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A Thesis
on Epidemics
for
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by
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On Epidemics

The subject which I have chosen for my Thesis; the subject of morbid poisons, has been more widely discussed, than any other question, connected with Medicine, and it is not to be denied, that a "very great & apparently irreconcilable difference has long existed among Medical Men, regarding the exact amount of influence exerted by contagion in the propagation of disease". But the important discoveries which have recently been made in organic chemistry, and the amount of positive knowledge which has been acquired in relation to the chemical compounds of the living organisms, and the nature of the morbid chemical actions (if I may so call them,) which influence the decomposition of organic bodies; by presenting to the Profession, a large mass of scientific facts, have greatly assisted to unite

opinions, and has called forth more correct reasoning on this subject than at any former period.

As the opinions we entertain respecting the origin, cause, and mode of propagation of disease, is derived rather from a reference to the great mass of medical facts already collected, than from individual & personal experience, (which students are not expected to possess); I have therefore considered, this a most suitable subject for my Thesis and I will beg to present the following propositions.

1st That all contagious diseases have their origin in a specific poison, which poison is formed in the living fluids of the body

2nd That endemic diseases arise principally from local causes; — Causes over which man ordinarily has control; that they are not necessarily

contagious, but that under certain circumstances some are capable of becoming intensely contagious.

3rd That Epidemics arise from general atmospheric, or telluric causes, or from causes emanating from both these sources, and that they are governed by some unknown laws, and are never contagious, and lastly by establishing these propositions, I shall seek to prove, that the employment and maintenance of all sanitary cordons & quarantine regulations, (except so far as regards the isolation of the sick affected by known contagious diseases) are injurious & oppressive, and are incapable of preventing the introduction & diffusion of disease.

In order the more completely to understand this subject, it is necessary to bear in mind that the human body consists of a mass of organic elements, or chemical compounds, produced & controlled, by certain vital affinities.

5

In these various organs, and tissues of the body, the most beautiful specimens of mechanism, the most perfect combination of power, and the finest development of action is displayed.

All the functions, & chemical affinities of these organs are carried on, modified, and altogether sustained by that mysterious agent called life. So long as this vital force is in operation, its action is not only opposed to decomposition and organic change in the living body; but whenever any virus, or cause of disease of any kind, is by any means introduced into the system, a vital action which is termed fever, is set up to oppose & prevent the effects of the morbid agent, and to expel it from the system. When however, this influence of life, which so preserves & controls the vital elements and organic compounds of the body, is withdrawn, then decomposition & structural change commence at once, and

6

all the organs, & tissues of the body, and of our vital organisms, are resolved back into their primary elements,

From this view of a few leading points, which are by every one received as undeniable facts, I think we must be led to consider the living body, to be a perfect laboratory, in which, vital actions, affinities, & combinations are being constantly performed, and further that any variation from the perfect performance of these vital actions, or functions, constitutes disease, and is an interference more or less with the chemistry of life; Bearing in mind these facts, I think it is not difficult to conceive how the introduction of any contagious matter into the system, may become a decomposing agent, & give, which shall prove active on the body, and give rise to the formation of compounds in the blood, that are incompatible, with life and which must either have their action arrested

by removal, or must go on increasing till life is overcome, With regard to contagion then I conceive the principle to be kept in view is this: - The blood is a compound fluid containing special materials in which alone, the several specific poisons have power to act, Most of the contagious diseases consequently are produced & are perpetuated by a specific virus which is formed originally in the blood, This virus, thus formed, on being introduced into the blood of a healthy individual, meets with the same material as that of which it is composed, & will therefore be then reproduced, and in this manner it is evident contagious diseases may be infinitely propagated, This morbid poison, or cause of disease, may be communicated to others by direct contact, or by the effluvia arising from the bodies of the sick, being inhaled through the medium of the atmosphere, & thus find its way through the lungs into the circulation. So this

8
7

mode of communication, the term contagion was formerly restricted, while infection was applied to the latter or that communicated through the medium of the atmosphere.

But as the same result occurs in both cases viz. the introduction of the specific poison into the system, the terms are considered now synonymous, and are used indiscriminately by some, while others employ the term contagion only. In whichever of these ways the poison is introduced, into the blood, it there finds in this fluid, a special material on which it (the virus) is capable of inducing its own peculiar action, & of producing in the system the same form of disease as its own.

