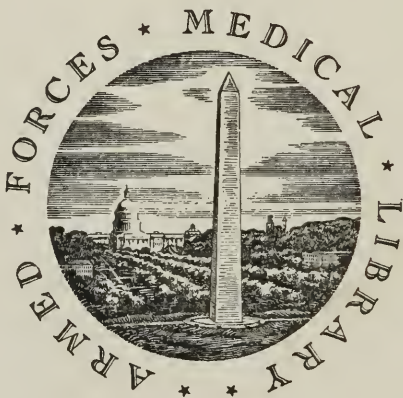


UNITED STATES OF AMERICA



FOUNDED 1836

WASHINGTON, D.C.

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E. A. B. C.

AN ORATION,

Ec. Ec.

*“ At a Stated Meeting of the PHILADELPHIA
MEDICAL SOCIETY, held on the 6th of
February, 1802.”*

*“ RESOLVED, That the Thanks of
this Society be presented to DR. CALDWELL,
for his eloquent and ingenious Oration delivered
yesterday, and that a Copy of it be requested
for immediate publication.”*

Extract from the Minutes.

W^m. HORSEY, Secretary.

AN ORATION

ON THE

CAUSES OF THE DIFFERENCE, IN POINT OF FREQUENCY
AND FORCE, BETWEEN THE

ENDEMIC DISEASES

OF THE

United States of America,

AND THOSE OF THE

COUNTRIES OF EUROPE,

DELIVERED, BY APPOINTMENT,

TO THE

“*PHILADELPHIA MEDICAL SOCIETY,*”

ON THE

FIFTH DAY OF FEBRUARY, 1802.

BY CHARLES CALDWELL, M. D.

Et c. Et c.

PHILADELPHIA :

PRINTED BY T. AND WILLIAM BRADFORD, BOOKSELLERS
AND STATIONERS, NO. 8, SOUTH FRONT STREET.

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1802.

AN ORATION,

Éc. Éc. Éc.



Gentlemen of the Medical Society,

WE are inhabitants of a hemisphere where Nature is peculiarly bold and gigantic in her operations. Nor has she confined these characters to solitary objects, as if they had been only the children of casualty. Actuated by her invariable principles of fitness and consistency, she has manifested them in the whole assemblage of things that lie west of the Atlantic. In erecting, in the bosom of the deep, the vast fabric of the American Continent, she would seem to have meditated an improvement on her former works. With this view she lengthened out its foundations towards the south, far beyond those of the continents of the east, and even beyond the most southerly island yet discovered by maritime adventurers. By extending it from the Artic Pole to the heights of Cape Horn, she has made it feel the influence of four zones, and has gone within but little more than thirty degrees of making it a high-way for the nations

between the extremes of the earth. In thus bestowing on her new and favourite dominion such a diversity of latitudes and climates, she laid a foundation for a state of things unknown in other quarters of the Globe.

But the encroachment of the new world on the waters of the south, is not its only mark of pre-eminence. The grandeur and magnificence of its internal scenery are no way unworthy of the immensity of its outline. Compared to our own, how diminutive and humble are the mountains, rivers, lakes, and cataracts of the old world! The summits of the Alps, the most exalted monument of transatlantic magnificence, are but little more than on a level with the base of the Andes; in giving rise to the Maragnon, La Plata, Mississippi, or St. Laurence, Europe would be drained of half her waters; and, even many of the inland seas of the eastern continents, are inferior in extent to the lakes of America.— But in what terms shall we speak of the falls of Niagara? and whither direct our course in search of its parallel? Language is inadequate to the description of an object so stupendous, and the cataracts of the old world are lost in its magnitude. Such a manifestation of omnipotence should never be approached but with deep veneration. Exhibiting an unexampled epitome of the attributes of physical grandeur, it affords a more impressive display of the

majesty and power of Deity, than any other portion of terrestrial scenery!

Nor is this superiority in the productions of the western hemisphere, limited to masses of lifeless matter. Notwithstanding the dreams of philosophers to the contrary, it extends to both the vegetable and animal kingdoms. Are not the forests of Europe and her neighbouring continents swallowed up in the grandeur of those of America? and, where is the greatness of the Elephant and Hippopotamos, compared to the long lost Mammoth of the west?

How delightful, then, to reside in the bosom of such sublimity! and who does not glory in being born an American! However rude and shapeless this physical grandeur may be, the wisdom of Deity has not created it in vain. Subservient to the promotion of something alike exalted, but more orderly and refined, its effects will ultimately break forth in a corresponding state of American intellect. Cease, then, ye philosophers of Europe, (it is the voice of nature resounding from our shores) cease to undervalue the man of the west! As soon as time shall have completely assimilated him to his new situation, and assigned him his proper place on the scale of American productions, you will be compelled to do homage to his mental pre-eminence!

But, whatever her future prospects, and present ascendancy in many respects may be, America has no ground to boast of perfection. She presents to view the same checquered state of things, which nature has wisely imposed on other countries. Greatness in the new world is not exclusively confined to those objects, which are pleasing or useful in their effects. It is equally an attribute of our physical evils. Do we boast of the unrivalled extent and elevation of our mountains?—Our continent and its dependencies exceed other quarters of the Globe in the number of its volcanos, and in the frequency and force of its earthquakes. Do we pride ourselves on the majesty and vastness of our rivers and lakes?—several of the former are annually swollen into wasteful inundations, and the latter are oftentimes swept by the most furious tempests. Still further rejecting mediocrity from her operations in the west, nature has subjected us to much greater extremes and more sudden vicissitudes of heat and cold, than are experienced in the corresponding latitudes of Europe. I wish this latter remark to be particularly remembered, as I shall have occasion to make frequent and important application of it in subsequent parts of my address.

