existence.

INDEED were plague possessed of real contagion, I know not how it could terminate in any place, except with the final extermination of the inhabitants. For as the system is known to be subject to repeated invasions of this disease, even during the same season, a first attack would (particularly in places where all precautions of cleanliness are neglected) prepare a sufficiency of poison for the superinducement of a second, which, on the same

principle, would again prepare the way for a third, till death would finally step in and relieve the patient from his accumulated sufferings.

BUT it is said, that plague is only conditionally contagious ; that it is communicable from the sick to the well, only under certain states or conditions of atmosphere ; and, that with the termination of these states or conditions, terminates also the communicability of this disease. This is certainly a kind of compromise, or half-way business, which approaches to an acknowledgement, that the evil under consideration results from a malignant constitution of the air.

THE most enlightened and respectable contagionists alledge, that the foregoing states or conditions of atmosphere contribute to the propagation, of plague, not by heightening the virulence of its contagion, but only by increasing the predisposition of the human system, i. e. by rendering it more susceptible of the action of pestilential poison.

A brief analysis of this proposition will expose the fallacy of the principles on which it is founded.

It is known to physicians that the constitution of man is not so extremely mutable as to be materially affected in its predispositions or susceptibilities, by the action of the atmosphere continued only for a few hours or a few days. There is reason to believe that a period of many months is not more than sufficient for the production of such an effect. Agreeably to the reasoning of our contagionists, then, it would be necessary for a person from a healthy situation to reside a considerable time in a place suffering from pestilence, before he would be liable to an attack of the disease. For in what other way could his system be rendered susceptible of the action of contagion?

BUT, how does this inference comport with observation? Do we not find that the very reverse of it is true? When a city is overrun by plague, strangers, on their first arrival, are known to be even more liable to an attack of it, than the old and permanent inhabitants of the place. Yet, according to the foregoing theory of our contagionists, the latter should be alone subject to the disease, because they alone have resided long enough in a malignant atmosphere, to have their systems prepared for its poison

IV. The last reason I shall offer for disbelieving in the contagion of the plague is, because it is a disease which unquestionably has possession of the atmosphere, as is manifest from its either banishing or assimilating to itself, all other diseases of the place where it prevails. For, it may be laid down as an axiom (if indeed medical science admit of a self-evident truth) that whatever disease acquires such an ascendancy over its contemporaries, as either to banish them, or oblige them to assume its own likeness, must do it by gaining the entire command of the atmosphere. Through no other medium could it exercise such authority, because no other medium is so general in its influence.

BUT I hold it superfluous to remark to you, that contagion, resulting from disordered action in the human system, is a cause by far too limited and feeble to revolutionize the atmosphere of a large city. Though the confined atmosphere of a single room, or even of a whole house, may be thoroughly contaminated by exhalation from the sick, it is impossible that from a source so disproportionate, the same thing can happen to a body of external atmosphere, several miles in extent, and renovated by a constant influx of fresh air.

IN opposition to the opinion that plague results from a general vitiation of the air, it will no doubt be urged, that in the cities of the East, Europeans secure themselves against this disease, by shutting themselves up in their own houses, and observing a strict quarantine during its prevalence.

THIS objection will probably have much weight with those, who either do not know, or do not recollect, that an exciting is no less necessary than a predisposing cause, to produce an attack of pestilential disease. It is a truth which must be familiar to every one who has made medical science his study, that our systems may be charged with the exhalation or seeds of pestilence, and yet, if no excess or irregularity occur to excite them into action, we may still escape a formal attack.

SUCH appears to be the case with the above mentioned Europeans. Though many of them retire into their houses carrying along with them the remote cause of pestilence, and though probably the whole of them become impregnated with this poison afterwards, yet, by avoiding every thing that might act as an exciting cause, they finally escape

the ravages of the disease. If however they act in a different manner ; if instead of being cautious and circumspect in their mode of living, they indulge, during their confinement, in intemperance or any kind of irregularity, they seldom find safety even in the most rigid seclusion from the sick. Hence, different individuals in the same house remain healthy, or sicken, accordingly as their habits are temperate or otherwise: and hence, those who escape plague under such circumstances, owe their exemption, not to the want of an intercourse with the infected, but to their avoiding such causes, as might rouse into action the principles of disease which lurk in their systems. Nor are such persons ever clear of danger from exciting causes, till by time and a change in the state of their atmosphere, their bodies are purged of the miasm they contain.

But further, it is customary with most Europeans in Constantinople, Syria, and Egypt, to confine themselves to the upper stories of their houses, during their quarantine, in times of pestilence. To this practice they have been led by observing, that those who reside below during their confinement, are by far the most liable to suffer from the disease.

THE explanation of this fact is simple and obvious. It would appear that the putrid exhalation which contributes to the pestilential state of their atmosphere, rises to but an inconsiderable distance above the surface of the ground. It either, therefore, does not reach the air of their upper stories at all, or exists in it in such a state of dilution and weakness, as to be incapable of deranging the functions of the body.

WERE it practicable for the citizens of Philadelphia to pass their time wholly in the upper parts of their houses, and to remain inaccessible to the lower stratum of air, during the prevalence of yellow fever, it is probable they might, by thus living above the region of the cause of disease, enjoy an equal exemption from its influence.