A person thus subjected to this morbid action & having once undergone the disease is as a general rule, secured against a second attack, from which fact we must necessarily conclude that for the development of contagious diseases

there must be a specific internal, as well as a specific external condition, and experience has proved, that the special materials on which alone the several specific poisons have the power to act, though unknown as to their exact nature are various, & frequently, finite in the system; that the portions of the system capable of being so acted upon is generally of limited quantity and not essential to existence, and that when once converted into a new & different condition and expelled, it is not for the most part again reproduced

Among the diseases which are indisputably contagious are the exanthemata, or eruptive diseases, such as small pox, scarlatina, measles & the typhoid fever, together with hooping cough, hydrophobia and a few others.

Liebig in his organic chemistry has attempted to define the action of specific poisons in producing disease, in these words, "He says 'If the vector

(to chemical action) "be able to impart its own state of transformation to only one of the component parts of a mixed liquid, its own reproduction may be the consequence of the decomposition of that body. Nothing thinks Professor Liebig can be simpler than this very large question. The morbid poison changes in the blood are fermentations, just such as occur in beer making. The morbid poison acting as a ferment, may be any organic matter in a state of change. The blood represents the sweet wort. The multiplication of the poison is analogous to the increase of yeast in fermenting liquors; and as this latter increase is contingent on the presence of gluten in the saccharine solution, so the former increase is dependant on the presence in the blood of some specific substance admitting of transformation". This doctrine when first advanced, was received as perfectly satisfactory, by the advocates of the chemical theory of the action of specific poisons in the

in the system, But Mr Linnow, I think has plainly shown that it is altogether a too superficial view, that there is no analogy between the multiplication of the poisons in ~~the~~ eruptive contagious diseases, and the increase of yeast in fermenting liquors,

1st That the increase of ferment is quite accidental in true fermentations, occurring only when some living growth is employed as the instigator of chemical change. With regard to the primary origin of contagious diseases, for all specific diseases must have arisen from some cause, at some period of time however remote,

Sir Gilbert Blane says "there is not a secretion or exhalation which may not be so vitiated as to produce diseases communicable to others by contact or respiration, under fortuitous circumstances, of combination, so that there may be more maladies awaiting our species which are still to develop themselves under the endless combinations of the

incidents of human life, through endless ages to come.

In the history of medicine we certainly do see instances of this. It is well understood that some diseases of ancient times have become extinct, whilst others whose existence ~~was~~ before unknown, have made the appearance since the dawn of medical science. According to the best authorities, until the middle of the sixteenth century small-pox was entirely unknown in the western world, although it is well ascertained that it existed in Asia, and especially in China for an incalculable period before it was known in Europe. Here at length History teaches us that it was introduced by the wild tribes, from the plains of Tartary, who added this evil, to the devastation spread by their arms, over the most civilized portion of the earth. "History," says Mr Bell, "almost forces upon us the conclusion that of all the myriads throughout the world

who have suffered from the disease, not one has been so affected, but by the propagation of new germs, from the original virus produced in the body of some ancient inhabitant of China centuries before the disease was even heard of in Europe". However this may be, I think we may now easily understand the nature, the ~~modus~~ operandi, of the wonderful discovery of Jenner although we cannot comprehend fully the magnitude of the blessing, he has bestowed upon man by this discovery. During the period of more than twelve ~~months~~ centuries in which this loathsome and fatal disease, small pox, had been committing its ravages through all Europe, it is believed, that at least one twelfth of the population of the globe, had either been destroyed or deprived of health, or disfigured by this plague.

But in 1794, by adopting a course of careful scientific enquiry, Jenner collected observations, which led to a discovery that has

given immortality to his name, & through
 the agency of which, the health & lives of millions
 are preserved, without sacrifice of pain or priv-
 ation. This discovery is a perfect illustration
 of the agency of a specific virus on its special
 material. Here a poison originating in the
 human system, and modified by passing
 through that of the cow, is capable of acting
 on that morbid material, which exists
 almost universally in the blood of man, and
 upon which the small-pox virus, when
 communicated to the system, exerts its power
 in such a manner as to neutralize it, or expel
 it from the system, and by this means in a
 great measure, to render innocuous the
 contagion of small-pox.