But I have not yet completed the catalogue of our evils. By far the most destructive remain to be mentioned. Our *diseases* are not

only frequent, but aspire to the same scale of greatness with our other phenomena. These forms of evil, therefore, as being objects which more immediately interest us, shall principally engage our attention on the present occasion.

But it is not my design to treat of the diseases of America at large. To accompany me through a range so extensive, would weary your patience, and be a waste of your time. My remarks shall relate only to the diseases of the United States. Nor do I mean to compare these, either as to their frequency or force, with those which occur in all the three continents of the old world. Such an attempt would embrace too much matter, to be condensed within the limits to which I am necessarily confined. My specific objects are, to endeavour to explain,

I. Why disease is more frequent; and,
 II. Why it is more powerful*, in the United States, than on the continent of Europe?

* That the diseases of the United States are more powerful and violent than the diseases of Europe, is a fact which we conceive to be satisfactorily established by the following considerations: 1st, In the treatment of our diseases we are obliged both to carry *blood-letting*, and to exhibit other powerful remedies to a much greater extent, than is, in general, either necessary or safe in the countries of Europe. 2dly, When European physicians emigrate to this country, their practice is

In attempting to explore this new and intricate region of science, I feel how incompetent I am to the accomplishment of such an enterprize. Nor could any thing but a conviction of the invaluable treasures it contains, and an ardent wish to see them drawn forth, and appropriated to the purposes of health and happiness, have induced me to volunteer my services as a pioneer for their discovery.

To enumerate, contrast, and estimate the comparative effects of, all the physical circumstances in two extensive countries, which have a tendency to influence the health of their inhabitants, must be acknowledged to be a task both complex and weighty. But the complicated nature of the enquiry is not the only difficulty presented to my view. The scarcity of matter calculated to shed light on it, constitutes a much more serious obstacle. Few authors have treated expressly of the climates, topography, and concomitant diseases of Europe, and my correspondence in that quarter of the Globe, has been hitherto too circumscribed, to furnish me with the necessary stock

always, in the first instances, too feeble to meet the violence and rapidity of the distempers they have to encounter. But it is presumable that, till better informed, such characters pursue in the United States that mode of practice which they had found best accommodated to the diseases of their native climates.

of information. Possessed, therefore, of but a very limited collection of facts and principles, you are not to expect that I can be comprehensive in my reasonings, or ample in my inductions. Should my humble essay induce others better qualified, to prosecute the subject to a satisfactory issue, I shall prove (though indirectly) a benefactor to science, and attain the principal object of my wishes.

I. *Why is disease more frequent in the United States than on the continent of Europe?* Has nature, in matters of health, been less beneficent to the new than to the old world? Or did she create both hemispheres alike, in this respect, leaving to the wisdom and industry of man to produce a difference? Has there been a period, in the succession of ages, when the inhabitants of Europe suffered the same quantity and the same kinds of disorders, which we experience now in our own country?

To reply to these questions with distinctness and accuracy, it will be necessary to divide disease into summer and winter classes. You perceive by this, that I mean to exclude from the present enquiry all truly contagious distempers, which prevail alike at every season, and to dwell only on the endemics which are common to Europe and America. The typhus of the old world, and which, happily for us is but little known in the new, will not be

included in my plan of research. After much enquiry and reflection, I must acknowledge myself too partially informed respecting this disease, to speak with decision either of its nature or of the causes which produce it*. I think too cheaply of the visionary speculations of others, to trespass on your time by an indulgence of my own.

By *summer diseases* I mean all those denominated *bilious*. By the *diseases of winter*, I mean, catarrh, rheumatism, peripneumony, and such others as are commonly esteemed more purely inflammatory. But let it not be inferred from this, that I consider the diseases of summer less inflammatory than those of winter. On the other hand, they are, in general, much more so†. The principal difference between them in this respect is, that, in the former, inflammation is thrown on the

* Though I have hazarded an opinion respecting this disease, in a former publication, yet, further deliberation on the subject, has induced me to admit at least a *peradventure*, that that opinion may be wrong. So difficult is it to acquire an accurate knowledge of a disease without the aid of observation and experience.

† Summer diseases frequently surpass in their violence the true inflammatory state of action. Instead of exciting the viscera which they attack to act with preternatural force, they paralyse them so as to prevent them from acting at all. Thus, in the most violent cases of yellow fever, the secretion of bile is generally suspended in consequence of a paralytic state of the liver, brought on by an excess of stimulus; whereas, in

viscera of the abdomen, and sometimes by sympathy on the brain; whereas in the latter, it is determined to the muscles, joints, and contents of the thorax. This appears to constitute the most discriminative characteristic between what are vulgarly called putrid, and inflammatory fevers.

I shall speak first of summer or bilious complaints, such as intermittents, common remittents, malignant fevers, cholera, and dysentery. These forms of disease are more frequent and general in the United States than in Europe, for the following reasons :

1st. Their remote or predisposing causes are more abundant in the former, than in the latter division of the Globe. I need scarcely remark, that these causes are, *heat* combined with *marsh miasma*, or the gas resulting from animal and vegetable putrefaction.