IT remains that I should advert to that opinion, which regards plague as nothing else than the highest grade of jail or typhus fever.

WERE I to express, in general terms, my sentiments respecting this hypothesis, I would say, that what entitles it to most consideration and credit is, its ranking in the catalogue of its advocates, the illustrious professor

of the institutes and practice of medicine, in the University of Pennsylvania. But, not even the authority of that great teacher can lead me to a belief in the identity of plague and typhus fever.

THESE diseases appear to be different for the following reasons :

I. BECAUSE they prevail in different seasons of the year, and under different degrees of heat. Typhus fever is a disease of high latitudes, and rages most during the winter season ; whereas plague is most common in countries nearer to the tropics, and originates and spreads only under the influence of a summer temperature.

II. TYPHUS fever is certainly propagated by contagion, and requires, for its communication from the sick to the well, no peculiarly malignant constitution of atmosphere. If a case of it be removed from a city, town, or hospital, where it prevails, to a healthy situation in the country, it remains still a source of danger to nurses and attendants. But it has been already mentioned, that the case is different with regard to plague ; because a similar removal disarms it entirely of its power

of propagation. How, I beg leave to ask, are these facts reconcileable with the opinion, which regards the latter as a higher and more malignant grade of the former disease? Supposing them to be in reality nothing more than different modifications or degrees of the same malady, would not the foregoing circumstances bespeak plague to be of the two the most weak and perishable?

III. TYPHUS fever attacks women rather than men, and the weakly and such as subsist on impoverished fare, rather than the robust and such as indulge in a generous diet. But it was stated in a former part of my address, that the reverse of this is true with respect to plague. Its favourite victims are, high livers, and those who possess the most vigorous constitutions.

VI. IN the countries of the East, which are so frequently the mournful theatre of pestilence, typhus fever is altogether unknown. But this would not be the case were it only a subordinate modification of plague: for in such a state of things, an inferior degree of the same circumstances which produce the latter disease, would inevitably in some instances give origin to the former. Perhaps the

warmth of eastern countries, and the general circulation of air which the inhabitants consequently preserve in their dwellings, is the cause of their exemption from typhus fever. For this, as already mentioned, is a disease of cold latitudes and seasons, rather than of warm.

V. TRUE plague never prevails except during the season, and within the sphere, of putrid exhalation. The aid of this poison, therefore, seems essential to its existence. But the case is different with regard to typhus. Perfectly independent of the putrefactive process, a vitiated secretion from the human system is all it requires for its origin and propagation. Nor is it liable, like plague, to be arrested in its course by a long continuance of dry weather.

VI. To whatever extent typhus fever may spread in a town or city, it never acquires such an ascendancy over its cotemporary diseases, as either to banish them, or force them to assume its own characteristic symptoms. The reason of this is, that it never becomes truly epidemic by gaining possession of the general atmosphere of the place where it prevails. It may be regarded as at all times

an insulated disease, resulting entirely from human contagion, and is neither preceded, accompanied, nor followed by uncommon malignity in other diseases. Nor is its prevalence marked by striking peculiarities in any of the cotemporary phenomena of nature. No commotions of the earth, nor frightful meteors in the Heavens, usher in its ravages ; no volcanic eruptions give token of its approach, nor break forth during its continuance to celebrate its orgies ; nor do drought and insects, the harbingers of famine, co-operate with it in the work of destruction.

PERFECTLY local in its origin, and circumscribed in its extent, typhus fever appears to possess no relationship to those sweeping epidemics, which are properly entitled to the name of pestilential. The disease of want and wretchedness, it is more peculiarly confined to the abodes of poverty ; but they, operating on a more extensive scale, and taking a loftier aim, attack, without distinction, the monarch on his throne, and the pauper who subsists on the fragments of charity.

BUT, conscious of the tresspass which the copiousness of my subject has already

obliged me to commit on your time, I shall conclude by laying before you a few general remarks.

PESTILENCE should be regarded as a generic term, including every description of disease, which depends for its origin and propagation on a malignant atmosphere.

As plague and yellow fever appears to result from this source, and as they agree with each other in so many and such essential points, they would seem to be nothing else than varieties of pestilence, modified by the difference of circumstances under which they prevail.

As the contagious nature of these diseases is, at least, extremely problematical, and as the propagation and ravages of both are certainly promoted by putrid exhalations, officers of police, in the cities of this and other countries, should be much less solicitous to close the avenues of their introduction from abroad, than to prevent their generation and nourishment from domestic causes.

FINALLY, as a malignant disease, whose features declare it to belong to the family of pestilence, has lately made its appearance in

the kingdom of Spain, I cannot, without mingled emotions of pity and contempt, contemplate the unenlightened and feeble efforts that are made to prevent its introduction into adjacent nations. Unless the pestilential constitution which appears to prevail in their atmosphere be done away, or a system of domestic cleanliness be rigorously enforced, as well might those nations attempt to countermand the laws of planetary attraction, or to stay, by their military guards, the course of the angel that rides on the whirlwind, as to set limits to the ravages of this calamity.

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