But to return, it will be recollected that I
 have stated my belief that all contagious diseases
 are produced by specific poisons, and that

these have their origin in the living Blood.

The number of diseases however originating in this manner are quite limited. Nearly all other affections except those which I have already named as indisputably contagious, arise from deteiorious or poisoning agents, which are found extraneous to the body, and from elements which do not exist in the blood and are therefore necessarily Non Contagious.

In my second proposition it is stated that those diseases, which are designated Endemic, or such as are confined to localities, and have their origin in local causes which are more or less preventible; that these are not necessarily or ordinarily Contagious, although from mismanagement, and other causes, they may become highly contagious.

The most fruitful cause of Endemic disease are miasmatic exhalations, or the exhalations arising from the decomposition of vegetable matter, or

mixed masses of animal & vegetable matter, emanations from stagnant waters, from cesspools, and from bad or imperfect drainage, the use of putrescent food, imperfect nutrition &c. These causes may operate singly & separately or may act in combination.

Now I conceive that epidemic diseases, on the other hand, differ from the specific, and the endemic diseases, in as much as they in themselves are never contagious, as they arise from causes which do not emanate from the bodies of the sick but from external atmospheric influences. They are extended over the earth's surface, partially or generally & are governed by unknown laws over which apparently man has no control.

Not so however does it appear to be with the local, or endemic causes of disease, which I have just enumerated above, for these such as malarious exhalations, putrescent food, foul water, offensive effluvia, and imperfect

ventilation (all of which are more or less, under the control of man) are the poisons which engender in the system a special liability or predisposition to disease, and which impart to all epidemics their great power.

This relation which these two great causes of disease bear to each other is one of the highest importance. It is a subject, which of late has received a large share of attention from scientific investigators, and one in which not only medical men, but all who regard the health & welfare of their own families, or of the communities in which they dwell, should be deeply interested.

That, what I would convey in my last proposition may be better understood, I will endeavour to explain the "modus operandi" of these predisposing causes upon the living body & their connection with the great exciting cause of disease: Epidemic influence.

You will please bear in mind the proposition

I have already laid down (viz. that the specific poison, from which contagious diseases arise, originates in the living blood, and that on being introduced into the circulation of a healthy individual, it there finds the same morbid material, as that of which it is composed, by a peculiar chemical change in which a reproduction issues.

Now it is admitted I believe by most Pathologists that the poison of epidemic diseases also act upon the blood by determining some chemical change, probably catalytic. But this poison instead of being engendered within the body, is always introduced from without, and besides experience has established this important fact, that the presence in the blood of some special element admitting of transformation, is necessary to enable the poisons of epidemics to be developed in the system. Of this peculiar morbid substance, nothing definite of its intimate nature

is known; we do know however that this material does not exist originally in the blood, like the materies morbi, of contagious diseases, but like the poison of epidemics is always introduced from without, and as it arises from local causes, which exist in our midst, may be made subject to our control. I am persuaded that the presence of such a matter is absolutely necessary in a great majority of cases for the morbidic action of epidemic poisons, which poisons have no direct action upon the healthful blood, and the liability of each individual among a number who may be concurrently exposed to the same epidemic poison, will mainly depend upon the degree in which his blood may be charged with the matter in question.

Whenever the cholera atmosphere for example is conveyed to any place, & what is true of cholera poison is true also of the poison of a large number of other epidemics,

its diffusion & severity among the inhabitants of that place will depend entirely upon the predisposition to the disease existing in their systems from local causes, to which I have already referred. With the origin of those poisons which give to epidemic atmospheres their peculiar morbid qualities, science has yet to discover. It is only known that in the very same localities, & under identical circumstances, so far as can be traced, different forms of epidemic diseases prevail at successive periods; as typhoid, or typhus fever, dysentery, epidemic cholera, yellow fever &c. But could the causes from which these epidemic poisons emanate, be discovered, it is not probable, that the extermination of the diseases, which they produce could be accomplished by medicine.