It has been already observed, that summer-heat, as well as winter-cold, is more intense in America, than in corresponding latitudes on the European continent. To be convinced of the truth of this, we need only

slighter attacks of that disease, this fluid is secreted in vast profusion. Hence it appears, that true inflammation is only a subordinate grade of morbid action.

refer to thermometrical journals kept on the opposite sides of the Atlantic. To develop the cause of such a phenomenon, does not belong to this enquiry. The establishment of the fact is all that is necessary for our present purpose.

Though excessive heat be not alone sufficient for the production of disease, yet, by debilitating the healthy functions of the body, it renders them more easily deranged by other agents. Hence, other circumstances being alike, our hottest summers are generally succeeded by our sickliest autumns. For, in proportion to the preternatural languor of healthy action, is the facility with which disease may invade the system.

But the super-abundance of *marsh miasma* in the United States, compared with most parts of Europe, surpasses the super-abundance of our summer heats, and would seem to be more immediately and powerfully influential in the production of our diseases. It is a truth which we cannot but deplore, that many parts of our country resemble, in their present state, vast factories of this febrile poison, rather than situations selected as the residence of beings governed by reason and devoted to health. This is the case, in particular, with an immense tract of territory bordering on the Atlantic, and extending from

the Delaware to the river St. Mary. It is also the case with lands immediately adjacent to many of our large rivers, even at the distance of several hundred miles from their mouths. The sickly condition, pale languid countenances, and emaciated frames of the inhabitants of these places, in the autumnal season, afford the most impressive evidence of the calamities entailed on them by a contaminated atmosphere.

It may be neither uninteresting nor useless to pause a moment, for the purpose of enquiring, what are the peculiar causes which render the miasma of marshes, or, in other words, the deleterious gas resulting from putrefaction*, so much more abundant in the United States, than it is in most European countries? Here a variety of circumstances present themselves to our consideration. Many, perhaps most of them, arise out of the present medial or half-way state of our agricultural improvements. For, as will hereafter appear, half cultivated countries are in a condition peculiarly fitted for

* Wherever the expression "febrile miasma" is used in this work, it is intended to denote the miasma or poisonous gas derived from putrefaction. I have, on the present occasion, intentionally waved a decision respecting the peculiar nature of this poison, and have therefore thought it best to bestow on it the common name by which it has been long designated.

the production of this poison. Places not yet rescued from the wilds of nature, and those where agriculture is carried to high perfection, are much less favourable for its generation, and, consequently, less subject to the evils which it produces. In the former the surface of the earth is too little, and in the latter too much, exposed to the solar action, to contribute to the process by which this gas is engendered.

The *first* circumstance I shall mention, in enumerating the causes which give rise to a super-abundance of miasma in the United States, is *the excess of our summer heats*. This excess, compared to the heat of European countries, has been already spoken of; but it will be recollected that it was in reference to a different effect, namely, the debility which it produces in the human functions.

The febrile miasma, under consideration, is a gaseous substance, resulting from the putrefaction of organised bodies. But this process cannot go forward unless it be aided by the action of heat. The more intense the heat, provided it do not exceed the 120° of Fahrenheit, and provided also that other circumstances be favourable, the more powerful is putrefaction, the more rapid its progress, and the more copious the volume of gas which it sends abroad through the atmosphere. Caloric, or the matter of heat, by entering abundantly

into dead animal and vegetable substances, expands their native juices, and whatever other liquids they may contain, loosens their texture, and, by weakening the cohesion of their constituent particles, facilitates the action of the chemical affinities in giving rise to new combinations. I need not add, that one of the products of such combinations is, the poisonous miasma of which we are treating.

In relation, then, to the generation of summer diseases, heat is capable of a twofold operation. It not only prepares the human system for the action of febrile effluvia, but contributes to call these effluvia into existence. In proportion, therefore, to our excess of heat in continuance and intensity over that of other places, must be our super-abundance of these diseases.

The *second* circumstance I shall notice, as contributing to the super-abundance of marsh miasma in the United States, is *our excess of humidity*. I mean, particularly, our *diffused and stagnating humidity*, that being the only portion of it, which lies in a state favourable for promoting putrefaction. Water collected into large bodies, especially if it move in a constant current, or be otherwise much agitated, contributes but little to this noxious process. But, in a state of diffusion and

stagnancy, it is no less necessary to its existence than the presence and action of heat. If animal and vegetable substances were perfectly exhausted of their moisture, they would be as unsusceptible of putrefaction as earths or metals. This appears to be the case with the carcasses of animals that die in the deserts of Arabia. The heat of the climate, connected with the aridity of the atmosphere, robs them so rapidly and completely of their juices, that they are said to resist putrefaction for ages. The causes of the excess of humidity in our country are worthy of particular consideration.

The annual amount of rain which falls in the United States is greater than that which waters an equal extent of the countries of Europe. This fact not only rests on the authority of pluviometrical registers kept on different sides of the Atlantic; but is further supported by the evident superiority which exists in the number and size of our creeks and rivers. It appears to be owing, at least, in part, to the extent and loftiness of the forests of America. For it is well known, that the cutting down of timber renders summer showers in particular both less frequent and less copious. Several large rivers of Europe have suffered a considerable diminution of their waters, in consequence of the entire removal of woods from the countries

where they rise. It would seem, however, that the destruction of forest timber must affect the size of rivers, no less by giving the sunbeams free access to the surface of the earth and waters, and thus facilitating the process of evaporation, than by actually diminishing the quantity of rain.

But the copiousness of our rains is not the only cause of our excess of diffused and stagnant humidity. It is farther increased by the lowness, flatness, and undrained condition of many and extensive tracts of country in the United States. This is the case not only along the shores of the Atlantic, but in numerous interior situations, even as far to the west as the river Mississippi.

In such tracts of country as these, the summer rains finding no declivity of surface to carry them speedily off, must necessarily stagnate and remain where they fall, till they be either slowly absorbed by the earth, or dissipated in air by means of evaporation. But, under circumstances of such stagnancy and diffusion, they contribute to putrefaction and its noxious gases on an extensive scale. Hence it is that low flat tracts of territory are most frequently and severely ravaged by summer diseases.

Let us attempt a brief illustration of this matter by comparing small things with great. A piece of uncultivated and undrained meadow land constitutes a true miniature representation of the tracts of country just described. But the most unlettered husbandman is sensible of the pernicious effects of living on the borders of such a meadow. He further knows, that its hurtful properties depend on its superabundance of stagnating humidity, and that the only method of rendering it innoxious to health, and useful in agriculture, is to circumscribe and intersect it with a number of ditches sufficient to carry off its redundant waters. But the same thing is true with regard to all low, humid countries, whatever may be their extent. To render them healthy, and productive in an agricultural point of view, their deficiency of natural drains and outlets for their moisture must be supplied by human industry and enterprize.

In hilly countries such precautions are by no means so necessary. There, every declivity is a conductor formed by nature to collect, and every rill and rivulet beneath, a drain to carry off the superfluous waters, which, by being suffered to stagnate, would contribute to the production of febrile miasma. Hence, in such situations, however frequent and profuse their rains, health is preserved on much easier terms, than it is in places of a

contrary description. But in all situations, whether hilly or not, swampy land should, as far as practicable, be drained of its diffused waters, and cultivated in grass or some other vegetable. A neglect of this rational, salutary, and lucrative practice, subjects thousands in the United States to the malignant action of marsh miasma, who would otherwise escape this deleterious poison. We offer premiums for the extermination of such birds and beasts of prey as make war on our domestic animals; we are vigilant and industrious in the destruction of insects which commit depredations on our fruit trees, gardens, and grain; but we are strangely supine and inattentive, in the adoption of measures to secure ourselves against the ravages of disease.

But, it may be asked, are there not in Europe, as well as in the United States, low humid tracts of country, and swampy situations bordering on more elevated lands, to operate as sources of marsh miasma? I answer, such evils have infested Europe, and been productive of very extensive disasters. But, happily for that portion of the Globe, their influence appears to be nearly at an end. Europe has been subject to bilious diseases. But, as her population increased, and lands became proportionably valuable, the wisdom of her inhabitants directed, and their necessities compelled them to apply to these imperfections

the proper remedies. I call marshy and undrained situations physical imperfections, and, till altered by man, they certainly are so, because they do not act in perfect subservience to what appear to be the leading principles and views of nature with regard to our earth.

Till rescued from the dominion of their diffused and stagnant waters by dikes and ditches, Holland and the low countries of Europe in general, were repeatedly ravaged by bilious diseases. But the health which the inhabitants of these places have enjoyed for nearly a century, affords the most decisive evidence of the influence of draining and cultivation, when skilfully conducted, in destroying the sources of febrile miasma. Nor must it be concealed, that of late years, in proportion as their drains and canals have been neglected, and as casual inundations have taken place, the inhabitants of the Batavian provinces have experienced a return of the effects of this exhalation. This truth was impressively manifested in the course of their late revolutionary convulsions. During that period of confusion and calamity, their system of municipal regulations, however wise in itself, and however venerable by its descent from their ancestors, was for a while abandoned. The public mind, neglectful of the means of preserving, was intent only on those of destroying, human life. In consequence of this, the

demon of putrefaction was suffered to resuscitate from their canals, where he had long lain entombed, and to venture once more abroad, marking his course with pestilence and death.

The disease which over-ran Hungary about the close of the seventeenth and beginning of the eighteenth century, and which is described under the denomination of "*Morbus Hungaricus*," appears to have been nothing but a bilious fever. It arose from the rude and imperfect agricultural state of the country at those periods. Like many parts of the United States at present, Hungary abounded then in uncultivated and undrained morasses. But since, by human industry, these offensive and noxious situations have been freed from their diffused waters, and clothed in vegetables, the "*Morbus Hungaricus*" has dwindled to a name. For the last fifty or sixty years, that kingdom has been nearly as free from disease as the nations which surround it.

From the beginning of the eighteenth century to the present time, Europe in general has been gradually acquiring an exemption from malignant fevers, which she had not known before since the remotest æra to which her history conducts us. Within this period she has but seldom suffered from genuine pestilence. By some, this amelioration of health

has been attributed to the general introduction of tea, as an article of diet, by others, to the substitution of vegetable for animal food, and (however strange and visionary the hypothesis may appear) by a third set, to the establishment of Infirmaries, Quarantines and Lazarettos! With much more reason might it be ascribed to improvements in agriculture, and general cleanliness in domestic economy. At the beginning of the last century Europe was interspersed with bogs and morasses, which served as the birth-places of febrile miasma. At present, most of those situations have exchanged their stagnant and offensive waters for crops of vegetables, and, instead of endangering the life of the husbandman, reward his labours with the means of subsistence.