Like all other phenomena of nature, these probably are beyond the control of man. But although no definite knowledge on this

point has been acquired. Experience & repeated observations made in every part of the world where epidemics, have prevailed, have shown whenever during their prevalence, any portion of the inhabitants are exposed to any one or more of the local causes, already enumerated, Malaria, putrescent food, foul water, or atmospheric impurities of ~~any~~ ~~kind~~ of any kind, that upon those thus pre-disposed, the epidemic poison, whethers it be cholera, typhus, or yellow fever, first seizes, and then manifests its highest degree of intensity.

On the other hand all who have observed the progress of epidemic diseases, will bear testimony, that without any of these deleterious influences the poison of epidemics is completely innocuous -

By viewing the matter therefore in this light, it is easily explained, why some localities do remain exempt from disease, sometimes ~~for~~

for years, when without any appreciable cause, a severe epidemic, will be developed. The existing local cause of disease in such places, may, & often do, prevail for several seasons producing in the mean time only the endemic affections which are peculiar to the localities, or to the nature of the poison.

But no sooner is the epidemic (morbific) influence added to the local poison, than there is developed some variety of Zymotic disease, which form of disease will characterize the nature of the special agent, with which that atmosphere is charged, whether it be the poison of Influenza or Cholera, or of Yellow Fever.

The conclusion therefore to which a consideration of these facts & observations lead, are

1st That ^{for} the invasion & development of Epidemic disease; the existence of two conditions is absolutely required. Namely the presence of the Epidemic poison in the atmosphere (An agent

not subject to man's power; and the introduction into the system of a morbid matter that has been germinated in some external source, and consequently is preventable (by man.)

And 2nd That the invasion of cholera, of yellow fever, & of other epidemics, is as effectually prevented, by preventing the accumulation of certain morbid materials in the system, as by arresting the development of the epidemic poison itself, which acts upon it.

Now ~~to~~ ^{it is} this morbid condition of the blood, is a condition effected entirely by local causes, over which man has efficient, and positive control. And these views do not appear to be based on theory, but upon opinions founded on observation, and corroborated by the experience of many scientific observers, among whom I may mention the Registrar General of England, who in the fulfilment of his official duties, has for many years

enjoyed a wide opportunity for studying the nature, and course of the great epidemics of the earth.

"The cause of Typhus, of Influenza, of Cholera, and of the like (epidemic) diseases" he affirms, "will not long remain in indisputable possession of the earth, & the air. * * * * Hydrophobia disappears when the dogs, which are liable to become mad, or to be bitten, are, every summer removed by police regulations. So will the other Zymotic diseases give way, when the putrid, decaying, noisome atmosphere, exhaled by church yards by slaughter houses, by the tanks of dirty water, by cesspools, sewers, and crowded dwellings; is dissipated & purified. The sewers and cesspools now under our houses, will inflict more pains, and destroy more lives, than ten thousand mad dogs let loose in the streets, and they may as certainly be removed."

If these views be correct, it must

be plainly understood, that it is possible, not only greatly to mitigate the severity of these epidemics & visitations, but also to keep the greater number of them absolutely at bay, by adopting those sanitary measures which are demanded, for the removal of those local causes of disease, which so greatly abound, especially in large cities. And it must be equally evident; that, ^{this} cannot be accomplished by stretching sanitary cordon around our borders, or by establishing quarantine restrictions at our ports of entry.

I cannot advocate the gloomy theories of Wallace, and of Malthus, that Providence, for the purpose of punishing vice, and in order to set bounds to the increase of mankind, hath ordained that pestilence, and famine shall from time to time, recur; that the earth be not overstocked, and men be laid under the cruel necessity of killing one another.

Rather would I maintain the benevolent doctrine of Jalfourd, that there exists no decree of Providence, nor any insuperable obstacle, in the constitution of nature, to the development of her vast, and untried resources, for surely the "immense regions of unbounded fertility long successions of spicy groves, trackless pastures watered by oceans, rivers formed to let in wealth to great continents, and islands which lay calmly on the breast of the crystal seas, were not created for eternal solitude & silence."

Until these are peopled and the earth is indeed "replenished and subdued" the command, and the blessing, "increase and multiply", must continue unrecalled, by its Great Author

Still I believe that as the tornado, the lightning, and the storm have their appointed tasks,

so have epidemics their destined mission
and like these, are the agents of a wise, and
a benevolent Creator, and are intended to
effect ultimately a removal of those social
evils which through man's inhumanity
to man, still makes "countless thousands
mourn".