It may not be improper to remark in this place, that in the United States, the progress of *clearing* has far exceeded that of the *actual cultivation* of land. For, it must be remembered, that these two terms are by no means synonymous. By the former we mean only, cutting down forest timber and eradicating underwood; while the latter includes, draining when necessary, ploughing, manuring and every other process calculated to render soil productive in the highest degree. If we extend our calculation throughout the whole populated portion of the United States, I do not believe it hyperbolic to assert, that we have ten acres

of land cleared for each one that is properly cultivated.

But the clearing of a country, when not accompanied by the necessary degree of cultivation, contributes to the propagation of bilious affections in a twofold manner. By freely exposing the surface of the earth to the action of the sun, it raises its temperature, and consequently hastens and renders more extensive the putrefaction of such dead animal and vegetable substances as cover it. And the cutting down of forest timber facilitates the diffusion through the atmosphere of the miasma issuing from humid and marshy situations. Thick woods present perhaps the best barrier against the spreading of this poison; for it is well known that the interposition of a range of trees oftentimes protects families from the exhalation of neighbouring morasses.

At the present period mill-ponds are much more productive of marsh miasma, and consequently more injurious to health, in many parts of the United States than in Europe. These bodies of water continue active sources of disease only for a limited time after their formation. As soon as the timber, shrubbery, and other vegetable substances which they drown, are entirely destroyed by putrefaction, they cease to be the

laboratories of febrile poison. But, owing to the ancient establishment of the mill-ponds of Europe, this destruction of their vegetables has been long since completed. Long since, therefore, must they have been nearly exhausted of their power of producing disease and death. In the United States the case is different. In consequence of the recent establishment of many of our mills, their ponds still contain immense quantities of organized bodies in a putrid and putrefying state. But the effects of such extensive factories of poison on surrounding neighbourhoods are too well known to require a recital. Mill-ponds thus circumstanced are among our most certain and prolific sources of autumnal disease.

I shall dismiss this head of my subject by remarking, that certain parts of the United States appear to have passed through the middle and sickly stage of improvement, and to have attained that healthiness which arises from a higher degree of cultivation. This is more particularly the case with Massachusetts and Connecticut. Perfectly healthy when our virtuous and enterprising ancestors first sought their shades as an asylum from persecution, these places became in the progress of cultivation, more subject to disease. But having passed this middle stage of improvement, they enjoy now a greater exemption

from summer and autumnal diseases, than any other old settled part of our country. According to the present appearance of things, this salutary stage of agriculture will be next attained by some of the interior counties of Pennsylvania.

A *third* general cause of the excess of marsh miasma in the United States, is, *the super-abundance of vegetable substances which are suffered to perish and putrefy on the earth around us.* Such substances abound in particular on our neglected swamps and marshes already mentioned. It would seem that, at present, these places are productive of plants to no other end, but to fertilize their own soil, and contaminate the atmosphere by means of putrefaction. Were they drained and cultivated in grass or other vegetables, the case would be different. In this state of things, their crops, instead of being left to perish and become sources of disease, would be carefully gathered in, and preserved for the sustenance of ourselves and our domestic animals.

But undrained swamps and marshes are not our only situations which super-abound with vegetables in a state of putrefaction. The same thing is true of our waste lands in general. It is in consequence of their natural growth of weeds and other vegetable productions being allowed to rot on their surfaces, that such lands increase

in fertility by lying for a time exempt from cultivation. I need scarcely repeat, that while the land is thus acquiring fresh vigour, the super-incumbent atmosphere must necessarily become impregnated with noxious effluvia. For, the more fixed portion of putrid vegetables does not more necessarily go to enrich the soil on which they lie, than their volatile principles rise to contaminate the surrounding air. In Europe the quantity of waste land is known to be much less than in the United States. But the same must also be true with regard to their quantity of neglected vegetables. The high value of land and of its productions in that part of the Globe, induces the inhabitants to be strictly economical in their management of both. It naturally follows, therefore, that the generation of febrile effluvia from these sources, must be, in a like proportion, less copious with them than with us.

But, our super-abundance of *heat* and of *marsh miasma* are not the only causes, which predispose the inhabitants of our country to summer diseases. Our mode of living contributes not a little to the same effect. We greatly exceed the inhabitants of Europe, particularly the warmer parts of it, in our consumption of animal food and of ardent spirits. This is owing to the ease with which our farmers and day-labourers can procure these articles for themselves and their families. But I hold it

superfluous to remark, that the habitual and free use of such stimulating substances, in a warm climate and season, is peculiarly calculated to lay a foundation for bilious diseases. Their modus operandi in the production of this effect, I have endeavoured to explain in a work which is already before the public*. It is peculiarly worthy of notice, that the French, who are devoted to vegetable food, and make but little use of ardent spirits, suffer, in general, much less from our summer diseases, than any other description of our inhabitants.

Under this head may be mentioned another custom of our country, which is also influential in the propagation of bilious affections. In many parts of the United States, the farmers are in the habit of procuring water for domestic purposes from *springs* instead of *wells*. These natural fountains are generally found in vallies, and other depressed places, and give rise to rivulets, which are for the most part skirted with narrow strips of marshy soil. In erecting their dwellings the inhabitants, either regardless of health, or unconscious of the danger to which they are exposing it, choose situations as convenient as practicable to these sources of water. Their houses, therefore, stand low, and are readily accessible

* Vid. Med. & Physic. Memoirs, page 58, et al.

to the febrile effluvia issuing from the margins of the neighbouring rivulets.

With the people of Europe, who inhabit the country, the case is different. Reserving their natural springs chiefly for the use of their domestic animals, they supply themselves with water for household purposes from wells and cisterns. Being less restricted, therefore, in their choice of situations for building, they generally prefer such as are elevated, and somewhat remote from rivulets and other sources of marsh miasma. This fact, though apparently of no great moment if considered alone, yet, when taken in connection with other circumstances, certainly adds something to the general preponderance in favour of the European chances for health. Allow me, on the present occasion to add, that it is safer in the United States, I mean that portion of the United States which lies between the Atlantic and the Granate Ridge, to inhabit the western than the eastern side of a tract of marsh. The reason of this is obvious. Our prevailing summer and autumnal winds are westerly, and therefore convey noxious effluvia to places situated in an easterly direction from the sources which produce them. Hence it is that the westerly side of a stream of water, or of a tract of uncultivated meadow land, is oftentimes healthy, while the opposite side is ravaged by the endemic of autumn.

The present is not an improper place to remark, that the political circumstances of the United States appear to be influential in modifying the constitutions, temperaments, and diseases of her inhabitants. Our free and popular forms of government, by diffusing through the people at large a spirit of general cheerfulness, by fostering sentiments of patriotism, by awakening the political passions, and by giving unlimited scope for the exercise of the intellectual faculties, increase both the quantity and energies of animal life. Hence the system is predisposed to a violent struggle and tumult under the pressure of disease, in the same manner as the mind is prepared for a manly and vigorous resistance to unwarranted encroachments on freedom and right. In other words, under these circumstances the national diathesis is such as to invite and suffer inflammatory diseases of an exalted grade.

During the reign of freedom in the States of Greece and the Republic of Rome, the inhabitants of these countries were subject to diseases of a more violent nature, and inflammatory type, than those which have existed since among their enslaved and degenerate descendants. Though this may be accounted for partly from the changes which have taken place in the modes of life of these people, yet it would seem to be also attributable in part to the hebetude of constitution naturally result-

ing from the loss of their liberties. For freedom is no less remarkable for giving tone and vigour to the body, than it is for increasing the energies of the mind. The difference between the type of the diseases of revolutionized France, and that of those which she suffered during the latter periods of her subjection to monarchy, will constitute, in future, an interesting field for observation and enquiry.

The *exciting* causes of bilious diseases are next to be considered. These, in like manner with the predisposing, are more powerful in the United States than on the continent of Europe. They are,

1st, Long exposure to the rays of the sun. As the superior intensity of summer heat in this country has been already adverted to and established, it would be superfluous to dwell on it here. Its agency as an exciting cause of disease must necessarily be in proportion to its power.

2dly, Excess in eating and drinking. It was remarked, in a former part of this address, that the Americans eat more meat and drink more ardent spirits than the inhabitants of Europe. This is more particularly the case in the summer season. But these are the kinds of alimentary matter most likely to prove the exciting cause of disease.

3dly, Great and sudden changes of weather from heat to cold and from dry to moist. These occurrences certainly exceed all other causes both in the extent and power of their influence in exciting disease. General and epidemic in their nature, their effects are necessarily felt by every one. Hence it is that equable weather is, for the most part, healthy, while such changes as the foregoing are commonly succeeded by sickness, corresponding to the nature of the season and situation. I need scarcely remark (for the truth is already familiar to you all) that the vicissitudes under consideration are much more frequent and striking here than in the countries of Europe.

But it is particularly worthy of notice, that in many parts of the United States, there is, towards the close of summer and during the autumnal season, a greater difference between the temperatures of the day and night, than in most places beyond the Atlantic. This remark is peculiarly applicable to the low-lands of Virginia, the two Carolinas, and Georgia. The phenomenon is attributable to the copiousness of their evening dews, which are proportionate to the abundance of their diurnal evaporation. We are naturally led to expect, that the effect of such changes on human health will correspond in magnitude to the changes themselves.

But, were the weather even alike variable on the eastern and western sides of the Atlantic; the inhabitants of Europe would suffer less from its changes, than those of the United States. This circumstance arises from the difference of the articles made use of as clothing in the two countries. In Europe, (I mean on the continent) flannel and cotton are much worn as under-clothes, both by the peasantry and those in higher life; while, in the United States, linen is too generally substituted for these purposes: But it is a truth familiar to every one, that the former articles are better calculated than the latter, to keep up cutaneous action, and preserve perspiration in an equable state. Those acquainted, therefore, with the necessary connection between these processes and health, will find no difficulty in determining which kind of covering is most suitable for the inhabitants of a variable climate. Perhaps there is nothing which would contribute more materially to the prevention of the diseases of our country, than the general adoption of flannel under-clothes. This substance is calculated to defend the body alike from the humidity and from the coldness of the atmosphere.

From this humble attempt to account for the greater *frequency*, I proceed to a few remarks on the superior *force*, of summer diseases in the United States, when considered

in relation to the same diseases, as they appear in the countries of Europe.

Allow me here to solicit your attention to two propositions, to which, as medical philosophers, you will not, I am confident, deny your assent.

1st, Disease, of whatever description it may be, must necessarily prove most powerful in the systems of those who are most strongly predisposed to it.

This appears to be a principal reason why the earliest cases of plague, yellow fever, and other malignant epidemics, are more frequently fatal, than such as occur at subsequent periods of their course. For it is a rational supposition that these diseases always attack first those persons in whom they find the strongest predisposition; or, in other words, the highest susceptibility of their morbid action.

2dly, The stronger the exciting cause, the more powerful is the disease which results from its action.

This proposition might be illustrated by examples innumerable. Moderate exposure to the action of the summer sun produces slight head-ache, accompanied by a perceptible degree of lassitude, while a long continued exposure to

the same action proves oftentimes the cause of dangerous illness, A moderate draught of cold water, taken by a person greatly heated, gives rise to a temporary spasm of the stomach, while a profuse draught, hastily swallowed under similar circumstances, is oftentimes productive of immediate death. Breathing a small quantity of carbonic acid gas occasions only giddiness, stupor, and sometimes pain in the head; whereas few causes are more suddenly, and none more certainly fatal, than a continued respiration of the same air.

By means of these propositions, connected with what has been advanced in former parts of this address, we are prepared to account for that superior violence which characterizes the summer diseases of our country. It was there asserted, and I flatter myself proven, *first*, that from the co-operation of numerous circumstances, the inhabitants of the United States are more strongly predisposed to bilious diseases than the inhabitants of Europe; and, *secondly*, that they are at the same time exposed to the action of more powerful exciting causes. Agreeably, therefore, to our preceding propositions, they must necessarily suffer these diseases, not only more frequently, but in greater force.

We proceed to a brief consideration of the diseases of winter, such as, catarrh, peripneumony, and rheumatism.

Why are these forms of disease more frequent and violent in the United States, than on the continent of Europe? Certain principles, which were explained at large, when we were treating of the diseases of summer and autumn, will furnish us with a solution of this question.

The diseases of winter are excited into action principally by great and sudden changes in the sensible qualities of the atmosphere. A sudden succession of intensely cold to warm weather, and of great humidity to preceding dryness, are known to be productive of these disorders. But it is not in summer alone that such changes are more frequent in the United States than in European countries. The same is equally true during the course of our winters. It necessarily follows, therefore, that the diseases of the latter season must be more frequent and general with us than beyond the Atlantic. Suffer me to add, that the wearing of flannel under-clothes in Europe, a practice, as formerly remarked, too much neglected by the inhabitants of America, contributes even more to preserve health in cold than in warm weather.

During winter the changes which occur in the sensible qualities of the atmosphere of our country, surpass not only in suddenness and frequency, but also in *degree*, those which take place in most parts of Europe.

Hence a principal reason of the superior violence of our winter disorders. For, as formerly observed, and indeed agreeably to the natural correspondence between cause and effect, a strong exciting cause must necessarily give origin to a powerful disease.

But this is not all. In the United States, the diathesis produced in the human body by the heat and exhalations of summer and autumn frequently mingles itself with the diseases of winter, and gives them a malignity unknown in Europe. This has been often and clearly exemplified in the diseases of Philadelphia, during the winters immediately succeeding our late epidemics. Throughout those seasons one of our most frequent disorders was, what is commonly denominated *bilious pleurisy*; a term used to denote a form of disease, where the viscera of both the thorax and abdomen are affected by inflammation. Nor is this complaint, which is among the most violent and dangerous we have to encounter, confined to Philadelphia and such other places as have been visited by pestilence. It is a common winter disease, in all low and marshy tracts of country, where bilious affections are endemic in autumn.

In Europe, as far as I have been able to carry my researches on the subject, the summer or malignant diathesis of the human system

appears to be much more rarely protracted, so as to affect the diseases of winter. Hence another weighty reason why those diseases are less violent and formidable, than such as occur, during the same season, in the United States.

Perhaps the severe labour which many of our countrymen have to encounter, during the winter, in clearing land, but from which the inhabitants of modern Europe are, in a great measure, exempt, may be worthy of notice in an enquiry into the causes of the superior violence of American diseases.

But I am sensible that all I have said falls far, very far short of a satisfactory explanation of this interesting subject. Is there a peculiar and nameless something necessarily attached to certain states of society, and to such states only, which modifies the human constitution, and influences the features and force of its diseases? And is this undiscovered yet powerful agent the same in the United States, at present, with that which was cotemporary with Botallus in France, and which prevailed in Great Britain during the days of Sydenham? The correspondence between the nature and magnitude of our disorders and of those described by these illustrious authors, would seem to authorise a conjecture that this is the case.

But I have not yet completed my comparative estimate between the diseases of the new and of the old world. It remains that I should invite your attention, for a few moments, to one which bears no common rank among the evils of our country. I allude to what is usually denominated "Cholera Infantum," but which might not improperly be called *Americana Pestilentia Infantum*, for it is sometimes characterized by the extent and malignity of pestilence. The frequent and melancholy ravages of this disease, have rendered a knowledge of it by far too general and familiar among us. I need not, therefore, inform you, that it makes its appearance only in the summer season, that it is a modification of bilious fever, that it prevails chiefly in our cities and low marshy tracts of country, and is confined to children under three years old.

As far as I have had an opportunity to inform myself, this disease is peculiar to the continent of America. In no transatlantic author, either ancient or modern, have I been able to find the smallest account of it. Even when the inhabitants of Europe were much more afflicted by bilious diseases than they are at present, the pestilence of children was either unknown to them, or the medical writers of that period have been strangely inattentive in with-holding its name from the records of their profession. Neither in the history of the

Hungary fever by Evagrius, in that of the endemics of Italy by Lancisi, nor in those of the bilious diseases of Spain, Portugal, and the United Provinces given by different authors, have we the slightest account of the summer complaint of children.

Whence, then, is this exemption to the countries of Europe, and why does the disease under consideration rage with such violence in the United States? Are the children of our country possessed of a peculiar and connate irritability of bowels surpassing that of the children of Europe? Or does the bowel complaint, to which the former are so subject, arise from some external agency, which has never shed its influence beyond the Atlantic? Perhaps the following considerations may throw some light on this curious and uninvestigated subject.

Cholera Infantum, or the pestilence of children, appears to originate, in subjects predisposed to it, from the action of two exciting causes.

1st, A suspension of cutaneous action, accompanied necessarily by a suppression of perspiration. And,

2dly, Excessive and morbid irritation excited in some part of the alimentary canal.

The first of these causes excites disorder in the stomach and bowels *indirectly*, or by means of sympathy, in the same manner as a coldness or want of due circulation and action in the feet, is oftentimes productive of dyspepsia and head-ache. But the latter operates *directly*, in the same way as a caustic or other active stimulant gives rise to excessive action and inflammation, when brought into immediate contact with the skin.

By far the most extensive and powerful agents in suppressing perspiration are, sudden changes in the atmosphere from heat to cold, and from dryness to moisture. Hence it is well known that the disease under consideration is not only originally excited, but rendered much more obstinate and fatal, by means of such changes. In the summer season it is not uncommon for hundreds of children, in the city of Philadelphia, to be attacked by this disorder, in a very short time after the sudden succession of cold and damp to a previous continuance of hot and dry weather. Such an occurrence has also in general a striking effect in heightening the malignity and danger of cases of the disease already in existence. But, in the course of this address, we have had occasion repeatedly to remark, that these atmospheric changes are much more frequent as well as much greater in the United States, than on the European continent. Their effects, therefore,

on the systems of children, already predisposed to bilious fever by the influence of miasma, must necessarily be more extensive and pernicious. I am also informed, and believe my information to be correct, that in Europe young children are more generally defended against the injuries of the weather by flannel underclothes than in the United States. This neglect to accommodate the dress of infants to the nature of our climate, does mischief beyond calculation, in encreasing the frequency and violence of cholera.

There is reason to believe, that, in the United States, children are more indulged in the use of improper food than in transatlantic countries. I allude particularly to the use of unripe and acid fruit, and other crude vegetable substances. What is more common among us, in the summer season, than to find children of ten or twelve months old devouring cherries, currants, green apples, pears, peaches, cucumbers, and radishes? Yet what can be more pernicious in their action on tender and highly irritable stomachs, which require aliment of the most bland and digestible nature? But, I have been oftentimes assured, by intelligent and observing travellers, that in the countries of Europe the case is different. There, children are denied the use of sour and unripe fruit, and confined to aliment more suited to their condition.

A humid atmosphere, variable weather, and the use of improper food, operating on systems predisposed to bilious fever by the heat and exhalations of summer, appear then, to be the principal sources of Cholera Infantum. And to the greater extent and power of these causes in the United States, than in the countries of Europe, am I inclined to attribute our exclusive subjection to this formidable disease.

From the foregoing body of facts and reasonings it appears, that the causes of the frequency and force of the endemic diseases of our country may be divided into general and local, or natural and accidental. The general or natural are, the excess of our summer heats, the frequent, great, and sudden changes in the temperature of our atmosphere, and the flatness and depression of many parts of our country connected with our copious precipitations of rain. Over these the power of man is capable of exercising but a very limited controul. We can neither impoverish the fountain of the intense heats of summer, elevate to a greater pitch above the level of the ocean the low lands of our middle and southern states, nor lock up the chambers of our northerly winds. In attempting to gain such an ascendancy over nature the philosophy of art would degenerate into folly. Nor are we able to stay the sluices of the heavens, when they are about to pour forth on our country a superabundance of waters.

But, with regard to our local or accidental sources of disease, the case is different. These we are competent to modify and destroy. We can remove from around our habitations the putrefying recrements of organized bodies ; we can clear and cultivate our natural meadowlands ; and enrich our fields by means of manure, instead of more slowly attaining the same end, by suffering them to lie for years in a waste and weedy state. Further, we can erect our dwellings on elevated situations, defend them from the exhalations of mill-ponds and neighbouring marshes by interposing ranges of trees, and, by means of flannel clothing, protect our persons from the changes of the weather. Nor is this all. We can substitute vegetables for part of the animal food which we now consume, malt liquor and cider for our high wines and ardent spirits, and, in all other respects, live in conformity to the genius of our climate. These objects fall within the sphere of our power, and it is no less our duty than our interest to attain them. Such an issue would contribute equally to individual health and happiness, and to the prosperity, strength, and aggrandisement of our country. Let us then, like Cadmus of Tyre, wage a war of extermination with these Hydras of disease, that our posterity may live in security from their ravages. The voice of patriotism combines with that of nature and of reason, to urge and animate us in the important enterprize.

With this, gentlemen, I take leave, for the present, of the subject of my address. Allow me to hope, that however faintly I have elucidated it myself, I may have been so fortunate as to have touched on a spring, which will move some of you to engage in the enquiry under happier auspices, and conduct it to a more perfect and satisfactory issue.

It remains only that I should tender you the homage of my thanks, for the repeated honours you have conferred on me; and entreat you to forget the insufficiency of this day's attempt, in the ardour of my zeal to serve our institution, and promote the interest of medical science.

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